uMKHANYAKUDE DISTRICT MUNICIPALITY

JOZINI REGIONAL COMMUNITY WATER SUPPLY SCHEME – PHASE 1A-2

CONTRACT Nº: SCMU 003/2023/2024

CIDB CLASSIFICATION: 7CE

CONSTRUCTION OF 5.6 km LONG 700 / 200 mm DIAMETER WELDED STEEL PIPELINES AND TWO 50 kℓ ELEVATED TANKS

THE TENDER - VOLUME 1 OF 2

ISSUED BY:

uMkhanyakude District Municipality
Stand 13433
Kingfisher Road
Mkuze, 3965

Private Bag 449
Mkuze
3965

Telephone N° : (035) 573 8600
Telefax N° : (035) 573 8730

PREPARED BY:

Royal HaskoningDHV (Pty) Ltd
3rd Floor, Boulevard Umhlanga,
19 Park Lane Street,
Umhlanga Rocks, 4320

P O Box 1243
Umhlanga Rocks
4320

Telephone Nº : (087) 350 6660
Email Address : Peterson.Ndlovu@rhdhv.com

JULY 2023

NAME OF TENDERER : .....

CONTACT PERSON : .....

TELEPHONE N° : ..... FAX N° : .....

E-MAIL ADDRESS: .....

CIDB REGISTRATION N°: ..... GRADE : .....

TENDER CLOSES: 12:00 ON WEDNESDAY, 19 JULY 2023

SUMMARY FOR TENDER OPENING PURPOSES

[To facilitate the reading out of tender parameters at the opening of tenders, the tenderer shall complete this form and submit it with his tender. This form does not replace the Form of Offer, C1.1, which must be completed]

Name of Contractor submitting the tender: .....

Tender amount *(as stated in the Form of Offer)*: R .....

Time for Completion offered: ……..

Details of contact person:

Name *(Print):* .....

Telephone No: ..... Fax No *:* .....

Cell Phone*:* .....

Email address *:* .....

Is Form of Offer signed by Tenderer and Witnesses? .....(*Yes / No*)

SIGNATURE *:* .....
(of person authorised to sign the tender)

Note: In the event of conflict between the data provided in this summary and that given in the Form of Offer, C1.1, the Form of Offer shall prevail.

TABLE OF CONTENTS

THE TENDER

DESCRIPTION **PAGE**

THE TENDER

T1 TENDERING PROCEDURES (White) T1.1

T1.1 Tender Notice and Invitation to Tender (White) T1.2

T1.2 Tender Data (Pink) T1.4

T.2 RETURNABLE DOCUMENTS (Yellow) T2.1

T2.1 List of Returnable Documents (Yellow) T2.2

T2.2 Returnable Schedules and documents (Yellow) T2.3

THE CONTRACT

THE CONTRACT (White) C1.1

C1 AGREEMENTS AND CONTRACT DATA (Yellow) C1.2

C1.1 Form of Offer and Acceptance (Yellow) C1.3

C1.2 Confirmation of Receipt (Yellow) C1.7

C1.3 Contract Data (Yellow) C1.9

C1.4 Performance Guarantee (White) C1.18

C1.5 Agreement in Terms of the OHS Act N° 85 of 1993 (White) C1.23

C1.6 Transfer of Rights and Indemnity in terms of GCC 6.10.1.5 (White) C1.26

C1.7 Adjudicator's Certificates (White) C1.28

C2 PRICING DATA (Yellow) C2.1

C2.1 Pricing Instructions (Yellow) C2.3

C2.2 Bill of Quantities (Yellow) C2.7

C3 SCOPE OF WORK (Blue) C3.1

C3.1: Description of Work (Blue) C3.5

C3.2: Engineering (Blue) C3.7

C3.3: Procurement (Blue) C3.11

C3.4: Construction (Blue) C3.16

C3.5: Management (Blue) C3.24

C3.6: Standard Specifications (Blue) C3.42

C3.7 Project Specifications (Blue) C3.46

C3.8 Particular Specifications (Blue) C3.130

C4 SITE INFORMATION (Green)..... C4.1

C4.1 Geotechnical (Green) C4.3

C4.2 Atmospheric / Climatic (Green) C4.4

C4.3 Environmental (Green)..... C4.6

C4.4 Locality Plan (White)..... C4.7

C4.5 Nameboard (White) C4.8

T1: TENDERING PROCEDURES

TABLE OF CONTENTS **Page**

T1.1: Tender Notice and Invitation to Tender T1.2
T1.2: Tender Data T1.4

T1.1 TENDER NOTICE AND INVITATION TO TENDER

T1.1 TENDER NOTICE AND INVITATION TO TENDER

uMKHANYAKUDE DISTRICT MUNICIPALITY

TENDER INVITATION

JOZINI REGIONAL WATER SUPPLY SCHEME - PHASE 1A-2
CONSTRUCTION OF 5.6 km LONG 700 / 200 mm DIAMETER WELDED STEEL PIPELINES AND TWO 50 kℓ ELEVATED TANKS

CONTRACT N° SCMU 003/2023/2024

Tenders are hereby invited from experienced and suitably qualified contractors who previously participated in this Bid for the construction of approximately 5,6 km welded steel pipeline and erection of two 50 kℓ elevated tanks with piping connections.

It is estimated that tenderers should have a CIDB contractor grading of **7CE or higher**. Only tenderers who are registered with the CIDB, or are capable of being registered prior to the closing date of the tender, in a contractor grading of **7CE**, will be eligible to tender. Tenderers must have experience in laying welded steel pipelines. The steel pipe will be supplied by the Employer.

To be eligible for evaluation, tenderers must achieve a minimum Quality Score of 60%, assessed in terms of objective criteria for experience, financial resources, key personnel, quality assurance and previous performance.

Tender Documents together with the tender drawings will be available for collection in the e-tender portal www.etender.gov.za on the 5th of July 2023.

A **Compulsory Briefing Meeting and Site Visit** will be held at **11h00 on 12 July 2023.** Prospective tenderers shall meet at the Council Chambers at the offices of uMkhanyakude District Municipality in Mkuze and the briefing will be followed by a site visit in Jozini. The Engineer will not be available for inspection purposes on any other occasion. Prospective Contractors are required to bring their copies of the tender documents to the compulsory briefing and site visit for signing by the Engineer. Failure to obtain a Tender Specification Document or non-attendance of the compulsory briefing and site visit will result in the disqualification of your tender.

All tender enquiries are to be directed to Mr Nathi Ndlovu of Royal HaskoningDHV (Pty) Ltd (Consulting Engineers) on 087 350 6660 or at Cell No. 071 602 4939.

All Tenderers must supply Tax Clearance Certificates from SARS confirming that the Tenderer's Tax matters are in order. Any Tender that does not comply with the tender invitation will be rejected and will not be considered.

Tenders must be submitted on the official Tender Specification Document collected from the Employer's Agent and are to be submitted in a sealed envelope clearly marked ***"Tender SCMU 003/2023/2024, Jozini Regional Community Water Supply Scheme – Phase 1: Construction of 5.6 km Long 700 / 200 mm Diameter Welded Steel Pipelines and two 50kl Elevated Tanks".*** The address of the tenderer must be clearly written on the envelope and the tender must be submitted into the Tender Box situated at the **Foyer of uMkhanyakude District Municipality, Stand No. 13433 Kingfisher Road, Mkuze, 3965** by no later than **12h00 on 19 July 2023** where they will be opened in public. The address of the Tenderer must be clearly written at the back of the envelope. Tenders shall be valid for a period of 90 days. **Late submissions of Tenders or Tenders received by way of Facsimile or E-mail will under no circumstances be considered.**

Tenders will be evaluated and adjudicated in terms of the uMkhanyakude District Municipality's Supply Chain Management Policy and the 80/20 preference point scoring system, with 80 points for price and 20 points for B-BBEE Status Level of Contribution for tenders of value below R50 million. uMkhanyakude District Municipality subscribes to the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000). The successful Tenderer will be required to provide security in the form of either Retention of 10% of the value of works or a Performance Guarantee of 10% of the Contract Sum.

UMkhanyakude District Municipality does not bind itself to accept the lowest or any of the tenders and reserves the right to accept the whole or any part of the tender.

Queries relating to any of the above may addressed to Mr Sizwe Khumalo, tel (035) 573 8600 or email: sizwek@ukdm.gov.za

MR WM NXUMALO
MUNICIPAL MANAGER

UMKHANYAKUDE DISTRICT MUNICIPALITY

T1.2 TENDER DATA

T1.2 TENDER DATA

GENERAL

The Conditions of Tender applicable to this contract are the Standard Conditions of Tender as contained in Annexure F of the CIDB *Standard for Uniformity in Construction Procurement, July 2015.* This document is obtainable separately. Tenderers shall obtain their own copies.

The Tender Data make several references to the Standard Conditions of Tender for details that apply specifically to this tender. The Tender Data shall have preference in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender.

Each item of Tender Data given below is cross-referenced to the relevant clause in the Standard Conditions of Tender to which it mainly applies.

F.1.1 Actions

The Employer for this Contract is:

uMkhanyakude District Municipality
Private Bag 449
MKUZE
3965
Telephone N° : (035) 573 8600
Fax N° : (035) 573 8730

F.1.2 Tender Documents

(a) The Tender Document, comprising two volumes, consists of the following:

THE TENDER (Volume 1)

T1: Tendering Procedures
- T1.1: Tender Notice and Invitation to Tender
- T1.2: Tender Data

T2: Returnable Documents
- T2.1: List of Returnable Documents
- T2.2: Returnable schedules and documents

THE CONTRACT

Part 1: Agreements and Contract Data
- C1.1: Form of Offer and Acceptance
- C1.2: Contract Data
- C1.3: Performance Security
- C1.4: Agreement in terms of the OHS Act No 85 of 1993
- C1.5: Transfer of Rights and Indemnity in terms of GCC 6.10.1.5
- C1.6: Adjudicator's Certificates

Part 2: Pricing Data
- C2.1: Pricing Instructions
- C2.2: Bill of Quantities

Part 3: Scope of Work
- C3.1: Description of the Works
- C3.2: Engineering
- C3.3: Procurement
- C3.4: Construction
- C3.5: Management
- C3.6: Standard Specifications
- C3.7: Project Specifications (Variations to Standard Specifications)
- C3.8: Particular Specifications

Part 4: Site Information

C4.1: Geotechnical
C4.2: Atmospheric/Climatic
C4.3: Environmental
C4.4: Locality Plan
C4.5: Nameboard Drawing
C4.6: Standard Drawings

THE DRAWINGS (Volume 2)

The Tender Document shall be obtained from the Employer's Agent at the physical address stated in the Tender Notice.

In addition, the following documents, which are obtainable separately, are also referred to and are deemed to form part of this tender.

(b) "General Conditions of Contract for Construction Works – 3rd Edition 2015"

This document is issued by the South African Institution of Civil Engineering. (Short title "General Conditions of Contract 2015"), and is obtainable separately. Tenderers shall obtain their own copies.

(c) "Standardised Specifications for Civil Engineering Construction" SABS 1200
This document is obtainable separately, and Tenderers shall obtain their own copies of the applicable sections.

(d) The Occupational Health and Safety Act N° 85 of 1993 and Amendment Act N° 181 of 1993, and the Construction Regulations 2014 (Government Gazette N° 37305 of 07 February 2014, Notice N° R84)

This document is obtainable separately, and Tenderers shall obtain their own copies.

(e) In addition Tenderers are advised, in their own interest, to obtain their own copies of the following acts, regulations and standards referred to in this document as they are essential for the Tenderer to get acquainted with the basics of construction management, the implementation of preferential construction procurement policies and participation of targeted enterprise and labour.

(i) The Construction Industry Development Board Act No 38 of 2000 and the Regulations in terms of the CIDB Act 38/2000, as at the closing time of this Tender,

(ii) SANS 1921:2004 Construction and Management

Part 1: General Engineering and Construction Works;

Part 2: Accommodation of Traffic on Public Roads occupied by the Contractor;

Part 6: HIV & AIDS Awareness.

(iii) SANS 10396:2003 Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures

(iv) SANS 1914:2003 Targeted Construction Procurement, Parts 1 to 6, dealing with Participation of Targeted Enterprises, Joint Ventures, Targeted Labour, etc.

The Tender Documents including Drawings shall be obtained from the Employer's Agent or his authorised representative at the physical address stated in the Tender Notice.

(f) The uMkhanyakude District Municipality's Supply Chain Management Policy in terms of Section III of the Local Government Municipal Finance Management Act (Act N° 56 of 2003).

F.1.4 Communication and Employer's Agent

The Employer's agent is:

Name : Royal HaskoningDHV

Address : 3rd Floor, The Boulevard Umhlanga, 19 Park Lane Street, Umhlanga Rocks, 4319

Tel. : 087 350 6660

Cell : 071 602 4939

E-mail address: Peterson.Ndlovu@rhdhv.com

All communication between the Tenderer and the Employer shall be addressed to Mr Nathi Ndlovu of Royal HaskoningDHV between the hours of 08h00 and 17h00 (8 am to 5 pm).

F.1.5 The Employer's right to accept or reject any tender offer

The Employer is not obliged to accept the lowest or any tender offered.

F.2.1 Eligibility

A Tenderer will only be eligible to submit a tender if he/she meets all of the following criteria:

(a) Only those Tenderers who are registered with the CIDB in a contractor grading designation equal to or higher than 7CE determined in accordance with Regulations 25 (1B) or 25 (7A) of the Construction Industry Development Regulations, for a CE class of construction work, are eligible to have their tenders evaluated

(b) Joint ventures are eligible to submit tenders provided that:

1. every member of the joint venture is registered with the CIDB
2. the lead partner has a contractor grading designation in the CE class of construction work.
3. the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than the contractor grading designation required
4. a valid Joint Venture Agreement is included with the tender, which shall be based on the CIDB Sample JV Agreement and shall include a clause to the effect that when the JV is dissolved the Lead Partner will remain liable in terms of the Contract including responsibility for latent defects and that this liability will continue for 10 years after completion of the Contract
5. the Lead Partner shall be nominated in the returnable documents and accepts all liability in terms of the Contract

(c) Only those tenderers who demonstrate by providing evidence that they have in their employ management and supervisory staff satisfying the requirements of the scope of work for supervisory and management staff are eligible to submit tenders.

F2.11 Alterations to documents

A Tender offer shall not be considered if the document has been taken apart from the original binding.

A Tender offer shall not be considered if alterations have been made to the offer or contract data (unless such alterations have been duly authenticated by the Tenderer) or if any particulars required therein have not been completed in all respects.

The tender shall be completed in full in ink.

Use of correction fluid is not permitted, and the presence of correction fluid in the tender shall render the tender invalid.

F.2.12 Alternative tender offers

Alternative tender offers will not be accepted.

F.2.13 Submitting a Tender Offer

F.2.13.2 Tenderers to note that the returnable documents are listed in T.2 (Returnable Documents).

F.2.13.3 Tender offers shall be submitted as an original only. Under no circumstances whatsoever may the tender forms be retyped or redrafted.

F.2.13.5 Delivery of Tender

The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are:

Location of tender box	**:**	**Foyer, uMkhanyakude District Municipality Building**
Physical address	**:**	**Stand 13433, Kingfisher Road, Mkuze, 3965**
Identification details	**:**	**Jozini Regional Community Water Supply Scheme – Phase 1 Contract Nº SCMU 003/2023/2024: Construction of 5.6 km Long 700/200 mm Diameter Welded Steel Pipelines and two 50 Kℓ Elevated Tanks**
Closing Date	**:**	**Wednesday, 19 July 2023**
Closing Time of tender	**:**	**12h00**

Under no circumstances must documents be handed to an employee of uMkhanyakude District Municipality or handed in at the Procurement Department. Tender documents sent via courier services must also be deposited in the Tender Box and not handed to an employee of uMkhanyakude District Municipality.

Late tenders and tenders not in the tender box at the time of opening will not be accepted by the District Municipality and will be returned to the applicant unopened.

NB: uMkhanyakude District Municipality will not accept responsibility for tender documents which are not deposited in the Tender Box.

F.2.13.6 A two envelope procedure will NOT be followed. (Read with F.3.5 hereafter).

F.2.13.9 Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.

F.2.14 Information and Data to be complete in all respects

The tender shall be completed in full in ink.

In the Bill of Quantities a price or rate shall be entered against each item where provision is made for such pricing whether quantities are stated or not.

No two or more items may be bracketed together for a single price or rate as this will invalidate the tender.

Items against which N/A or – is entered, or which are left blank, are to be considered as incomplete and will invalidate the tender.

Items against which NIL or zero (0) is entered are to be considered as fully priced and the tenderer will provide the items in question at zero (0) or NIL price.

F.2.15.1 Closing Time

The closing time for submission of Tender Offers is: as per the Tender Notice and Invitation to Tender.

F.2.16.1 Tender offer validity

The Tender Offer validity period is **90** days from the closing time for submission of tenders.

F.2.17 Clarification of Tender Offer after Submission

Clarification of a Tender Offer in response to a request to do so from the Employer during the evaluation of Tender Offers must be provided within two working days of the Employer's request, failing which the Employer may regard the Tender Offer as being non-responsive.

Arithmetical errors, omissions, discrepancies and imbalanced unit rates

Check responsive tenders for discrepancies between amounts in words and amounts in figures. Where there is a discrepancy between the amounts in figures and the amount in words, the amount appearing in the summary to the Pricing Schedule shall govern.

Check responsive tender offers for:

a) the gross misplacement of the decimal point in any unit rate;
b) omissions made in completing the pricing schedule or bills of quantities; or
c) arithmetic errors in:
    i) line item totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or
    ii) the summation of the prices.
d) imbalanced unit rates.

Notify shortlisted tenderers of all errors, omissions or imbalanced rates that are identified in their tender offers.

Where the tenderer elects to confirm the errors, omissions or re-balancing of imbalanced rates the tender offer shall be corrected as follows:

a) If bills of quantities or pricing schedules apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the unit rate shall govern and the line item total shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted and the unit rate shall be corrected.
b) Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall be corrected.
c) Where the unit rates are imbalanced adjust such rates by increasing or decreasing them and selected others while retaining the total of the prices derived after any other corrections made under (a) and (b) above.

Where there is an omission of a line item, no correction is possible and the offer may be declared non-responsive.

Declare as non-responsive and reject any offer from a tenderer who elects not to accept the corrections proposed and subject the tenderer to the sanction under 4.16.2 of SANS 10845-3

The tenderer is required to submit balanced unit rates for rate only items in the pricing schedule. The rates submitted for these items will be taken into account in the evaluation of tenders.

F.2.18 Provide other material

The tenderer shall, when requested by the Employer to do so, submit the names of all management and supervisory staff that will be employed together with satisfactory evidence that such staff members satisfy the eligibility criteria.

Should the tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, within two working days of the Employer's request, the Employer may regard the Tender Offer as being non-responsive.

F.2.19 Inspections, tests and analyses

Access shall be provided for inspections and testing by personnel acting on behalf of the Employer on request.

F.2.20 Sureties, Bonds and Policies

The tenderer is required to submit with his tender a letter of intent from an approved insurer undertaking to provide the Performance Bond to the format included in Part T2.2 of this procurement document.

F.2.22 Return of Tender Documents

Where a tenderer who received a tender document does not submit a tender, the tender documents issued to him must be returned to the Employer within 28 days after the closing date for submission of tenders.

F.2.23 Certificates

The tenderer shall submit with his tender the Certificates as called for in Section T2 – Returnable Documents. Proof of qualifications and other documentation required shall only be accepted on the basis of originals and certified copies of certificates and other documents.

F.3.4 Opening of Tender Submissions

Tenders will be opened immediately after closing time of tenders (see Tender Notice and Invitation to Tender) at the location of the tender box.

F.3.5 Two-envelope system

The two-envelope system will NOT be followed for this contract.

F.3.11 Evaluation of Tender Offers

The Tenders will first be evaluated for functionality assessed in terms of objective criteria for experience, financial resources, key personnel, quality assurance and previous performance as per the scorecard below. Tenderers must achieve a minimum Quality Score of 60% for their tenders to be accepted for further evaluation in terms of Method 2, Financial Offer and Preference.

The Functionality criteria and maximum score in respect of each criteria are as follows:

1.	Experience Applicable to Past 5 years	15 points
2.	Financial Resources	16 points
3.	Key Personnel	17 points
4.	Quality Assurance	10 points
5.	Previous Performance	42 points
Total possible points		100 points

$$\text{Tenderer's score} = \frac{\text{Tenderer's Points Scored}}{\text{Total possible points (100)}} \times 100$$

Only tenderers scoring 60% or more for the quality (functionality) scorecard included in Section M in T2.2.1 will be eligible for further evaluation.

See Returnable Documents T2.2.1 Section M.

F.3.11.3 Method 2: Financial Offer and Preference

The formula to be used for calculating the price and preference shall be:

- 80 points are allocated for price – W_t = 80 points
- 20 points are allocated for B-BBEE status level of contribution – N_p (maximum) = 20 points.

For Tenders of value not exceeding R50 000 000 (inclusive of VAT).

F.3.11.7 Scoring price

The formula to be used for calculating the value of A shall be Formula 2 Option 1.

F.3.11.8 Scoring preferences

Points for preference will be scored as set out in Returnable Documents T2.2.1 Section N. The tenderer is to complete this Section to claim points for B-BBEE Status Level.

F.3.11.9 Scoring functionality

Functionality is an Eligibility Criterion. Only tenderers scoring 60% (60 points) or more for functionality as detailed in F2.1 and included in Section B in T2 will be eligible for tender, and evaluated for Price and Preference.

F.3.13 Acceptance of Tender Offer

F.3.13.1 Tender Offers will only be accepted if, in addition to the conditions listed in the Standard Conditions of Tender;

(a) The Tenderer has purchased the tender documents as stated in the Tender Advertisement and Notice to Tenderers.

See Returnable Documents T2.2.1 Section B.

(b) The Tenderer has attended the compulsory briefing meeting.

See Returnable Documents T2.2.1 Section C.

(c) The tenderer has the legal capacity to enter into the Contract and the signatory to the tender has the legal capacity to sign the tender.

See Returnable Documents T2.2.1 Section D.

(d) The Tenderer is in good standing financially, and is not
- Insolvent
- in receivership
- bankrupt
- being wound up
- having his affairs administered by a court or a judicial officer
- suspending his business activities
- subject to legal proceedings in respect of the foregoing.

Tenderers are required to submit a Bank Rating with this tender.

See Returnable Documents T2.2.1 Section E.

(e) The Tenderer can provide proof that he/she is in good standing with respect to duties, taxes, levies and contributions required in terms of legislation applicable to the work in the contract.

See Returnable Documents T2.2.1 Section F.

(f) The Tenderer can demonstrate that he/she possesses the necessary professional and technical qualifications and competent, financial resources, equipment and other physical facilities, managerial capability, personnel, experience and reputation to perform the contract;

See Returnable Documents T2.2.1 Sections G and T2.2.2 Sections R, S and T.

(g) The Tenderer or any of its principals, directors or managers is not employed in the service of the State or any municipality. In the event that such principals are involved, official approval from the Executing Authority regarding carrying out remunerative work outside of the public service must be included in the tender submission.

The tenderer must completed the Declaration of Interest and the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the employer or potentially compromise the tender process.

See Returnable Documents T2.2.1 Section H.

(h) The Tenderer must demonstrate that he/she is able to arrange an acceptable performance guarantee should he/she be awarded the contract.

See Returnable Documents T2.2.1 Section I and Performance Guarantee Section C1.3.

(i) The Tenderer must confirm that he/she has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act, N° 85 of 1993, and the OSHA 1993 Construction Regulations 2014.

See Returnable Documents T2.2.1 Section J.

(j) The Tenderer and his principals are not under any restriction to participate in the Employers procurement due to corrupt or fraudulent practices.

See Returnable Documents T2.2.1 Section K.

(k) The tenderer is up to date with the payment of their Municipal Accounts and Rates.

See Returnable Documents T2.2.1 Section L.

(l) The tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector.

(m) The Employer is satisfied that the Tenderer or any of his principals have not influenced the tender offer and acceptance by the following criteria:

- having offered, promised or given a bribe or other gift or remuneration to any person in connection with the obtaining or execution of this contract;
- having acted in a fraudulent or corrupt manner in obtaining or executing this contract;
- having approached an officer or employee of the Employer or the employer's Agent with the objective of influencing the award of a contract in the Tenderer's favour;
- having entered into any agreement or arrangement, whether legally or not, with any other person, firm or company to refrain from tendering for this contract or as to the amount of the Tender to be submitted by either party;
- having disclosed to any other person, firm or company other than the Employer, the exact or approximate amount of his proposed Tender;

(n) the Tenderer is judged 'eligible' in terms of Clause F2.1.

The Employer may, in addition to using any other legal remedies, repudiate the Tender offer and acceptance and declare the Contract invalid should it have been concluded already

The Employer does not bind itself to accept the lowest or any tender.

Failure to sign the form of offer and acceptance will render the tender "non-responsive"

F.3.18 Copies of contract

The number of paper copies of the signed contract to be provided by the Employer is: **one.**

T2: RETURNABLE DOCUMENTS

TABLE OF CONTENTS **Page**

T2.1: List of Returnable Documents T2.2
T2.2: Returnable Schedules and Documents T2.3

T2.1 LIST OF RETURNABLE DOCUMENTS

The Tender Document must be submitted as a whole. All forms must be properly completed as required, and the document shall not be taken apart or altered in any way whatsoever.

The list of returnable documents comprise the following: tick ✔ ☐

1. RETURNABLE SCHEDULES AND OTHER DOCUMENTS REQUIRED FOR TENDER EVALUATION PURPOSES

A.	Details of Registration with CIDB	☐
B.	Proof of Purchase of Tender Documents	☐
C.	Certificate of Attendance at Site Meeting	☐
D	Certificate of Authority for Signatory	☐
D1.	Certificate for Company	☐
D2.	Certificate for Close Corporation	☐
D3.	Certificate for Partnership	☐
D4a.	Certificate of Authority for Joint Venture	☐
D4b.	Resolution of Board of Directors to enter into Consortia or Joint Ventures	☐
D4c.	Joint Venture Disclosure Form	☐
D5.	Certificate for Sole Proprietor	☐
E.	Tenderer's Financial Standing	☐
F1.	VAT Registration Certificate	☐
F2.	Tax Clearance Certificate Requirements (MBD2)	☐
F3.	Skills Development Levy Certificate	☐
F4.	Workmen's Compensation Registration Certificate	☐
F5.	Unemployment Insurance Fund (UIF) Registration Certificate	☐
G1.	Schedule of Similar Work Undertaken	☐
G2.	Schedule of Present Commitments	☐
G3.	Assessment of Contractor's Performance by Independent Reference	☐
H1.	Compulsory Enterprise Questionnaire	☐
H2.	Declaration of Interest	☐
H3.	Declaration for Procurement above R10 million (MBD5)	☐
H4.	Declaration Certificate for Local Production and Content (MBD6.2)	☐
I.	Form of Intent to Provide a Performance Guarantee	☐
J.	Health and Safety Declaration	☐
K1.	Declaration of Tenderer's Past Supply Chain Management Practices - MDB8	☐
K2.	Certificate of Independent Bid Determination MBD 9	☐
L.	Municipal Account	☐
M.	Quality Scorecard (Functionality)	☐
N.	Preference Points – B BBEE Status Level (MBD 6.1)	☐

2. RETURNABLE SCHEDULES AND OTHER DOCUMENTS THAT WILL BE INCORPORATED INTO THE CONTRACT

O.	Record of Addenda to Tender Documents	☐
P.	Amendments, Qualifications and Alternatives	☐
Q1.	Preliminary Programme	☐
Q2.	Preliminary Cash Flow	☐
R.	Schedule of Plant and Equipment	☐
S.	Proposed Subcontractors	☐
T.	Key Personnel	☐

Note: Tenderer to tick off each box to ensure that the necessary schedules and documents have been filled in and are included into the tender document.

T2.2 RETURNABLE SCHEDULES AND DOCUMENTS

TABLE OF CONTENTS **PAGE**

T2.2.1 Returnable Schedules and Documents required for Tender Evaluation Purposes T2.4

T2.2.2 Returnable Schedules and other Documents that will be incorporated into the Contract T2.67

T2.2.1 RETURNABLE SCHEDULES AND DOCUMENTS REQUIRED FOR TENDER EVALUATION PURPOSES

A.	Details of Registration with CIDB	T2.5
B.	Proof of Purchase of Tender Documents	T2.6
C.	Certificate of Attendance at Site Meeting	T2.7
D	Certificate of Authority for Signatory	T2.8
D1.	Certificate for Company	T2.9
D2.	Certificate for Close Corporation	T2.10
D3.	Certificate for Partnership	T2.11
D4a.	Certificate of Authority for Joint Venture	T2.12
D4b.	Resolution of Board of Directors to enter into Consortia or Joint Ventures	T2.13
D4c.	Joint Venture Disclosure Form	T2.15
D5.	Certificate for Sole Proprietor	T2.20
E.	Tenderer's Financial Standing	T2.22
F1.	VAT Registration Certificate	T2.24
F2.	Tax Clearance Certificate Requirements (MBD2)	T2.25
F3.	Skills Development Levy Certificate	T2.28
F4.	Workmen's Compensation Registration Certificate	T2.29
F5.	Unemployment Insurance Fund (UIF) Registration Certificate	T2.30
G1.	Schedule of Similar Work Undertaken	T2.31
G2.	Schedule of Present Commitments	T2.33
G3.	Assessment of Contractor's Performance by Independent Reference	T2.34
H1.	Compulsory Enterprise Questionnaire	T2.35
H2.	Declaration of Interest	T2.37
H3.	Declaration for Procurement above R10 million	T2.39
H4.	Declaration Certificate for Local Production and Content	T2.41
I.	Form of Intent to Provide a Performance Guarantee	T2.44
J.	Health and Safety Declaration	T2.45
K1.	Declaration of Tenderers Past Supply Chain Management Practices - MDB8	T2.46
K2.	Certificate of Independent Bid Determination MBD 9	T2.48
L.	Municipal Account	T2.50
M.	Quality Scorecard (Functionality)	T2.51
N.	Preference Points – B BBEE Status Level (MBD 6.1)	T2.58

A. DETAILS OF REGISTRATION WITH CIDB

PRIMARY CONTRACTOR

Contractors Name: ……

Contractors CIDB Registration Number: ……

Contractors CIDB Registration Classification: ……..

JOINT VENTURE PARTNER 1 (Where Applicable)

Contractors Name: ……

Contractors CIDB Registration Number: ……

Contractors CIDB Registration Classification: ……..

JOINT VENTURE PARTNER 2 (Where Applicable)

Contractors Name: ……

Contractors CIDB Registration Number: ……

Contractors CIDB Registration Classification: ……..

Note: This information will be checked on the CIDB Website

Date:…… **Signature of Tenderer: ……..**

B. PROOF OF PURCHASE OF TENDER DOCUMENTS

[The Tenderer shall insert here proof of purchase of the tender documents in the form of an official receipt or other acceptable form of proof]

C. CERTIFICATE OF ATTENDANCE AT SITE MEETING

This will not be required as ONLY Contractor's who previously participated in this Bid have been invited to tender.

D. CERTIFICATE OF AUTHORITY FOR SIGNATORY

Indicate the status of the tenderer by ticking the appropriate box hereunder. The tenderer must complete the certificate set out below for the relevant category, **and attach its required certificates to the page provided at the end of this form.**

	(a) COMPANY	**(b) CLOSE CORPORATION**	**(c) PARTNERSHIP**	**(d) JOINT VENTURE**	**(e) SOLE PROPRIETOR**
Status (√ tick)					
Complete Section	D1	D2	D3	D4a, D4b, D4c, D4d	D5
Provide Certificates	Company Registration	Company Registration	Company Registration	Company Registration Agreements Power of Attorney	ID Document

Failure to provide all of the required information pertaining to the Joint Venture in the case of Tender Offers by Joint Ventures may result in the Tender Offer being judged non responsive and ineligible for evaluation

D.1 CERTIFICATE FOR COMPANY

I, ...chairperson of the Board of Directors of ....… hereby confirm that by resolution of the Board (copy attached) taken on ..... 20....., Mr/Ms……..…….. acting in the capacity of ……..…….. ..... , was authorised to sign all documents in connection with the tender for Contract Nº SCMU 003/2023/2024 and any contract resulting from it, on behalf of the company.

Chairman: .....

As Witnesses: 1. .....

2. .....

Date: .....

D.2 CERTIFICATE FOR CLOSE CORPORATION

We, the undersigned, being the key members in the business trading as .....

..... hereby authorise Mr/Ms .....,

acting in the capacity of ..... , to sign

all documents in connection with the tender for SCMU 003/2023/2024 and any contract resulting from it, on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

Note : This certificate is to be completed and signed by all of the key members upon whom rests the direction of the affairs of the Close Corporation as a whole.

Signed: .....

As Witnesses: 1. .....

2. .....

Date: .....

D.3 CERTIFICATE FOR PARTNERSHIP

We, the undersigned, being the key partners in the business trading as, ...

..... hereby authorise Mr/Ms .....

acting in the capacity of …… ....., to sign all documents in connection with the tender for SCMU 003/2023/2024 and any contract resulting from it, on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

Note : This certificate is to be completed and signed by all of the key partners upon whom rests the direction of the affairs of the Partnership as a whole.

Signed: .....

As Witnesses: 1. .....

2. .....

Date: .....

D.4a CERTIFICATE OF AUTHORITY FOR JOINT VENTURE

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorize Mr/Ms, ... authorized signatory of the company..... acting in the capacity of lead partner, to sign all documents in connection with the tender offer for SCMU 003/2023/2024 and any contract resulting from it, on our behalf.

This authorization is evidenced by the attached power of attorney signed by legally authorized signatories of all the partners to the Joint Venture.

NAME OF FIRM	ADDRESS	AUTHORISING SIGNATURE, NAME AND CAPACITY
Lead Partner		
JV Partner 1		
JV Partner 2		

Note : This certificate is to be completed and signed by all of the key partners upon whom rests the direction of the affairs of the Partnership as a whole.

Signed: .....

As Witnesses: 1. .....

2. .....

Date: .....

D.4b RESOLUTION OF BOARD OF DIRECTORS TO ENTER INTO CONSORTIA OR JOINT VENTURES

(IF APPLICABLE)

Resolution of a meeting of the Board of Directors/Members/Partners* of:

_____

_____
(Legally correct full name and registration number, if applicable, of the Enterprise)

Held at _____ (place) on _____ (date)

Resolved that:

1. The Enterprise submit a Bid/Tender, in consortia/joint venture with the following enterprise:

   _____

   _____

   (List all the legally correct full names and registration numbers, if applicable, of the Enterprises forming the consortia/joint venture)

   to the Employer and for the work explained in the Scope of Work for Contract Nº SCMU 003/2023/2024.

2. Mr/Mrs/Miss/Ms*:
   _____

   in his/her* capacity as: _____ (position in the Enterprise)

   and who will sign as follows: _____

   be, and is hereby, authorised to sign a consortium/joint venture agreement with the parties listed under item 1 above, and any and all other documents and/or correspondence in connection with and relating to the consortium/joint venture, in respect of the project described under Item 1 above.

3. The Enterprise accepts joint and several liability with the parties listed under item 1 above for the due fulfilment of the obligations of the joint venture/consortium deriving from, and in any way connected with, the Contract to be entered into with the Employer in respect of the project described under Item 1 above.

   The Enterprise chooses as its *domicilium citandi et executandi* for all purposes arising from this joint venture/consortium agreement and the Contract with the Employer in respect of the project under Item 1 above:

   Physical address: _____

   _____

   _____

   _____

   _____ (code)

Postal address: _____

_____

_____

_____ (code)

Telephone: _____ (with code)

Fax: _____ (with code)

Email: _____

	Name	**Enterprise**	**Capacity**	**Signature**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

Note:
1. * Delete which is not applicable
2. This resolution must be signed by all the Directors/Members/Partners of the Bidding Enterprise.
3. Should the number of Directors/Members/Partners exceed the space available above, additional names and signatures must be added on a separate page.

Signed: .....

As Witnesses: 1. .....

2. .....

Date: .....

D.4c JOINT VENTURE DISCLOSURE FORM (TO BE COMPLETED IN CASE OF TENDER BY JV)

Note:

1) All the information requested must be filled in the spaces provided. If additional space is required, additional sheets may be attached.
2) A copy of the formal joint venture agreement must be attached to this form. In order to demonstrate the partner's share in the ownership, control, management responsibilities, risks and profits of the joint venture, the proposed joint venture agreement must include specific details relating to:
   i) the contributions of capital and equipment
   ii) work items to be performed by the Partners.
   iii) work item to be performed under the supervision of the Partner
3) Copies of all written agreements between partners concerning the contract must be attached to this form including those which relate to ownership options and to restrictions/limits regarding ownership and control.
4) Should any of the above not be complied with, the joint venture will be deemed null and void and will be considered non-responsive.

1) JOINT VENTURE PARTICULARS.

1.1 a) Name of Firm.....

b) Postal Address .....

c) Physical Address: .....

d) Telephone: .....

e) Fax: .....

2) IDENTITY OF EACH NON-ABE PARTNER

2.1 a) Name of Firm.....

b) Postal Address .....

c) Physical Address: .....

d) Telephone: .....

e) Fax: .....

2.2 a) Name of Firm:.....

b) Postal Address .....

c) Physical Address: .....

d) Telephone: .....

e) Fax: .....

3) BRIEF DESCRIPTION OF THE ROLES OF THE PARTNERS IN THE JOINT VENTURE

.....

.....

.....

4) RECENT CONTRACTS EXECUTED BY PARTNERS IN THEIR OWN RIGHT OR AS PARTNERS OTHER JOINT VENTURES.

a) .....

b) .....

c) .....

d) .....

e) .....

5) CONTROL AND PARTICIPATION IN THE JOINT VENTURE

(Identify by name and firm those individual who are, or will be, responsible for, and have authority to engage in the relevant management functions and policy and decision making, indicating any limitations in their authority e.g. co-signature requirement and Rand limits).

a) Joint Venture cheque signing

.....

.....

b) Authority to enter into contracts on behalf of the Joint Venture.

.....

c) Signing, co-signing and/or collateralising of loans.

.....

.....

.....

d) Acquisition of lines of credit.

.....

.....

.....

e) Acquisition of performance bonds.

.....

.....

.....

f) Negotiating and signing labour agreements.

.....

.....

.....

6) MANAGEMENT OF CONTRACT PERFORMANCE

(Fill in the name and firm of the responsible person).

a) Supervision of field operations.....

.....

b) Major purchasing .....

.....

c) Estimating .....

.

.....

d) Technical management .....

.....

7) MANAGEMENT AND CONTROL OF JOINT VENTURE

a) Identify the “managing partner”, if any.

.....

.....

.....

.....

b) What authority does each partner have to commit or obligate the other to financial institutions, insurance companies, suppliers, subcontractors and/or other parties participating in the execution of the contemplated works?

.....

.....

.....

.....

c) Describe the management structure for the Joint Venture's work under the contract

MANAGEMENT FUNCTION/ DESIGNATION	NAME	PARTNER (EX NON-ABE/EX ABE)*

8) PERSONNEL

a) State the approximate number of operative personnel (by trade/function/discipline) needed to perform the Joint Venture work under the Contract.

TRADE/FUNCTION/ DISCIPLINE	NUMBER LEAD PARTNER	NUMBER PARTNER 1

b) Number of operative personnel to be employed on the contract who are currently in the employ of partners.

i) Number currently employed by Lead Partner .....

ii) Number of currently employed by Partner 1.....

c) Number of operative personnel who are not currently in the employ of the respective partners and will be engaged on the project by the Joint Venture
.....

d) Name of individual who will be responsible for hiring Joint Venture employees

.....

e) Name of partner who will be responsible for the preparation of Joint Venture payrolls
.....

9) CONTROL AND STRUCTURE OF THE JOINT VENTURE

Briefly describe the manner in which the Joint Venture is structured and controlled.

.....

.....

.....

.....

.....

The undersigned warrants that she/he is dully authorised to sign this Joint Venture Disclosure Form and affirms that the foregoing statements are correct and include all material information necessary to identify and explain the terms and operations of the Joint Venture and the intended participation of each partner in the undertaking.

The undersigned further covenants and agrees to provide the Employer with complete and accurate information regarding actual Joint Venture work and the payment therefore, and any proposed changes in any provisions of the Joint Venture agreement, and to permit the audit and examination of the books, records and files of the Joint Venture, or those of each partner relevant to the Joint Venture, by duly authorised representatives of the Employer.

Signature .....

Duly authorised to sign on behalf of .....

Name .....

Address .....

.....

Telephone .....

Date .....

Signature .....

Duly authorised to sign on behalf of.....

Name .....

Address .....

.....

Telephone .....

Date .....

D.5 CERTIFICATE FOR SOLE PROPRIETOR

I, ... , hereby confirm that I am the sole

owner of the business trading as ....

Signature of Sole owner: .....

As Witnesses:

1. .....

2. .....

Date: .....

REGISTRATION CERTIFICATE / AGREEMENT / ID DOCUMENT

[Important note to Tenderer: Registration Certificates for Companies, Close Corporations and Partnerships, or Agreements and Powers of Attorney for Joint Ventures, or ID documents for Sole Proprietors, all as referred to in the foregoing forms and in T2.1, must be inserted here]

E. TENDERER'S FINANCIAL STANDING

The Tenderer shall provide information about his commercial position, which includes information necessary for the Employer to evaluate the Tenderer's financial standing.

To that end, the Tenderer must provide with his tender, a bank rating, certified by his banker, to the effect that he will be able to successfully complete the contract at the tendered amount within the specified time for completion.

However, should the Tenderer be unable to provide a bank rating with his tender, he shall state the reasons as to why he is unable to do so, and in addition provide the following details of his banker and bank account that he intends to use for project:

Name of account holder : .....

Name of Bank: ..... Branch: .....

Account number: ..... Type of account: .....

Telephone number:..... Facsimile number: .....

Name of contact person (*at bank:* .....

Failure to provide either the required bank details or a certified bank rating with his tender, will result in the tender being considered ineligible.

The Employer undertakes to treat the information thus obtained as confidential, strictly for the use of evaluation of the tender submitted by the Tenderer.

SIGNATURE: .....…….. DATE ….....
(of person authorised to sign on behalf of the Tenderer)

E1. BANK RATING

[Attach rating here]

F1. VAT REGISTRATION CERTIFICATE

[The tenderer's VAT Registration Certificate to be inserted here].

F2. TAX CLEARANCE CERTIFICATE

TAX CLEARANCE CERTIFICATE REQUIREMENTS MBD2

It is a condition of bid that the taxes of the successful bidder must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet the bidder's tax obligations.

1 In order to meet this requirement bidders are required to complete in full the attached form TCC 001 "Application for a Tax Clearance Certificate" and submit it to any SARS branch office nationally. The Tax Clearance Certificate Requirements are also applicable to foreign bidders / individuals who wish to submit bids.

2 SARS will then furnish the bidder with a Tax Clearance Certificate that will be valid for a period of 1 (one) year from the date of approval.

3 The original Tax Clearance Certificate must be submitted together with the bid. Failure to submit the original and valid Tax Clearance Certificate will result in the invalidation of the bid. Certified copies of the Tax Clearance Certificate will not be acceptable.

4 In bids where Consortia / Joint Ventures / Sub-contractors are involved, each party must submit a separate Tax Clearance Certificate.

5 Copies of the TCC 001 "Application for a Tax Clearance Certificate" form are available from any SARS branch office nationally or on the website www.sars.gov.za.

6 Applications for the Tax Clearance Certificates may also be made via eFiling. In order to use this provision, taxpayers will need to register with SARS as eFilers through the website www.sars.gov.za.

APPLICATION FORM FOR TAX CLEARANCE CERTIFICATE*]*

(IN RESPECT OF TENDER) *.....* ***[EXAMPLE]***

1. NAME OF TAXPAYER/TENDERER: ……..……..

2. TRADE NAME: ……..……

3. IDENTIFICATION No. (if applicable) | | | | | | | | | | | | | |

4. COMPANY/CLOSE CORPORATION REG No. : | | | | | | | | | | |

5. INCOME TAX REFERENCE No. : | | | | | | | | | | |

6. VAT REGISTRATION No. : | | | | | | | | | | |

7. PAYE EMPLOYERS REG No. (if applicable) : | | | | | | | | | | |

NB : Copy of the tender request must be attached to this application.

CONTACT PERSON REQUIRING TAX CLEARANCE CERTIFICATE:

SIGNATURE : .....

NAME : ....

TELEPHONE NUMBER : CODE: ……..... NUMBER: .....

ADDRESS : ....

.....

DATE : 20...../...../.....

Please note that the Commissioner for the South African Revenue Service (SARS) will not exercise his discretionary powers in favour of any person with regard to any interest, penalties and/or additional tax leviable due to the late or underpayment of taxes, duties or levies or the rendition of returns by any person.

NAME OF PERSON RESPONSIBLE FOR CONTRACT : .....

(ST 5.1) March 1999

NB: This example of the application form for a tax clearance certificate is included for the convenience of tenderers. The application form has to be submitted to SARS to enable them to issue the required Tax Clearance Certificate. The original and valid Tax Clearance Certificate obtained from the SARS must be submitted with the tender (to be attached to the next page).

TAX CLEARANCE CERTIFICATE

[Original Tax Clearance Certificate obtained from SARS to be inserted here].

F3. SKILLS DEVELOPMENT LEVY CERTIFICATE

[The Tenderer's Skills Development Levy Certificate to be inserted here].

F4. WORKMEN'S COMPENSATION REGISTRATION CERTIFICATE

[The tenderer's Workmen's Compensation Registration Certificate or proof of payment of contributions to be inserted here].

F5. UNEMPLOYMENT INSURANCE FUND (UIF) REGISTRATION CERTIFICATE

[The Tenderer's Unemployment Insurance Fund (UIF) Registration Certificate to be inserted here].

G1. a. SCHEDULE OF SIMILAR WORK UNDERTAKEN WITHIN LAST 5 YEARS

Principal Contractor
NAME: _____

Name of Similar Project Successfully Undertaken	Description	Date Completed	Contract Value R	Referees		
				Name	Position	Contact Details

Note: 1. Similar work (or Project) means welded steel pipelines.
2. Five of the projects listed in these Forms G1a and G1b must be used for the Quality Score Criteria 1 in Section M T2.2.1.
3. When evaluating the Quality Score, the Employer will contact the reference for any two or more of the projects listed and ask them to complete the "Assessment of Performance" form (see example G3). The Tenderer's score for Criteria 5 in Section M will be based on the reply.

Signature : _____ **Date:** _____

G1 b. SCHEDULE OF SIMILAR WORK UNDERTAKEN WITHIN LAST 5 YEARS

Joint Venture Partner
NAME: _____

Name of Similar Project Successfully Undertaken	Description	Date Completed	Contract Value R	Referees		
				Name	Position	Contact Details

Note:
1. ***If there is more than 1 Joint Venture Partner, the page is to be copied and completed for each additional Joint Venture.***
2. ***Similar work (or Project) means welded steel pipelines.***
3. ***Five of the projects listed in these Forms G1a and G1b must be used for the Quality Score Criteria 1 in Section M T2.2.1.***
4. ***When evaluating the Quality Score, the Employer will contact the reference for any two or more of the projects listed and ask them to complete the "Assessment of Performance" form (see example G3). The Tenderer's score for Criteria 5 in Section M will be based on the reply***

G2. PRESENT COMMITMENTS

Employer and Contract Description	Contract Amount	Duration and Completion Date	Consulting Engineer

Signature : _____ **Date:** _____

S A M P L E F O R M

G3. ASSESSMENT OF CONTRACTOR'S PERFORMANCE BY INDEPENDENT REFERENCE

(This will be sent by the Employer to at least 2 of the references listed in Criteria 1 Section M Page T2.51 to obtain scores for Criteria 5a and 5b Pages T2.55 and T2.56)

Please assess the Contractor (Name:) .....

on his/her performance on the following Contract.

Contract No. .....

Name of Contract: ..... Year of execution: .....

Contract value: ..... Employer: .....

Contract duration: ..... Engineer: .....

Reference's Position in Contract: .....

Your assessment of the Contractor's performance in the following areas: *(please tick **one** of the blocks on the right hand side)*	**Not true**	**Partially fulfilled**	**Substantially fulfilled**	**Completely fulfilled**
"Contractor's Management was adequate for the contract"				
"Contractor provided suitably qualified Site personnel"				
"Contractor complied with Health & Safety requirements"				
"Contractor's provided adequate resources for the contract"				
"Contractor's communication and compliance to instructions was good"				
"Quality of work produced was to drawings and specification"				
"Contract was completed on time"				

Any other comments:

.....

.....

.....

Name of person completing this assessment form (Reference): .....

ECSA Prof. Reg. No: ..... Representing firm: .....

Please return by fax to: ..... or e-mail to: .....

Signature of Reference/Validator..... Date of Assessment: .....

H1. COMPULSORY ENTERPRISE QUESTIONNAIRE

The following particulars must be furnished. In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted.

Section 1: Name of enterprise: .....

Section 2: VAT registration number, if any: .....

Section 3: CIDB registration number, if any: .....

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	Identity number*	Personal income tax number*

*Complete only if sole proprietor or partnership and attach separate page if more than 3 partners

Section 5: Particulars of companies and close corporations

Company registration number:.....

Close corporation number: .....

Tax reference number: .....

Section 6: Record in the service of the state

Indicate by marking the relevant boxes with a cross, if any sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has been within the last 12 months in the service of any of the following:

a member of any municipal council		an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999)	
a member of any provincial legislature			
a member of the National Assembly or the National Council of Province			
a member of the board of directors of any municipal entity		a member of an accounting authority of any national or provincial public entity	
an official of any municipality or municipal entity		an employee of Parliament or a provincial legislature	

If any of the above boxes are marked, disclose the following:

Name of sole proprietor, partner, director, manager, principal shareholder or stakeholder	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*insert separate page if necessary

Section 7: Record of spouses, children and parents in the service of the state

Indicate by marking the relevant boxes with a cross, if any spouse, child or parent of a sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has been within the last 12 months in the service of any of the following:

a member of any municipal council		an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999)	
a member of any provincial legislature			
a member of the National Assembly or the National Council of Province			
a member of the board of directors of any municipal entity		a member of an accounting authority of any national or provincial public entity	
an official of any municipality or municipal entity		an employee of Parliament or a provincial legislature	

If any of the above boxes are marked, disclose the following:

Name of spouse, child or parent	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*insert separate page if necessary

The undersigned, who warrants that he/she is duly authorised to do so on behalf of the enterprise:

i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my/our tax matters are in order;

ii) confirms that neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;

iii) confirms that no partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise, has within the last five years been convicted of fraud or corruption;

iv) confirms that I/we are not associated, linked or involved with any other tendering entities submitting tender offers and have no relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and

v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed: ..... Date: .....

Name: ..... Position: .....

Enterprise name: .....

H2. DECLARATION OF INTEREST

(MBD4)

DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state∗.

2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority and/or take an oath declaring his/her interest.

3. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

3.1 Full Name: ……

3.2 Identity Number: ……

3.3 Company Registration Number: ……

3.4 Tax Reference Number: ……

3.5 VAT Registration Number: ……

3.6 Are you presently in the service of the state∗ **YES / NO**

3.6.1 If so, furnish particulars.

……

……

3.7 Have you been in the service of the state during the previous twelve months? **YES / NO**

3.7.1 If so, furnish particulars.

……

……

∗ MSCM Regulations: "in the service of the state" means to be –

(a) a member of –
  (i) any municipal council;
  (ii) any provincial legislature; or
  (iii) the national Assembly or the national Council of provinces;
(b) a member of the board of directors of any municipal entity;
(c) an official of any municipality or municipal entity;
(d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
(e) a member of the accounting authority of any national or provincial public entity; or
(f) an employee of Parliament or a provincial legislature.

3.8 Do you, have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.8.1 If so, furnish particulars.

……

……

3.9 Are you, aware of any relationship (family, friend, other) between a bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.9.1 If so, furnish particulars

3.10 Are any of the company's directors, managers, principal shareholders or stakeholders in service of the state? **YES / NO**

3.10.1 If so, furnish particulars.

……

……

3.11 Are any spouse, child or parent of the company's directors, managers, principal shareholders or stakeholders in service of the state? **YES / NO**

3.11.1 If so, furnish particulars.

……

……

CERTIFICATION

I, THE UNDERSIGNED (NAME) ……

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.

I ACCEPT THAT THE STATE MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

Signature …… Date ……..

Position……

Name of Tenderer ……

H3. DECLARATION FOR PROCUREMENT ABOVE R10 MILLION MBD5

DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (ALL APPLICABLE TAXES INCLUDED)

For all procurement expected to exceed R10 million (all applicable taxes included), bidders must complete the following questionnaire:

		*YES / NO
1	Are you by law required to prepare annual financial statements for auditing?	* Delete if not applicable
1.1	If yes, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years. …… ……	
2	Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days?	
2.1	If no, this serves to certify that the bidder has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days.	
2.2	If yes, provide particulars. …… …… ……	*YES / NO
3	Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?	
3.1	If yes, provide particulars. …… …… ……	

4. Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic? *YES / NO

4.1 If yes, furnish particulars

……..

……..

CERTIFICATION

I, THE UNDERSIGNED (NAME) ……

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.

I ACCEPT THAT THE STATE MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

…….. ……..
Signature Date

…….. ……
Position Name of Bidder

H4. DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT MBD6.2

This Municipal Bidding Document (MBD) must form part of all bids invited. It contains general information and serves as a declaration form for local content (local production and local content are used interchangeably).

Before completing this declaration, bidders must study the General Conditions, Definitions, Directives applicable in respect of Local Content as prescribed in the Preferential Procurement Regulations, 2011 and the South African Bureau of Standards (SABS) approved technical specification number SATS 1286:201x.

1. General Conditions

1.1. Preferential Procurement Regulations, 2011 (Regulation 9.(1) and 9.(3) make provision for the promotion of local production and content.

1.2. Regulation 9.(1) prescribes that in the case of designated sectors, where in the award of bids local production and content is of critical importance, such bids must be advertised with the specific bidding condition that only locally produced goods, services or works or locally manufactured goods, with a stipulated minimum threshold for local production and content will be considered.

1.3. Regulation 9.(3) prescribes that where there is no designated sector, a specific bidding condition may be included, that only locally produced services, works or goods or locally manufactured goods with a stipulated minimum threshold for local production and content, will be considered.

1.4. Where necessary, for bids referred to in paragraphs 1.2 and 1.3 above, a two stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.

1.5. A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.

1.6. The local content (LC) as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 201x as follows:

$$LC = 1 - \left(\frac{x}{y}\right) \times 100$$

Where
x imported content
y bid price excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by the South African Reserve Bank (SARB) at 12:00 on the date, one week (7 calendar days) prior to the closing date of the bid as required in paragraph 4.1 below.

1.7. A bid will be disqualified if:

- the bidder fails to achieve the stipulated minimum threshold for local production and content indicated in paragraph 3 below; and.
- this declaration certificate is not submitted as part of the bid documentation.

2. Definitions

2.1. **"bid"** includes advertised competitive bids, written price quotations or proposals;

2.2. **"bid price"** price offered by the bidder, excluding value added tax (VAT);

2.3. **"contract"** means the agreement that results from the acceptance of a bid by an organ of state;

2.4. **"designated sector"** means a sector, sub-sector or industry that has been designated by the Department of Trade and Industry in line with national development and industrial policies for local production, where only locally produced services, works or goods or locally manufactured goods meet the stipulated minimum threshold for local production and content;

2.5. **"duly sign"** means a Declaration Certificate for Local Content that has been signed by the Chief Financial Officer or other legally responsible person nominated in writing by the Chief Executive, or senior member / person with management responsibility(close corporation, partnership or individual).

2.6. **"imported content"** means that portion of the bid price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or its subcontractors) and which costs are inclusive of the costs abroad, plus freight and other direct importation costs, such as landing costs, dock duties, import duty, sales duty or other similar tax or duty at the South African port of entry;

2.7. **"local content"** means that portion of the bid price which is not included in the imported content, provided that local manufacture does take place;

2.8. **"stipulated minimum threshold"** means that portion of local production and content as determined by the Department of Trade and Industry; and

2.9. **"sub-contract"** means the primary contractor's assigning, leasing, making out work to, or employing another person to support such primary contractor in the execution of part of a project in terms of the contract.

3. The stipulated minimum threshold(s) for local production and content for this bid is/are as follows:

Description of services, works or goods	Stipulated minimum threshold
_____	_____%
_____	_____%
_____	_____%

4. Does any portion of the services, works or goods offered have any imported content? YES / NO

4.1 If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.6 of the general conditions must be the rate(s) published by the SARB for the specific currency at 12:00 on the date, one week (7 calendar days) prior to the closing date of the bid.

The relevant rates of exchange information is accessible on www.reservebank.co.za.

Indicate the rate(s)of exchange against the appropriate currency in the table below:

Currency	**Rates of exchange**
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

NB: Bidders must submit proof of the SARB rate (s) of exchange used.

LOCAL CONTENT DECLARATION BY CHIEF FINANCIAL OFFICER OR OTHER LEGALLY RESPONSIBLE PERSON NOMINATED IN WRITING BY THE CHIEF EXECUTIVE OR SENIOR MEMBER/PERSON WITH MANAGEMENT RESPONSIBILITY (CLOSE CORPORATION, PARTNERSHIP OR INDIVIDUAL)

IN RESPECT OF BID No. .....
ISSUED BY: (Procurement Authority / Name of Municipality / Municipal Entity):
.....

NB The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.

I, the undersigned, ……..... (full names),
do hereby declare, in my capacity as …… ……..
of .....(name of bidder entity), the following:

(a) The facts contained herein are within my own personal knowledge.

(b) I have satisfied myself that the goods/services/works to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286.

(c) The local content has been calculated using the formula given in clause 3 of SATS 1286, the rates of exchange indicated in paragraph 4.1 above and the following figures:

Bid price, excluding VAT (y)	R
Imported content (x)	R
Stipulated minimum threshold for Local content (paragraph 3 above)	
Local content % as calculated in terms of SATS 1286	

If the bid is for more than one product, a schedule of the local content by product shall be attached.

(d) I accept that the Procurement Authority / Municipality /Municipal Entity has the right to request that the local content be verified in terms of the requirements of SATS 1286.

(e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286, may result in the Procurement Authority / Municipal / Municipal Entity imposing any or all of the remedies as provided for in Regulation 13 of the Preferential Procurement Regulations, 2011 promulgated under the Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

SIGNATURE: _____ **DATE:** _____

WITNESS No. 1 _____ **DATE:** _____

WITNESS No. 2 _____ **DATE:** _____

I. FORM OF INTENT TO PROVIDE A PERFORMANCE GUARANTEE

[The Tenderer must attach hereto a letter from the bank or institution. with whom he has made the necessary arrangements, to the effect that the said bank or institution will be prepared to provide the required performance guarantee forthwith upon award of the contract to this tenderer].

Tenderers are to refer to Form C1.3: Form of Guarantee.

J. HEALTH AND SAFETY DECLARATION

In terms of Clause 5(h) of the OHSA Construction Regulations 2014 (referred to as "the Regulations" hereafter), a Contractor may only be appointed to perform construction work if the Employer is satisfied that the Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act No 85 of 1993 and the Construction Regulations 2014.

To that effect a person duly authorised by the tenderer must complete and sign the declaration hereafter in detail.

Declaration by Tenderer

1. I the undersigned hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the Construction Regulations 2014.
2. I hereby declare that my company / enterprise has the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Employer's Health and Safety Specifications.
3. I hereby undertake, if my tender is accepted, to provide a sufficiently documented Health and Safety Plan in accordance with Regulation 7(1) of the Construction Regulations, approved by the Employer or his representative, before I will be allowed to commence with construction work under the contract. I hereby agree that my company/enterprise will not have a claim for compensation for delay or extension of time because of my failure to obtain the necessary approval for the said safety plan.
4. I confirm that copies of my company's approved Health and Safety Plan, the Employer's Safety Specifications as well as the OHSA 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Contractor's personnel, the Employer's personnel, the Engineer, visitors, and officials and inspectors of the Department of Labour.
5. I hereby confirm that adequate provision has been made in my tendered rates and prices in the bill of quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2014, including the cost for specific items that may be scheduled in the bill of quantities.
6. I hereby confirm that I will be liable for any penalties that may be applied by the Employer in terms of the said Regulations for failure on my part to comply with the provisions of the Act and the Regulations as set out in Clause 33 of the Regulations.
7. I agree that my failure to complete and execute this declaration to the satisfaction of the Employer will mean that I am unable to comply with the requirements of the OHSA 1993 Construction Regulations 2014, and accept that my tender will be prejudiced and may be rejected at the discretion of the Employer.
8. I am aware of the fact that, should I be awarded the contract, I must submit the notification required in terms of Clause 4 of the OHSA 1993 Construction Regulations 2014 before I will be allowed to proceed with any work under the contract.

SIGNATURE: ..... DATE: .....…….....
(of person authorised to sign on behalf of the Tenderer)

K1. DECLARATION OF TENDERER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

(MBD 8)

1 This Municipal Tender Document must form part of all bids invited.

2 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.

3 The tender of any tenderer may be rejected if that tender, or any of its directors have:

a. abused the municipality's / municipal entity's supply chain management system or committed any improper conduct in relation to such system;

b. been convicted for fraud or corruption during the past five years;

c. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or

d. been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (N° 12 of 2004).

4 In order to give effect to the above, the following questionnaire must be completed and submitted with the tender.

Item	Question	Yes	No
4.1	*Is the tenderer or any of its directors listed on the National Treasury's database as a company or person prohibited from doing business with the public sector?* (Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the *audi alteram partem* rule was applied).	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		
4.2	**Is the tenderer or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (N° 12 of 2004)?** (To access this Register enter the National Treasury's website, www.treasury.gov.za, click on the icon "Register for Tender Defaulters" or submit your written request for a hard copy of the Register to facsimile number (012) 3265445).	Yes ☐	No ☐
4.2.1	If so, furnish particulars:		

Item	Question	Yes	No
4.3	Was the tenderer or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars:		
4.4	**Does the tenderer or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?**	Yes ☐	No ☐
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the tenderer and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.5.1	If so, furnish particulars:		

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME) ……..……..……
CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM TRUE AND CORRECT.

I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT, ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

Signature	Date
Position	Name of Tenderer

K2. CERTIFICATE OF INDEPENDENT BID DETERMINATION

MBD9

1 This Municipal Bidding Document (MBD) must form part of all bids[1] invited.

2 Section 4 (1) (b) (iii) of the Competition Act N°. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).[2] Collusive bidding is a *per se* prohibition meaning that it cannot be justified under any grounds.

3 Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:

a. take all reasonable steps to prevent such abuse;

b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and

c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.

4. This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.

5. In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid:

[1] Includes price quotations, advertised competitive bids, limited bids and proposals.

[2] Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

I, the undersigned, in submitting the accompanying bid:

Tender SCMU 003/2023/2024: Construction of 5.6 km Long 700 / 200 mm Diameter Welded Steel Pipelines and two 50 kℓ Elevated Tanks

in response to the invitation for the bid made by:

uMkhanyakude District Municipality

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of: _____that:
(Name of Bidder)

1. I have read and I understand the contents of this Certificate;

2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;

3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;

4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;

5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:

   (a) has been requested to submit a bid in response to this bid invitation;
   (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
   (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium[3] will not be construed as collusive bidding.

7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:

   (a) prices;
   (b) geographical area where product or service will be rendered (market allocation)
   (c) methods, factors or formulas used to calculate prices;
   (d) the intention or decision to submit or not to submit, a bid;
   (e) the submission of a bid which does not meet the specifications and conditions of the bid; or
   (f) bidding with the intention not to win the bid.

8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.

9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

   [3] Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act N° 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act N° 12 of 2004 or any other applicable legislation.

Signature	Date
Position	Name of Tenderer

L. MUNICIPAL ACCOUNT

MUNICIPAL ACCOUNT/ RATES SETTLEMENT

The Tenderer shall attach one of the following to this page (as applicable):

1. An original/certified copy of the most recent municipal certificate, indicating the status of payment of all municipal accounts and taxes i.e. electricity, water, refuse, rates and levies, from the Municipality in which jurisdiction its business is situated.

2. In the case where the Tenderer does not own property/is a tenant for the purpose of its business establishment, the Tenderer to provide an original/certified copy of a certificate from its landlord certifying that all tenants payments in respect of all municipal accounts and taxes i.e. electricity, water, refuse, rates and levies are paid up to date.

3. In the case where it is not possible for a Tenderer to obtain the certificate in (2) above from its landlord, the Tenderer is required to submit an original/certified copy of the lease agreement for the premises where its business is situated.

(Failure to do so may lead to your Tender being disqualified)

This serve to confirm that my rates with_____ municipality are up to date and have attached my municipal rates account as proof.

NAME OF BIDDER: _____

DATE : _____/_____/____

This serves to confirm that my municipal rates with_____ municipality are not up to date.

I have made arrangement to settle this account by _____ **(ATTACH LETTER OF ARRANGEMENT AS PROOF)**

I intend to settle my account in full within ten (10) working days should I be favoured by uMKHANYAKUDE DISTRICT MUNICIPALITY as a preferred bidder.

NAME OF BIDDER: _____ **Signature:** _____

DATE : ___/____/____

M. QUALITY SCORECARD

Points for quality must be entered here **by the Tenderer** based on the following Quality Scorecard. **Only Tenderers scoring 60% or more for quality will be considered eligible for evaluation**.

Tenderers should supply supporting information to prove points claimed where it's not available in other Returnable Schedules.

1. Criteria: Experience Applicable to last 5 years only: Maximum Score = 15

	List below up to 5 contracts of similar work undertaken as main contractor within the last 5 years Projects listed must be selected from those listed in previous Section G1a and/or G1b of T2.2.1					**Value/Size of Individual Contracts**	**Points**	**Score (S)**
	Contract	**Value**	**Reference**					
			Name	**Organisation**	**Tel N°**			
1.1						< R9 million	0	
1.2						R9 – 12 million	1	
1.3						R12 - 18 million	2	
1.4						> R18 million	3	
1.5								
1.6	**Possible Full Points =**						**15**	
1.7	**Actual Points Obtained S1 =**							

Note: 1. Similar work (or Project) means welded steel pipelines.
2. The Employer will send the "Assessment of Performance" form (see example G3) to two or more of the five references listed here. Two replies will then be used to score Criteria 5a and 5b on Pages T2.55 and T2.56.

2. Criteria: Financial Resources (Bank Rating): Maximum Score = 16

2.	**Score one of the ratings listed below as reflected on rating received – see Section E1 of T2.2.1**	**Points**	**Score (S)**
2.1.	Bank Rating A – Undoubted for the amount of enquiry	16	
2.2	Bank Rating B – Good for the amount of enquiry	12	
2.3	Bank Rating C – Good for the amount quoted if applied strictly in the way of business	9	
2.4	Bank Rating D – Fair trade for the amount of enquiry	5	
2.5	Bank Rating E – Figures considered too high Bank Rating F – Financial Position Unknown Bank Rating G – Dishonour on records Bank Rating H – Frequently Dishonoured	**Not eligible to tender**	
2.6	**Possible Full Points =**	**16**	
	Actual Points Obtained S2 =		

Note: Tenderers are to submit a copy of their bank rating in Section E of T2.2.1

3. Criteria: Experience of Key Personnel: Maximum Score = 17

	Proposed key Personnel	Experience		Points	Score (S)
3.1	Project Director Name:	Relevant Professional Registration with ECSA and/or SACPCMP		2	
		Years of appropriate experience (score one of the categories)	<5	0	
			5 to 10	1	
			>10	2	
3.2	Construction Manager Note the Construction Manager may not be the same person as the Project Director Name:	Relevant Professional Registration with ECSA and/or SACPCMP		2	
		Recognised Degree or Diploma in Civil Engineering		2	
		Years of appropriate experience (score one of the categories)	<5	0	
			5 to 10	1	
			>10	2	
3.3	Site Supervisor Name:	Recognised Degree or Diploma in Civil Engineering		2	
		Years of appropriate experience (score one of the categories)	<5	0	
			5 to 10	1	
			>10	2	
3.4	Total number of full time skilled workers and artisans assigned (in addition to Project Director, Construction Manager and Site Supervisor)	(score one of the categories)	0	0	
			1	1	
			2	2	
			>2	3	
3.5	**Possible Full Points =**			**17**	
3.6	**Actual Points Obtained S3 =**				

Note: ***Curricula Vitae to be attached in Section T: Key Personnel of T2.2.1.***
Years of appropriate experience means experience in the construction of welded steel pipelines.
Wherever points are claimed certified copies of Registration, Degrees or Diplomas to be attached as applicable. Failure to attach such information will result in nil score being recorded

4. Criteria: Quality Assurance Plan and Control Procedures: Maximum Score = 10

4	Score one status as listed below	**Points**	**Score (S)**
4.1	ISO Accreditation	10	
4.2	Own Internal QA Plan	6	
4.3	None	0	
4.4	**Possible Full Points =**	**10**	
4.5	**Actual Points Obtained S4**		=

Note: If 4.1 selected, attach current copy of ISO Accreditation Certificate.
If 4.2 selected attach copy of company Quality Assurance Plan.
Failure to attach such information will result in nil score being recorded

5. Criteria: Performance on Two Similar Previous Projects undertaken within the last 5 years: Maximum Score = 42

Note: The two projects scored here will be selected and scored by the Employer from the five projects listed in Criteria 1 Experience
The Employer will send form G3 to two or more of the five references listed in Criteria 1 on Page T2.55.
The Employer will then complete these two pages and scores based on the reference responses received.

PROJECT 1

TO BE COMPLETED BY EMPLOYER WHEN EVALUATING TENDERS

5a.1 Project Name: _____ Value of work carried out by Contractor: R _____

Detail of work carried out by Contractor: _____

5a.2 Reference: Name:_____ **Organisation**: _____ **Contact Details:**_____

	Qualitative Statements as assessed by Referees (refer to returned forms H3)	**Points**	**Score**
5a.3	"Contractor's Management was adequate for the contract"	Not true 0 Partially fulfilled 1 Substantially fulfilled 2 Completely fulfilled 3 (Score from returned reference sheet H3)	
5a.4	"Contractor provided suitably qualified Site personnel"		
5a.5	"Contractor complied with Health & Safety requirements"		
5a.6	"Contractor's provided adequate resources for the contract"		
5a.7	"Contractor's communication and compliance to instructions was good"		
5a.8	"Quality of work produced was to drawings and specification"		
5a.9	"Contract was completed on time"		
5a.10	**Possible Full Points**	**21**	
5a.11	**Actual Points Obtained S5a =**		

5. Criteria: Performance on Two Similar Previous Projects undertaken within the last 5 years: Maximum Score = 42

Note: The two projects scored here will be selected and scored by the Employer from the five projects listed in Criteria 1 Experience
The Employer will send form G3 to two or more of the five references listed in Criteria 1 on Page T2.55.
The Employer will then complete these two pages and scores based on the reference responses received.

PROJECT 2

TO BE COMPLETED BY EMPLOYER WHEN EVALUATING TENDERS

5b.1 Project Name: _____ Value of work carried out by Contractor: R _____

Detail of work carried out by Contractor: _____

5b.2 Reference: Name:_____ **Organisation**: _____ **Contact Details:**_____

	Qualitative Statements as assessed by Referees (refer to returned forms G3)	**Points**	**Score**
5b.3	"Contractor's Management was adequate for the contract"	Not true 0 Partially fulfilled 1 Substantially fulfilled 2 Completely fulfilled 3 (Score from returned reference sheet H3)	
5b.4	"Contractor provided suitably qualified Site personnel"		
5b.5	"Contractor complied with Health & Safety requirements"		
5b.6	"Contractor's provided adequate resources for the contract"		
5b.7	"Contractor's communication and compliance to instructions was good"		
5b.8	"Quality of work produced was to drawings and specification"		
5b.9	"Contract was completed on time"		
5b.10	**Possible Full Points**	**21**	
5b.11	**Actual Points Obtained S5b =**		

Total Score for Quality

	Criteria	Possible Full Points	Actual Points Obtained
1	Experience applicable to past 5 years	15	S1=
2	Financial Resources	16	S2=
3	Experience of Key Personnel	17	S3=
4	Quality Assurance Plan and Control Procedures	10	S4=
5	Previous Performance on Similar Projects Project 1 Project 2	 21 21	 S5a= S5b=
6	**Total Possible Points**	**100**	**Total Points Obtained** = % Ta =

To be scored by Employer

<u>Note:</u> Only Eligible for Evaluation if Ta ≥ 60%

N. PREFERENCE POINTS – B-BBEE STATUS LEVEL

(MBD6.1)

SPECIFIC GOALS

This preference form must form part of all bids invited. It contains general information andserves as a claim form for preference points for Specific goals.

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS AND DEFINITIONS

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.21.2

a) The value of this bid is estimated to not exceed R50 000 000 (all applicable taxes included) and therefore the.....preference point system shall be applicable; or

b) Either the 80/20 preference point system will be applicable to this tender.

1.3 Points for this bid shall be awarded for:

(a) Price; and

(b) Specific goals.

1.4 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOALS	
Total points for Price and Specific goals must not exceed	**100**

1.5 Failure on the part of a bidder to submit the required documents to substantiate the pointsclaimed with the bid, will be interpreted to mean that points for specific goals are not claimed.

1.6 The purchaser reserves the right to require of a bidder, either before a bid is adjudicatedor at any time subsequently, to substantiate any claim in regard to specific goals in any manner required by the purchaser.

2. DEFINITIONS

(a) "B-BBEE" means broad-based black economic empowerment as defined insection 1 of the Broad-Based Black Economic Empowerment Act.

(b) "Specific goals" means specific goals as contemplated in section 2(1)*(d)* of the Actwhich may include contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender and disability including the implementation of programmes of the Reconstruction and Development

Programme as published in *Government Gazette* No. 16085 dated 23 November1994

(c) "bid" means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of goods or services, through price quotations, advertised competitive bidding processes or proposals.

(d) "Broad-Based Black Economic Empowerment Act" means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);

(e) "EME" means an Exempted Micro Enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

(f) "functionality" means the ability of a tenderer to provide goods or services in accordance with specifications as set out in the tender documents.

(g) "prices" includes all applicable taxes less all unconditional discounts;

(h) "proof of B-BBEE status level of contributor" means:

1) B-BBEE Status level certificate issued by an authorized body or person;

2) A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;

3) Any other requirement prescribed in terms of the B-BBEE Act;

(i) "QSE" means a qualifying small business enterprise in terms of a code of goodpractice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;

(j) "rand value" means the total estimated value of a contract in Rand, calculated at thetime of bid invitation, and includes all applicable taxes;

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1 POINTS AWARDED FOR PRICE (the 80/20 or 90/10 preference point systems)

A maximum of 80/90 points is allocated for price on the following basis:

80/20 **or** **90/10**

$$Ps = 80\left(1 - \frac{Pt - P\,min}{P\,min}\right) \text{ or } Ps = 90\left(1 - \frac{Pt - P\,min}{P\,min}\right)$$

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmin = Price of lowest acceptable bid

3.2 FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME-GENERATING PROCUREMENT.

3.2.1 POINTS AWARDED FOR PRICE

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 **or** **90/10**

$$Ps = 80\left(1 + \frac{Pt - P\,max}{P\,max}\right) \text{ or } \qquad Ps = 90\left(1 + \frac{Pt - P\,max}{Pmax}\right)$$

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmax = Price of highest acceptable bid

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1 In terms of Regulation 3 (1) an organ of state must, in the tender documents, stipulate the specific goal in the invitation to submit the tender for which a point may be awarded, and the number of points that will be awarded to each goal, and proof of the claim for such goal.

SPECIFIC GOAL	NUMBER OFPOINTS FOR (80/20 PREFERENCE SYSTEM)	NUMBER OF POINTS (90/10 PREFERENCE SYSTEM)
1.Enterprise owned by Black people	4	2
2.Enterprise owned by Women	4	2
3. Enterprise owned by Youth	4	2
4.Enterprise owned by Disabled persons	4	2
5. Enterprise owned by SMME`S – QSE and EME	4	2

5. BID DECLARATION

5.1 Bidders who claim points in respect of specific goals must complete the following:

SPECIFIC GOAL	NUMBER OFPOINTS FOR (80/20 PREFERENCE SYSTEM)	NUMBER OF POINTS (90/10 PREFERENCE SYSTEM)
1.Enterprise owned by Black people		
2.Enterprise owned by Women		
3. Enterprise owned by Youth		
4.Enterprise owned by Disabled persons		
5. Enterprise owned by SMME`S –QSE and EME		

6. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 3.1

6.1 Specific goals: = …… (maximum of 10 or 20 points)

(Points claimed in respect of paragraph 6.1 must be in accordance with the table reflected in paragraph 3.1 and must be substantiated by submitting the required documents.

7. DECLARATION WITH REGARD TO COMPANY/FIRM

7.1 Name of company/firm :……..

7.2 VAT registration number :……

7.3 Company registration number :……..

7.4 TYPE OF COMPANY/ FIRM

☐ Partnership/Joint Venture / Consortium
☐ One person business/sole propriety
☐ Close corporation
☐ Company
☐ (Pty) Limited

[TICK APPLICABLE BOX]

7.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

……
……
……
……

7.6 COMPANY CLASSIFICATION

☐ Manufacturer
☐ Supplier
☐ Professional service provider
☐ Other service providers e.g. transporter, etc.
[TICK APPLICABLE BOX]

7.7 Total number of years the company/firm has been in business:……

7.8 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals indicated in paragraphs 1.4 and 5.1 of the foregoing certificates, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 5.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct.

iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –

(a) disqualify the person from the bidding process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

(d) recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and

(e) forward the matter for criminal prosecution.

WITNESSES 1. …….. 2. ……..	…… SIGNATURE(S) OF BIDDERS(S) DATE: …….. ADDRESS …….. …….. ……..

B-BBEE CERTIFICATE

[Attach B-BBEE Certificate here]

MBD 3.3

ANNEXURE B (1 of 2)

PRO FORMA CESSION

MEMORANDUM OF AGREEMENT

entered into between

(Name of firm)

(Address)

(hereinafter referred as the "Cedent" and duly represented herein by

(Please attach all necessary resolutions passed concerning this matter)

and

(Name of firm or individual)

(Address)

(hereinafter referred to as the "Cessionary" and duly represented herein by

(Please attach all necessary resolutions passed concerning this matter)

WHEREAS the Cedent has a claim against the uMkhanyakude District Municipality for the amount of _____ *arising out of Certificate No ___ of Contract _____ (hereinafter referred to as the "said claim");*

AND WHEREAS the Cedent has given to the Cessionary the Cedent's right, title and interest in and to the said claim in the amount of _____

NOW THEREFORE it is agreed as follows:

The Cedent hereby cedes, transfers and makes over to the Cessionary the Cedent's right title and interest in and to the said claim in the amount of: _____

It is specifically recorded that:

1. Both parties have notified the uMkhanyakude District Municipality of this cession.
2. The Cessionary fully understands that the uMkhanyakude District Municipality is in no way indebted to the Cessionary, unless and until the cedent has duly performed its' obligations under the Contract of employment with the UMKHANYAKUDE DISTRICT MUNICIPALITY. The responsibility to honour the debt shall still vest with the Cedent.

The Cessionary hereby accepts the said cession upon signature of this agreement.

ANNEXURE B (2 of 2)

SIGNED AT _____ ON THIS THE _____ DAY OF _____ 20…...

SIGNATURE OF Cessionary.....

WITNESSES:

1.....

2.....

SIGNED AT _____ ON THIS THE _____ DAY OF _____ 20…..

SIGNATURE OF Cedent.....

WITNESSES:

1.....

2.....

T2.2.2 RETURNABLE SCHEDULES AND OTHER DOCUMENTS THAT WILL BE INCORPORATED INTO THE CONTRACT

O. Record of Addenda to Tender Documents T2.68
P. Amendments, Qualifications and Alternatives T2.69
Q1. Preliminary Programme T2.71
Q2. Preliminary Cash Flow T2.72
R. Schedule of Plant and Equipment T2.73
S. Proposed Subcontractors T2.74
T. Key Personnel T2.75

O. RECORD OF ADDENDA TO TENDER DOCUMENTS

I / We confirm that the following communications amending the tender documents that I / we received from the employer or his agent before the closing date for submission of this tender offer have been taken into account in this tender offer.

ADDENDUM No	DATE	TITLE OR DETAILS

SIGNATURE: …….. DATE: ……..
(*of person authorized to sign on behalf of the Tenderer)*

P. AMENDMENTS, QUALIFICATIONS AND ALTERNATIVES

(This is not an invitation for amendments, deviations or alternatives but, should the Tenderer desire to make any departures from the provisions of this contract, he shall set out his proposals clearly hereunder. The Employer will not consider any amendment, alternative offers or discounts unless forms (a), (b) and (c) have been completed to the satisfaction of the Employer).

I / We herewith propose the amendments, alternatives and discounts as set out in the tables below:

(a) AMENDMENTS

PAGE, CLAUSE OR ITEM N°	PROPOSED AMENDMENT

[Notes: 1. Proposals for amendments to the General and Special Conditions of Contract will not be considered, and may invalidate the offer;

2. The Tenderer must give full details of all the financial implications of the amendments and qualifications in a covering letter attached to his tender.]

(b) ALTERNATIVES

PROPOSED ALTERNATIVE	DESCRIPTION OF ALTERNATIVE

[Notes: 1. Individual alternative items that do not justify an alternative tender, and an alternative offer for time for completion should be listed here.

2. In the case of a major alternative to any part of the work, a separate Bill of Quantities, programme, etc, and a detailed statement setting out the salient features of the proposed alternatives must accompany the tender.

3. Alternative tenders involving technical modifications to the design of the works and methods of construction shall be treated separately from the main tender offer.]

(c) DISCOUNTS

ITEM ON WHICH DISCOUNT IS OFFERED	DESCRIPTION OF DISCOUNT OFFERED

[Note: The Tenderer must give full details of the discounts offered in a covering letter attached to his tender, failing which, the offer for a discount may have to be disregarded.]

SIGNATURE: .....……..…….. DATE: .....
(of person authorised to sign on behalf of the Tenderer)

Q1. PRELIMINARY PROGRAMME

The Tenderer shall detail below or attach a preliminary programme reflecting the proposed sequence and tempo of execution of the various activities comprising the work for this Contract. The programme shall be in accordance with the information supplied in the Contract, requirements of the Scope of Work and with all other aspects of his Tender.

PROGRAMME

| ACTIVITY | WEEKS | | |

Q2. PRELIMINARY CASH FLOW

[The Tenderer shall attach a preliminary cash flow reflecting the proposed monthly cash flow in unison with the construction program. The Tenderer shall attach a form that has enough columns to cover the time periods involved in the period for performance of the contract. The program shall be in accordance with the information supplied in the Contract, requirements of the Project Specifications and with all other aspects of this tender.]

Note: The cash flow must be based upon the completion time proposed by the tenderer or as stated elsewhere in this tender document as the case may be.

Pro Forma Cash Flow

CASHFLOW	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Per Month															
Cumulative															

R. SCHEDULE OF PLANT AND EQUIPMENT

The following are lists of major items of relevant equipment that I / we presently own or lease and will have available for this contract if my / our tender is accepted.

(a) Details of major equipment that is owned by me / us and immediately available for this contract.

DESCRIPTION *(type, size, capacity etc)*	QUANTITY	YEAR OF MANUFACTURE

Attach additional pages if more space is required

(b) Details of major equipment that will be hired, or acquired for this contract if my / our tender is accepted

DESCRIPTION *(type, size, capacity etc)*	QUANTITY	HOW ACQUIRED	
		HIRE/ BUY	SOURCE

Attach additional pages if more space is required

The Tenderer undertakes to bring onto site without additional cost to the Employer any additional plant not listed but which may be necessary to complete the contract within the specified contract period.

Failure to complete this form properly and correctly, will lead to the conclusion that the tenderer does not have the necessary plant and equipment resources at his disposal, which will prejudice his tender.

SIGNATURE: .....…….....…….. DATE: .....
(of person authorised to sign on behalf of the Tenderer)

S. PROPOSED SUBCONTRACTORS

I/We hereby notify you that it is my/our intention to employ the following subcontractors for work in this contract.

If I/we am/are awarded a contract I/we agree that this notification does not change the requirement for me/us to submit the names of proposed subcontractors in accordance with requirements of the contract for such appointments. If there are no such requirements in the contract, then your written acceptance of this list shall be binding between us.

I/We confirm that all subcontractors who are contracted to construct a house or building are registered as home builders with the National Home Builders Registration Council.

NAMES AND ADDRESSES OF PROPOSED SUBCONTRACTORS	COMPANY REGISTRATION No AND CIDB CLASSIFICATION	DESCRIPTION OF WORK TO BE EXECUTED BY SUBCONTRACTOR

[Tenderers are to attach to this page the relative experience of the proposed Sub-Contractors.]

SIGNATURE: .....……...…….... DATE:…….....
(of person authorised to sign on behalf of the Tenderer)

T. KEY PERSONNEL

In terms of the Scope of Work and the Conditions of Tender, unskilled workers may only be brought in from outside the local community if such personnel are not available locally.

The Tenderer shall list below the personnel which he intends to utilize on the Works, including key personnel which may have to be brought in from outside if not available locally. Full names must be provided for at least the first three rows.

CATEGORY OF EMPLOYEE	NAMES AND/OR NUMBER OF PERSONS		
	KEY PERSONNEL, PART OF THE CONTRACTOR'S ORGANISATION	KEY PERSONNEL TO BE IMPORTED IF NOT AVAILABLE LOCALLY	UNSKILLED PERSONNEL TO BE RECRUITED FROM LOCAL COMMUNITY
Project Director / Contract Manager			
Construction Manager			
Site Supervisor, Quality Control			
Health & Safety Officer			
Artisans and other Skilled workers			
Plant Operators			
Unskilled Workers			
Others:.....			

The Tenderer shall attach hereto the *curricula vitae*, in the form included hereafter, of at least the Construction Manager. The information is necessary for evaluation of the tender.

SIGNATURE: .....…….....…….. DATE: …….....
(of person authorised to sign on behalf of the Tenderer)

CURRICULUM VITAE OF PROJECT DIRECTOR

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	**Full time on Project: Y / N**
Professional Registration Number:	**Attend site meetings: Y / N**
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required Service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

..... **……..……**

SIGNATURE OF THE INCUMBENT IN THE SCHEDULE **DATE**

CURRICULUM VITAE OF CONSTRUCTION MANAGER

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	**Full time on Project: Y / N**
Professional Registration Number:	**Attend site meetings: Y / N**
Name of Employer (firm):	
Current position:	**Years with firm:**
Employment Record:	
Experience Record Pertinent to Required Service:	

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

..... **……..……**

SIGNATURE OF THE INCUMBENT IN THE SCHEDULE **DATE**

CURRICULUM VITAE OF SITE SUPERVISOR

Name:		**Date of birth:**
Profession:		**Nationality:**
Qualifications:		**Full time on Project: Y / N**
Professional Registration No:		**Attend site meetings: Y / N**
Name of Employer (firm):		
Current position:		**Years with firm:**
Employment Record:		
Experience Record Pertinent to Required service:		

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

..... **……..……**

SIGNATURE OF THE INCUMBENT IN THE SCHEDULE **DATE**

CURRICULUM VITAE OF HEALTH AND SAFETY OFFICER

Name:		**Date of birth:**
Profession:		**Nationality:**
Qualifications:		**Full time on Project: Y / N**
Professional Registration No:		**Attend site meetings: Y / N**
Name of Employer (firm):		
Current position:		**Years with firm:**
Employment Record:		
Experience Record Pertinent to Required service:		

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

..... **……..……**

SIGNATURE OF THE INCUMBENT IN THE SCHEDULE **DATE**

THE CONTRACT

C1: AGREEMENTS AND CONTRACT DATA

C2: PRICING DATA

C3: SCOPE OF WORK

C4: SITE INFORMATION

C1: AGREEMENTS AND CONTRACT DATA

TABLE OF CONTENTS **PAGE**

C1.1 Form of Offer and Acceptance C1.3
C1.2 Confirmation of Receipt..... C1.7
C1.3 Contract Data C1.9
C1.4 Performance Guarantee..... C1.18
C1.5 Agreement in Terms of the OHS Act N° 85 of 1993..... C1.23
C1.6 Transfer of Rights and Indemnity in terms of GCC 6.10.1.5..... C1.26
C1.7 Adjudicator's Certificates..... C1.28

C1.1: FORM OF OFFER AND ACCEPTANCE

IMPORTANT NOTE:

<u>ALL Tenderers MUST</u> complete and sign Form A: OFFER (the first page hereafter).

Form B: ACCEPTANCE will be signed by the <u>Employer</u> and then only in the case of the successful Tenderer.

Form C: SCHEDULE OF DEVIATIONS must be signed by the <u>Employer</u> as well as the <u>successful Tenderer</u> after award of the contract.

A tender in which Form A: OFFER has <u>not</u> been completed and signed by the Tenderer, will invalidate the OFFER and may be disqualified at the discretion of the Employer.

C1.1 FORM OF OFFER AND ACCEPTANCE

(Agreement)

OFFER

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract in respect of the following works:

Contract No. SCMU 003/2023/2024 : Construction of 5.6 km Long 700 / 200 mm Diameter Steel Pipelines and two 50 kℓ Elevated Tanks

The Tenderer, identified in the Offer signature block below, has examined the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the Tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance, the Tenderer offers to perform all of the obligations and liabilities of the Contractor under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the Conditions of Contract identified in the Contract Data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VALUE ADDED TAX IS

……

……Rand (in words); R …….... (in figures).

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document to the Tenderer before the end of the period of validity stated in the Tender Data, whereupon the Tenderer becomes the party named as the Contractor in the Conditions of Contract identified in the Contract Data.

For the Tenderer:

…….....
Signature

…….
Name

…….
Capacity

Name and address of *organisation*):

……..

……..

……..

Signature and name of witness:

……
Signature

…….
Name

…….
Date

ACCEPTANCE

By signing this part of the Form of Offer and Acceptance, the Employer identified below accepts the Tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the Conditions of Contract identified in the Contract Data. Acceptance of the Tenderer's Offer shall form an agreement between the Employer and the Tenderer upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the contract are contained in

Part 1 Agreement, and Contract Data, (which include this Agreement)
Part 2 Pricing Data
Part 3 Scope of Work
Part 4 Site Information

and drawings and documents or parts thereof, which may be incorporated by reference into Parts 1 to 4 above.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules as well as any changes to the terms of the Offer agreed by the Tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Agreement. No amendments to or deviations from said documents are valid unless contained in this Schedule, which must be duly signed by the authorised representative(s) of both parties.

The Tenderer shall within two weeks after receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's Agent (whose details are given in the Contract Data) to arrange the delivery of any other bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the Conditions of Contract identified in the Contract Data at, or just after, the date this Agreement comes into effect. Failure to fulfill any of these obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Tenderer (now Contractor) within five days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this Agreement, this Agreement shall constitute a binding contract between the parties.

For the Employer:

…….....
Signature

…….
Name

…….
Capacity

Name and address of organisation:

……..

……..

……..

Signature and name of witness:

……
Signature

…….
Name

Date: ……

SCHEDULE OF DEVIATIONS

Notes:

1. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender,
2. A Tenderer's covering shall not be included in the final contract document. Should any matter in such, letter, which constitutes a deviation as aforesaid become the subject of agreements reached during the process of, offer and acceptance, the outcome of such agreement shall be recorded here,
3. Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here,
4. Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the final draft of the Contract,

1. Subject: .....

Details: .....

.....

2. Subject: .....

Details: .....

.....

By the duly authorised representatives signing this Schedule of Deviations, the Employer and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or change to the terms of the offer agreed by the Tenderer and the Employer during this process of offer and acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the Tenderer of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this Agreement.

For the Tenderer:	**For the Employer**
Signature..……..	Signature …….……..
Name ……...……..	Name ……..…….……
Capacity ……..…	Capacity ……...
Name and address of organisation	Name and address of organisation
…….....	……..….....
……..…..…	……..…….
……..…..…	……..……
Witness Signature.....	Witness Signature.....
Witness Name.....	Witness Name .....
Date.....	Date .....

C1.2 CONFIRMATION OF RECEIPT

The Tenderer, (now Contractor), identified in the Offer part of this Agreement hereby confirms receipt from the Employer, identified in the Acceptance part of this Agreement, of one fully completed original copy of this Agreement, including the Schedule of Deviations (if any) today:

The ..... (day) of ..... (month) 20..... (year)

at ..... (place)

For the Contractor:

…….....

Signature

…….

Name

…….

Capacity

Signature and name of witness:

…….

Signature

…….

Name

…….

Date

C1.3: CONTRACT DATA

C1.3: CONTRACT DATA

TABLE OF CONTENTS **PAGE**

C1.3.1 Part 1: Data Provided by Employer C1.10
C1.3.2 Part 2: Data Provided by Contractor C1.16
C1.3.3 Part 3: Corrigenda to GCC 2015 by SAICE C1.17
C1.3.4 Part 4: Corrigenda to GCC 2015 by Employer C1.17

C.1.3 CONTRACT DATA

C1.3.1 PART 1: DATA PROVIDED BY THE EMPLOYER

CONDITIONS OF CONTRACT

The Conditions of Contract are

- the "General Conditions of Contract"
  - o "The General Conditions of Contract for Construction Works, Third Edition, 2015" published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685 and obtainable from www.saice.org.za; together with
  - o each subsequent corrigendum and erratum thereto, as issued by their publisher up to the Base Date of this Contract;

  (collectively hereinafter referred to as GCC 2015); and

- amendments to the GCC 2015 as contained in this Contract Data.

Each party to the Contract shall purchase its own copy of the correct print edition of the GCC 2015 that applies to this Contract (see Note 1 below), available from the publisher:

South African Institution of Civil Engineering
Private Bag X200
Halfway House 1685
South Africa
Tel +27 (0)11 805 5947
www.saice.org.za

NOTES:

Note 1

GCC 2015 makes several references to the Contract Data. The Contract Data shall take precedence over the GCC 2015 in the interpretation of any ambiguity or inconsistency

Note 2

Each item of data below is cross-referenced to the Clause in the GCC 2015 to which it applies.

Note 3

The documents forming the Contract are to be taken as mutually explanatory of one another.

Note 4

Certain pro-forma forms and pro-forma agreements contained in the GCC 2015 have been adapted for this particular Contract. Those pro-forma forms and pro-forma agreements contained in the GCC 2015 do not apply where replaced by similar pro-forma forms and pro-forma agreements in this procurement document.

Note 5

The term 'Employer's Agent' in this tender has the same meaning as 'Engineer' as used in earlier versions of GCC and still in customary use in the construction industry and shall be understood in this sense.

CONTRACT-SPECIFIC DATA

Each item of data given below is cross-referenced to the clause in the Conditions of Contract to which it applies.

The following contract-specific data, referring to the General Conditions of Contract, are applicable to this Contract:

Compulsory Data:

Clause	Data
1.1.1.13	The Defects Liability Period is 365 days
1.1.1.14	Time for Practical Completion is **8** months
1.1.1.15	The name of the Employer is uMkhanyakude District Municipality
1.1.1.26	The Pricing Strategy of a Re-measurement Contract shall apply
1.2.1.2	The address of the Employer is: Physical address: Stand 13433 Kingfisher Road MKUZE 3965 Postal address: Private Bag 449 MKUZE 3965 e-mail address: sabelom@ukdm.gov.za Contact numbers: Tel. : (035) 573 8600 Fax : (035) 573 8730
1.1.1.16	The name of the Employer's Agent is: Royal HaskoningDHV (Pty) Ltd

Clause	Data
1.2.1.2	The address of the Employer's Agent is: Physical address: 3rd Floor, The Boulevard Umhlanga, 19 Park Lane Street, Umhlanga Rocks, 4319 Postal address: P O Box 1243 Umhlanga Rocks 4320 Contact Person : Mr Nathi Ndlovu e-mail address : Peterson.Ndlovu@rhdhv.com Contact numbers: Corporate : 087 350 6660 Cell : 071 602 4939
3.2.3	The Employer's Agent shall obtain the specific approval of the Employer before carrying out any of his functions or duties according to the following Clauses of the General Conditions of Contract.
4.10.1	The contractor shall employ a Community Liaison Officer (CLO), who will be identified by the Employer and on terms specified in this document. The contractor shall recruit local labour only through the services of the CLO in consultation with the Project Steering Committee. **Contractor's default in Payment to Labourers and Employees:** Any dispute between the Contractor and labourers, regarding delayed payment or default in payment of fair wages, if not resolved immediately may compel the Employer to intervene. The Employer may, upon the Contractor defaulting payment, pay the moneys due to the workers not honoured in time, out of any moneys due or which may become due to the Contractor under the Contract.
5.3.1	The documentation required before commencement with Works execution are: • Health and Safety Plan (Refer to Clause 4.3) • A signed Agreement between the Employer and the Contractor for the Works to be completed by the Contractor in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act (Act No.85 of 1993) and the Construction Regulations promulgated thereunder (Refer to Clause 4.3). • Initial programme (Refer to Clause 5.6) • Performance Security (Refer to Clause 6.2) • Insurance (Refer to Clause 8.6)
5.3.2	The time to submit the documentation required before commencement with Works execution is 14 days
5.4.2	The access and possession of Site shall not be exclusive to the Contractor but shall be as set out elsewhere in the Contract.

Clause	Data
5.8.1	The non-working days are Sundays The special non-working Days are: • Any statutory public holiday in terms of the Public Holidays Act, and, where such statutory public holiday falls on a Sunday, and the next Monday subsequently becomes a statutory public holiday in terms of the Public Holidays Act, then both the relevant Sunday and the relevant Monday shall be special non-working days under the contract; • any proclaimed statutory day of mourning which is proclaimed as a statutory public holiday; • any proclaimed statutory election day which is proclaimed as a statutory public holiday; and • all annual year-end shutdown periods as recommended by the South African Bargaining Council for the Civil Engineering Industry.
5.12.2.2	Extension of Time for Abnormal Rainfall Extensions of time to be considered for abnormal rainfall in terms of Clause 5.12.2.2 shall be calculated as per section C4.2. For the purpose of applying the formula, accurate rain gauging shall be taken at suitable points on the Site and the Contractor shall at his own expense, take all necessary precautions to ensure that rain gauges cannot be interfered with by unauthorized persons.
5.13.1	The penalty for failing to complete the works is 0,05% of contract price per day. The limit of penalties is 10% of the Contract Price
5.16.3	The latent defect period is 10 years, commencing on the day after the date of certification of Practical Completion
6.2.1	The security to be provided by the Contractor shall be a total not exceeding 10% of the Contract Sum in a form to be selected by the Contractor from the applicable options in C1.2.2.
6.5.1.2.3	The percentage allowance to cover overhead charges is: 50% on the cost of labour (6.5.1.2.1) and 15% on the cost of materials (6.5.1.2.2).
6.8.2	The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule with the following values: The value of the Contract Price Adjustment Factor shall be calculated to 4 decimal places. The value of "x" is 0,10. The values of the coefficients are: a = 0,25 b = 0,25 c = 0,40 d = 0,10 The Site or largest part thereof shall be deemed to be located in the national province of KwaZulu-Natal.

Clause	Data
	The descriptions of the "L", "P", "M" and "F" indices in the Contract Price Adjustment Schedule shall be replaced with the following, which shall apply to this contract: "L" is the "Labour Index" and shall be the Consumer Price Index for the urban area nearest to the Site, as stated in the Contract Data, and as published in the Statistical News Release, P0141, Additional Tables: Table 14 "CPI – all items according to area" of Statistics South Africa, or as otherwise amended after the Commencement Date by Statistics South Africa to another suitable equivalent index to be applied to the contract and which takes effect on a specific date, subject to written agreement between the Contractor and Employer. P" is the "Construction Equipment Index" and shall be the Producer Price Index applicable to the appropriate Construction Equipment as stated in the Contract Data and as published in the Statistical Release P0151, Table 4 of Statistics South Africa, or as otherwise amended after the Commencement Date by Statistics South Africa to another suitable equivalent index to be applied to the contract and which takes effect on a specific date, subject to written agreement between the Contractor and Employer. The Construction Equipment shall be Civil engineering plant as listed in Statistical Release P0151, Table 4 "Producer Price Index" of Statistics South Africa. "M" is the "Materials Index" and shall be the Producer Price Index applicable to the appropriate materials as stated in the Contract Data and as published in the Statistical Release P0151, Table 3 or Table 4 of Statistics South Africa, or as otherwise amended after the Commencement Date by Statistics South Africa to another suitable equivalent index to be applied to the contract and which takes effect on a specific date, subject to written agreement between the Contractor and Employer. The Materials shall be Building and Construction - Civil Engineering as listed in the Statistical Release P0151, Table 3 or Table 4 respectively, of Statistics South Africa (which shall apply to the "Materials Index" as a relevant Producer Price Index). "F" is the "Fuel Index" and shall be the Producer Price Index for Diesel at wholesale level for the area as stated in the Contract Data and as published in the Statistical News Release P0151, Table 4 of Statistics South Africa, or as otherwise amended after the Commencement Date by Statistics South Africa to another suitable equivalent index to be applied to the contract and which takes effect on a specific date, subject to written agreement between the Contractor and Employer.' Where applicable, the area for Diesel at wholesale level shall be 'Coast' as listed in the Statistical Release P0151, Table 4 of Statistics South Africa (which shall apply to the "Fuel Index" as a relevant Producer Price Index). The applicable industry for the Producer Price Index for materials is Building and Construction Civil Engineering. The area for the Producer Price Index for fuel is Coast. The base month is "one month prior to the Closing Time of the Tender".
6.8.3	Price adjustments for variations in the costs of special materials are not provided for.
6.10.1.5	The percentage advance on materials not yet built into the Permanent Works is 80%. Proof of ownership is required.
6.10.3	There is no limit of retention money.

Clause	Data
8.6.1.1.2	The value of Plant and materials supplied by the Employer to be included in the insurance sum is: Nil.
8.6.1.1.3	The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is a maximum of 4 % of the Contract Sum.
8.6.1.3	The limit of indemnity for liability insurance is R 10 000 000,00 for any single claim. The number of claims during the construction and Defects Liability Periods shall be unlimited.
8.6.8	**Manufacturing and/or fabrication and storage at premises other than the Site** *Add the following new Sub-Clause 8.6.8:* "Where the contract involves manufacturing and/or fabrication of the Works or part thereof at premises other than the Site, the Contractor shall satisfy the Employer that all materials and equipment for incorporation in the Works are adequately insured during manufacture and/or fabrication. In the event of the Employer having an insurable interest in such Works during manufacture or fabrication then such interest shall be noted by endorsement to the Contractor's policies of insurance."
10.5.2	Dispute resolution shall be by ad-hoc adjudication
10.5.3	The number of Adjudication Board Members to be appointed is one.
10.7.1	The determination of disputes shall be by arbitration.

Variations to the General Conditions of Contract applicable to this contract are:

Clause	Data
	None

Additional clauses to the General Conditions of Contract applicable to this contract are:

Clause	Data
1.1	**Definition** *Add the following at the end of Sub-Clause 1.1.1:*
1.1.1.35	"Client", as used in the Occupational Health and Safety Act - Construction Regulations, means Employer.
1.1.1.36	"Principal Contractor", as used in the Occupational Health and Safety Act - Construction Regulations, means Contractor.

C1.3.2 PART 2: DATA PROVIDED BY THE CONTRACTOR

The Contractor is advised to read the *General Conditions of Contract*, as specified in Part 1, in order to understand the implications of this Data which is required to be completed.

Each item of data given below is cross-referenced to the clause in the Conditions of Contract to which it mainly applies

<table>
<tr><th>Clause</th><th>Data</th></tr>
<tr><td>1.1.1.9</td><td>The Name of the Contractor is _____
[Enter the legal name of the Contractor]</td></tr>
<tr><td>1.2.1.2</td><td>The address of the Contractor is:

Physical address:
_____
_____
_____
_____

Postal address:
_____
_____
_____
_____

e-mail address: _____

Contact numbers:
Corporate: _____
Direct: _____
Mobile: _____
Fax: _____</td></tr>
<tr><td>6.2.1</td><td>The security to be provided by the Contractor shall be one of the following:

<table>
<tr><th>Type of security
(with Value Added Tax excluded from the Contract Sum and from the value of the Works for calculating the percentages)</th><th>Indicate "Yes" or "No"</th></tr>
<tr><td>Retention of 10% of the value of the Works (5% held for defects liability period).</td><td></td></tr>
<tr><td>Fixed Performance guarantee of 10% of the Contract Sum</td><td></td></tr>
<tr><td>Variable Performance guarantee</td><td></td></tr>
</table>
</td></tr>
</table>

Signature..…….. Date…….……

(of person authorised to sign on behalf of the Tenderer)

C1.3.3 Part 3: Corrigenda to GCC 2015 by SAICE

Corrections 2017-06-09 published by SAICE and all further updates, errata or other amendments to GCC 2015 published by SAICE prior to the Base Month of this Contract shall be deemed to form part of GCC 2015.

Each party to the Contract shall purchase its own copy of such updates, errata, corrections and other amendments to GCC 2015.

C1.3.4 Part 4: Corrigenda to GCC 2015 by the Employer

The items in this Part 4 (if any) shall be deemed to be supplementary corrigenda by the Employer to the GCC 2015, and shall be deemed to form part of GCC 2015. In the event of conflict between any item in this Part 4 and an item in the above Part 3, the relevant item in Part 3 shall take precedence.

C1.4: PERFORMANCE GUARANTEE

C1.4 PERFORMANCE GUARANTEE

For use with the General Conditions of Contract for Construction Works, Third Edition, 2015.

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

Physical address: .....

"Employer" means: uMkhanyakude District Municipality

"Company" means:……

"Contractor" means: .....

"Employer's Agent" means: Royal HaskoningDHV (Pty) Ltd

"Works" means: Contract SCMU 003/2023/2024: Construction of 5.6 km Long 700 / 200 mm Diameter Welded Steel Pipelines and two 50 kℓ Elevated Tanks.

"Site" means: Construction area at Jozini Local Municipality.

"Contract" means: The Agreement made in terms of the Form of Offer and Acceptance and such amendments or additions to the Contract as may be agreed in writing between the parties.

"Contract Sum" means: The accepted amount inclusive of tax of R.....

Amount in words: .....

.....

"Guaranteed Sum" means: The maximum aggregate amount of R.....

Amount in words: .....

.....

Type of Performance Guarantee: ..... *(Insert Variable or Fixed)*

"Expiry Date" means: ..... (*Give date)* or any other later date set by the Contractor and / or Employer provided such instruction is received prior to the Expiry Date as indicated here.

CONTRACT DETAILS

Employer's Agent issues: Interim Payment Certificates, Final Payment Certificate and the Certificate of Completion of the Works as defined in the Contract.

1. VARIABLE PERFORMANCE GUARANTEE

1.1 Where a Variable Performance Guarantee has been selected, the Guarantor's Liability shall be limited during the following periods to diminishing amounts of the Guaranteed Sum as follows:

1.1.1 From and including the date of signing the Performance Guarantee up to and including the date of the interim payment certificate certifying, for the first time, more than 50% of the Contract Sum:

R……

(Amount in words ……)

1.1.2 From the day following the date of the said interim payment certificate up to and including the Expiry Date, or the date of issue by the Employer's Agent of the Certificate of Completion of the Works, whichever occurs first:

R……

(Amount in words ……)

1.2 The Employer's Agent and/or the Employer shall advise the Guarantor in writing of the date on which the interim payment certificate certifying, for the first time, more than 50% of the Contract Sum, has been issued and the date on which the Certificate of Completion of the Works has been issued.

2. FIXED PERFORMANCE GUARANTEE

2.1 Where a Fixed Performance Guarantee has been selected, the Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

2.2 The Guarantor's period of liability shall be from and including the date on which the Performance Guarantee is signed, up to and including the Expiry Date, or the date of issue by the Employer's Agent of the Certificate of Completion of the Works, or the date of payment in full of the Guaranteed Sum, whichever occurs first.

2.3 The Employer's Agent and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of Completion of the Works has been issued.

3. CONDITIONS APPLICABLE TO VARIABLE AND FIXED PERFORMANCE GUARANTEES

3.1 The Guarantor hereby acknowledges that:

3.1.1 Any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;

3.1.2 Its obligation under this Performance Guarantee is restricted to the payment of money.

3.2 Subject to the Guarantor's maximum liability referred to in 1.1 or 2.1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 3.2.1 to 3.2.3:

3.2.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Employer's Agent in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 3.2.2;

3.2.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 3.2.1 and the sum certified has still not been paid;

3.2.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 3.2.

3.3 Subject to the Guarantor's maximum liability referred to in 1.1 or 2.1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

3.3.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 3.3; or

3.3.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 3.3; and

3.3.3 the aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.

3.4 It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 3.2 and 3.3 shall not exceed the Guarantor's maximum liability in terms of 1.1 or 2.1.

3.5 Where the Guarantor has made payment in terms of 3.3, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

3.6 Payment by the Guarantor in terms of 3.2 or 3.3 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

3.7 Payment by the Guarantor in terms of 3.3 will only be made against the return of the original Performance Guarantee by the Employer.

3.8 The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.

3.9 The Guarantor chooses the physical address as stated above for the service of all notices for all purposes in connection herewith.

3.10 This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 1.1.2 or 2.2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

3.11 This Performance Guarantee, with the required demand notices in terms of 3.2 or 3.3, shall be regarded as a liquid document for the purposes of obtaining a court order.

3.12 Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of Magistrate's Court.

Signed at .....

Date .....

Guarantor's signatory (1) .....

Capacity .....

Guarantor's signatory (2) .....

Capacity .....

Witness signatory (1) .....

Witness signatory (2) .....

C1.5: AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT No 85 OF 1993

C1.5: AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT N° 85 OF 1993

THIS AGREEMENT is made between **uMkhanyakude District Municipality** (hereinafter called the EMPLOYER)

of the one part, herein represented by: .....

in his capacity as: .....

AND: .....

(hereinafter called the CONTRACTOR) of the other part, herein represented by .....

.....

in his capacity as: .....

duly authorized to sign on behalf of the Contractor.

WHEREAS the CONTRACTOR is the Mandatory of the EMPLOYER in consequence of an agreement between the CONTRACTOR and the EMPLOYER in respect of

Contract Tender SCMU 003/2023/2024 : Construction of 5.6 km Long 700 / 200 mm Diameter Welded Steel Pipelines and two 50 kℓ Elevated Tanks;

AND WHEREAS the EMPLOYER and the CONTRACTOR have agreed to enter into an agreement in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act No 85 of 1993, as amended by OHSA Amendment Act No 181/1993 (hereinafter referred to as the ACT);

NOW THEREFORE the parties agree as follows:

1. The CONTRACTOR undertakes to acquaint the appropriate officials and employees of the CONTRACTOR with all relevant provisions of the ACT and the regulations promulgated in terms thereof.

2. The CONTRACTOR undertakes to fully comply with all relevant duties, obligations and prohibitions imposed in terms of the ACT and Regulations: Provided that should the EMPLOYER have prescribed certain arrangements and procedures that same shall be observed and adhered to by the CONTRACTOR, his officials and employees. The CONTRACTOR shall bear the onus of acquainting himself/herself/itself with such arrangements and procedures.

3. The CONTRACTOR hereby accepts sole liability for such due compliance with the relevant duties, obligations, prohibitions, arrangements and procedures, if any, imposed by the ACT and Regulations, and the CONTRACTOR expressly absolves the EMPLOYER and the EMPLOYER'S AGENT from being obliged to comply with any of the aforesaid duties, obligations, prohibitions, arrangements and procedures in respect of the work included in the contract.

4. The CONTRACTOR agrees that any duly authorized officials of the EMPLOYER shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the CONTRACTOR has complied with his undertakings as more fully set out in paragraphs 1 and 2 above, which steps may include, but shall not be limited to, the right to inspect any appropriate site or premises occupied by the CONTRACTOR, or to take such steps it may deem necessary to remedy the default of the CONTRACTOR at the cost of the CONTRACTOR.

5. The CONTRACTOR shall be obliged to report forthwith to the EMPLOYER any investigation, complaint or criminal charge which may arise as a consequence of the provisions of the ACT and Regulations, pursuant to work performed in terms of this agreement, and shall, on written demand, provide full details in writing of such investigation, complaint or criminal charge.

Thus signed at ……..….. for and on behalf of the **CONTRACTOR**

on this the ..... day of …… 20……

SIGNATURE: ……..……..……..…….…

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. .....

2. .....

Thus signed at ……. for and on behalf of the **EMPLOYER**

on this the …….. day of ..... 20……

SIGNATURE: .....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. .....

2. .....

C1.6: TRANSFER OF RIGHTS AND INDEMNITY

C1.6: TRANSFER OF RIGHTS AND INDEMNITY

(To be completed during construction by successful Tenderer only when claiming for materials on site)

Claim for materials on site, Payment Certificate N°. …… **Date:** ……..

Contract N°: SCMU 003/2023/2024 for Construction of 5.6 km Long 700 / 200 mm Diameter Welded Steel Pipelines and two 50 kℓ Elevated Tanks.

I, the undersigned (name of signatory) ……..……..…. in my capacity as……..…. of (name of Contractor) ……

duly authorised hereto on behalf of the Contractor hereby transfer, cede and assign all the Contractor's rights, title and interest in and to the materials and goods, for which evidence of bona fide ownership is attached hereto, unto and in favour of (name of Employer) …….. Insofar as the Contractor retains actual control of the materials and goods, the right of ownership thereof passes to the Employer by *constitutum possessorium.*

I herewith indemnify the Employer against any claim to and in respect of said materials by reason of the Contractor's sequestration or liquidation or of any defect in the Contractor's title to the materials and agree that no payment for materials on site will be made by the Employer until such time as I have submitted documentary proof of bona fide ownership of the said materials and goods.

This transfer shall become effective upon conclusion of the Contractor receiving payment from the Employer or from any other person on behalf of the Employer for the materials and goods as Materials on Site, payment of retention money thereon excluded.

I further confirm that I am fully responsible for all materials and goods listed under this Transfer of Rights and that they have been insured adequately against all risks and will remain insured until they are built into or used in the permanent works and taken over by the Employer.

This certificate of Transfer of Rights applies only to the materials and goods as listed in the following table.

DESCRIPTION OF ITEM	UNIT	QUANTITY	RATE	AMOUNT	SUPPLIER
TOTAL VALUE OF MATERIALS AND GOODS					

Signed by: ……Date: ……..……..……
for and on behalf of the Contractor.

Witnessed by: …… Date: ……

NOTE: This form, together with the documentary proof of ownership or proof of payment by the Contractor to the supplier, shall accompany the Contractor's claim for payment for materials on site in terms of Clause 6.10.1.5 of the General Conditions of Contract 2015.

C1.7: ADJUDICATOR'S CERTIFICATES

TABLE OF CONTENTS **PAGE**

C1.7.1: Disclosure Statement C1.29
C1.7.2: Adjudication Board Member Agreement C1.30

C1.7.1 DISCLOSURE STATEMENT

Please note that words in italics within brackets are items which should be stated.

(Date)

Contract: .....

Contractor: .....

Employer: uMkhanyakude District Municipality

Employer's Agent : .....

Dear Sirs/Mesdames

I am willing and available to serve as *ad-hoc* Adjudication Board Member in the above mentioned Contract.

In accordance with the General Conditions of Contract for Construction Works Adjudication Board Rules relating to disclosure statements by selected or nominated persons to the adjudication, I hereby state that:

- I shall act with complete impartiality and know of nothing at this time, which could affect my impartiality.
- I have had no previous involvement with this project.
- I do not have any financial interest in this project.
- I am not currently employed by the Contractor, Employer or Employer's Agent.
- I do not have any financial connections with the Contractor, Employer or Employer's Agent.
- I do not have or have not had a personal relationship with any authoritative member of the Contractor, Employer or the Employer's Agent which could affect my impartiality.
- I undertake to immediately disclose to the parties any changes in the above position which could affect my impartiality or be perceived to affect same.

Should there be any deviation from the foregoing statements, details shall be given.

I further declare that I am experienced in the work which is carried out under the Contract and in interpreting contract documentation.

Name in full: .....

Signature: .....

C1.7.2: ADJUDICATION BOARD MEMBER AGREEMENT

This Agreement is entered into between:

Adjudication Board Member:

Name: .....

Physical address: .....

.....

.....

Postal address: .....

.....

.....

e-mail address: ..... Fax number: .....

Telephone number: ..... Mobile number: .....

Contractor:

Name: .....

Physical address: .....

.....

.....

Postal address: .....

.....

.....

e-mail address: ..... Fax number: .....

Telephone number: ..... Mobile number: .....

Employer:

Name: uMkhanyakude District Municipality

Physical address: Stand 13433, Kingfisher Road, MKUZE, 3965

Postal address: Private Bag 449, MKUZE, 3965

Telephone number: (035) 573 8600 Fax number: (035) 573 8730

The Contractor and the Employer will hereinafter be collectively referred to as the Parties.

The Parties entered into a Contract for Contract .....

.....
which provides that a dispute under or in connection with the General Conditions of Contract for Construction Works, Third Edition, 2015, must be referred to ad-hoc adjudication.

The undersigned natural person has been appointed to serve as Adjudication Board Member and together with the undersigned Parties agree as follows:

1, The Adjudication Board Member accepts to perform his duties in accordance with the terms of Contract, the General Conditions of Contract for Construction Works Adjudication Board Rules and this Agreement.

2. The Adjudicator undertakes to remain independent and impartial of the Contractor, Employer and Employer's Agent for the duration of the Adjudication Board proceedings.

3. The Adjudication Board Member agrees to serve for the duration of the Adjudication Board proceedings.

4. The Parties may at any time, without cause and with immediate effect, jointly terminate this Agreement.

5. Unless the Parties agree, the Adjudication Board Member shall not act as arbitrator or representative of either Party in any subsequent proceedings between the Parties under the Contract. No Party may call the Adjudication Board Member as a witness in any such subsequent proceedings.

6. The standing Adjudication Board's duties shall end upon the Adjudication Board Member(s) receiving notice from the Parties of their joint decision to disband the Adjudication Board.

7. The Adjudication Board Member shall be paid in respect of time spent upon or in connection with the adjudication including time spent travelling:

(a) A monthly retainer of ..... *(amount)*
for ..... *(number)* of months, and/or

(b) A daily fee of ..... *(amount)*
based on a ..... *(number)* hour day, and or

(c) An hourly fee of ..... *(amount)*, and/or

(d) A non-recurrent appointment fee of ..... *(amount)*
which shall be accounted for in the final sums payable.

8. The Adjudication Board Member's expenses incurred in adjudication work shall be reimbursed at cost.

Upon submission of an invoice for fees and expenses to the Parties, the *(Contractor/Employer*)* shall pay the full amount within 28 days of receipt of the invoice and he shall be reimbursed by the other party by half the amount so that the fees and expenses are borne equally by the Parties. Late payment of such invoices shall attract interest at prime plus 3% points compounded monthly at the prime rate charged by the Adjudication Board Member's bank.

This Agreement is entered into by:

Contractor's signature: .....

Contractor's name: .....

Place: .....

Date: .....

Employer's signature .....

Employer's name: uMkhanyakude District Municipality

Place: .....

Date: .....

Adjudication Board Member's signature: .....

Adjudication Board Member's name: .....

Place: .....

Date: .....

**Delete the inapplicable part*

C2: PRICING DATA

C2.1: PRICING INSTRUCTIONS

C2.2: BILL OF QUANTITIES

C2: PRICING DATA

TABLE OF CONTENTS **PAGE**

C2.1: Pricing Instructions C2.3

C2.2: Bill of Quantities..... C2.7

C2.1 PRICING INSTRUCTIONS

C2.1 PRICING INSTRUCTIONS

1.0 GENERAL

The Contractor's attention is drawn to the Conditions of Contract, to the Specification and the Tender Drawings, all of which are to be read in conjunction with the Bill of Quantities.

2.0 STANDARD SYSTEM

The Bill of Quantities shall be interpreted in accordance with the method of measurement set out in the Specifications except where variations are implied by the omission of items or by the actual wording of the items in the Bill of Quantities.

The quantities in the Bill of Quantities are provisional. The Works as executed will be measured for payment in accordance with the Bill of Quantities and under the items set forth therein, notwithstanding any custom to the contrary.

In the event of any item to be measured not being reasonably covered by the above Bill, then the Standard Method of Measurement described in Clause 6.7 of the General Conditions of Contract (2015) shall apply and the appropriate rate shall be negotiated between the Engineer and the Contractor.

3.0 MEASUREMENT

Measurement shall be made of the finished work from the net dimensions or masses indicated in the drawings, and no allowance has been made, or will be made for waste.

4.0 PRICES INCLUSIVE

Prices and rates to be inserted in the Bill of Quantities are to be the full inclusive value of the Work described under the several items, but excluding Value Added Tax, which is not to be included in the rates but is to be included in the appropriate item in the Summary Sheet of the Schedule of Quantities.

The items shall, unless otherwise stated herein, be held to include making, conveying and delivering, unloading, storing, unpacking, hoisting, setting, fitting and fixing in position, cutting and waste, laps, patterns, models and templates, labour, plant, fuel, hiring costs, temporary works, return of packings, safety precautions, overheads, on-costs, establishment charges, profit and all other costs and expenses which may be required in and for the construction of the work described together with all risks, liabilities and obligations arising out of the Conditions of Contract or implied in the Documents on which the Tender is to be based. Where special risks, liabilities and obligations cannot be dealt with as above, then the price thereof is to be separately stated in the item provided for the purpose.

5.0 SPECIFICATIONS AND DESCRIPTIONS

Descriptions in the Bill of Quantities are abbreviated and all Specification Clauses shall be read and deemed to apply to the items described in this Bill of Quantities which are to be priced accordingly.

In the event of any Clause in the preceding Specifications being in conflict with any description and/or amplification thereof in the Bill of Quantities the former shall prevail, and the Project Specification shall take precedence over the General Specification.

Directions and description of work and material given in the Specification are not necessarily repeated in the Bill of Quantities. Reference is to be made to the Conditions of Contract, Specification and other relevant documents for this information. While references may be given in the Bill, such references are not necessarily complete.

6.0 COMPLETION OF BILL OF QUANTITIES

The Bill of Quantities shall be completed in full in black ink.

A price or rate shall be entered against each item where provision is made for such pricing in the Bill of Quantities, whether quantities are stated or not.

No two or more items can be bracketed together for a single price or rate as this will invalidate the tender.
Items against which **N/A, left blank or –** is entered are to be considered as incomplete and will invalidate the tender.
Items against which **NIL or zero (0)** is entered are to be considered to be fully priced and the tenderer will provide the items in question as specified at zero (0) or NIL price.

7.0 METHOD OF MEASUREMENT

Quantities have generally been measured in accordance with SABS 1200 Standard Specifications where applicable and where not applicable then generally in accordance with the Sixth Edition (including amendments) of the Standard System of Measuring Builder's Work as issued by the Association of South African Quantity Surveyors unless otherwise stated herein.

7.1 Terms Used

In this Bill of Quantities the following expressions shall have the meanings hereinafter assigned to them unless otherwise described in the items concerned:-

(i) "ALLOW" — Where the word "allow" is used in any item of the Bill of Quantities the sum entered by the Contractor is at his risk and shall cover all costs and charges in respect of the work referred to during the period of the Contract.

(ii) "PROVIDE" — Where the word "provide" is used and a sum has been inserted by the Engineer to cover the cost of any particular item of work, the sum so entered shall be dealt with in accordance with the provisions of the General Conditions of Contract.

(iii) "BUDGETARY ALLOWANCE" — Where the word "budgetary allowance" is used, the sum inserted by the Engineer to cover the cost of the particular item of work will be omitted during the Contract and the work will be measured in accordance with the procedure set out in the Bill of Quantities and valued at the rates contained in the priced Bill of Quantities for similar work.

8.0 APPROVED, DIRECTED OR SELECTED

8.1 The words "approved", "directed" or "selected" refer to the approval, direction or selection of the Engineer.

9.0 TRADE NAMES, PROPRIETARY BRANDS, ETC

All materials, fittings, furnishings, etc., specified under a Trade Name, Proprietary Brand or Catalogue Reference, shall be:

9.1 Used in strict accordance with the Manufacturer's latest printed instructions.

9.2 Either exactly as described or of equal quality, weight or specification and approved by the Engineer.

The Contractor shall first obtain written approval from the Engineer before goods are placed on order from a source of supply other than is specified herein. Such approval shall not be unreasonably withheld.

10.0 MATERIALS AND WORKMANSHIP

All materials shall be the best of their respective kinds specified and the workmanship shall be the standard defined for the trade tests required for such work and to the approval of the Engineer.

In all cases the materials and workmanship shall be in accordance with the latest edition of the relevant South African Bureau of Standards (SABS) or if not defined therein the British Standard Specification (BSS) or Code of Practice (BSCP) unless otherwise specified.

The quantities given in this Bill should not be used for ordering materials.

The units of measurement described in the Bill of Quantities are metric units for which the standard international abbreviations are used. Abbreviations used in the Bill of Quantities, including some non-standard abbreviations, are as follows:

mm	=	millimeter	h	=	hour	pe	=	plain ended
m	=	meter	kg	=	kilogram	FL	=	flanged
km	=	kilometer	t	=	ton (1000 kg)	D/FL	=	double flanged
m^2	=	square meter	No.	=	number	C/F	=	centre to face
sum	=	lump sum	P C sum	=	Prime Cost sum	DN	=	Nominal diameter
ha	=	hectare	Prov sum	=	Provisional sum	ID	=	Inside diameter
m^3	=	cubic meter	%	=	per cent	OD	=	Outside diameter
m^3.km	=	cubic meter-kilometer	kℓ	=	kilolitre	kW	=	kilowatt
ℓ	=	litre	MPa	=	megapascal			

C2.2: BILL OF QUANTITIES

SUMMARY OF BILL OF QUANTITIES

Section	Description	Amount R-c
A	Preliminary and General	
B	Earthworks	
C	Concrete	
D	Pipework	
E	Steelwork	
F	Road Crossing	
G	Steel Elevated Tanks	
H	Dayworks	
SUBTOTAL		
CONTINGENCIES **Add:** 10% of Subtotal *(The provisional sum provided here may only be expended as directed by the Employer's Agent's Representative and may be deducted in whole or in part)*		
CONTRACT PRICE ADJUSTMENT **Add:** 8% of Subtotal *(The provisional sum provided here may be employed only as necessary in terms of the Contract Price Adjustment Schedule)*		
SUBTOTAL		
VALUE ADDED TAX Add 15 % of Subtotal *(Provisional sum based on current rate of VAT)*		
TOTAL TO FORM OF OFFER (Page C1.4)		

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
A	**SABS 1200 A**	**SECTION A: PRELIMINARY AND GENERAL**				
	PSA 8.2.1	**FIXED - CHARGE ITEMS**				
A1	8.3.1	**Contractual requirements**	Sum	1		
	8.3.2	**Establish Facilities on Site**				
A2	8.3.2.1	Facilities for the Engineer (SABS 1200 AB):				
A2.1		Furnished office and parking bay	Sum	1		
A2.2		Nameboard as shown on Sketch 1 (2No)	Sum	1		
A2.3		Use of survey equipment	Sum	1		
A2.4		Computer, GPS facility Garmin eTrex 20 Navigation device or similar approved (Clause PSAB 4.3) and cellular phone:	Sum	1		
A2.5		Laptop computer preloaded with windows 7, MS Office 2010 or later version, MS Project 2010 and 3G internet usage	Sum	1		
A2.6		12 Megapixel digital Sony Cybershot camera or similar approved	Sum	1		
A3	8.3.2.2	Facilities for the Contractor:				
A3.1		Offices, storage sheds, workshops, living accommodation, ablution and toilet facilities, tools and equipment, water supplies, electric power, communications, access and plant	Sum	1		
A3.2		Dealing with water:				
A3.3		Generally on site	Sum	1		
A3.4		Stream crossings (2N°)	Sum	1		
A4	8.3.3	General responsibilities and other fixed charge obligations	Sum	1		
A5	8.3.4	Remove Engineer's and Contractor's site establishment on completion	Sum	1		
A6		Accommodation of traffic at road crossings	Sum	1		
A7	PE8.1.1	Preparation of risk assessments, safe work procedures, the project H&S File, the H&S plan, the provision of PPE and protective clothing, and other H&S matters that the contractor deems necessary	Sum	1		
A8	PE8.1.2	Completing and checking the Project H&S File and handing over to the Client on completion of the works	Sum	1		
A9	PE8.1.3	Compliance with SANS 1921 Part 6 HIV/Aids Awareness	Sum	1		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
A10	PZ8.1	Preparation and establishment of all procedures required to achieve and ensure compliance with the requirements of the Environmental Management Programme, RoD, Employer's Environmental Management Specification and the Ecological Report	Sum	1		
	SABS 1200 A PSA 8.2.2	**TIME RELATED ITEMS**				
A11	8.4.1	Contractual requirements	Sum	1		
A12	8.4.2	Operate and maintain facilities on the site for the duration of construction:				
A12.1	8.4.2.1	Facilities for the Engineer-				
A12.1.1		Furnished office and parking bay	Sum	1		
A12.1.2		Nameboards (2 No)	Sum	1		
A12.1.3		Use of survey equipment and one survey assistant	Sum	1		
A12.1.4	PSAB 4.3	Computer, camera and GPS facilities	Sum	1		
A12.1.5	8.4.5	General responsibilities and other time related obligations	Sum	1		
A12.2	8.4.2.2	Facilities for the Contractor-				
		Contractor's establishment as per list below:				
A12.2.1		Offices, storage sheds, workshops, living accommodation, ablution and toilet facilities, tools and equipment, water supplies, electric power, communications, access and plant	Sum	1		
A12.3	PSA8.4.2.2	Dealing with water:				
A12.3.1		Generally on the site	Sum	1		
A12.3.2		River and stream crossings	Sum	1		
A12.3.3	8.4.3	Supervision for duration of construction	Sum	1		
A12.3.4	8.4.4	Company and head office overhead costs for the duration of the contract	Sum	1		
A13	PE8.2.1	Updating and amending the risk assessments, safe work procedures, the project H&S File, the H&S plan, the provision of PPE and protective clothing and any other H&S matters that the contractor deems necessary	Sum	1		
A14	PE9.2.2	Full compliance with all H&S matters during the construction of the works under the contract	Sum	1		
A15	8.4.5	General responsibilities and other time related obligations	Sum	1		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
A16	PZ8.1	Allow for all costs associated with all environmental activities, unless if provided for payment elsewhere to esnure compliance with all the requirements of the Employer's Management Specification, Environmental Management Programme, Environmental Authorisation (RoD)	Sum	1		
A18	C3.3	Administration and supervision of mandatory subcontract work including supervision of SMMEs. Payment will be on progress of the SMME work proportional to the contract participation goal of 30%	Sum	1		
	8.5	**PROVISIONAL SUMS**				
A19	PSAB8.2.1	Engineer's telephone and internet costs including R350 per week for cellphone usage (prime cost)	Prov Sum	1	50 000	50 000
A19.1		Contractor's mark-up on Item A19	%	25000.00		
A20		Provisional sum for compensating landowners for land and crop damage due to construction	Prov Sum	1	150000.00	150000.00
A20.1		Contractor's mark-up on Item A20	%	150000.00		
A21		Installation of cathodic protection systems by a selected sub contractor	Prov Sum	1	1500000.00	1500000.00
A21.1		Contractor's mark-up on Item A21	%	1500000.00		
A22		Coating integrity surveys by CP Professional Services Provider	Prov Sum	1	200000.00	200000.00
A22.1		Contractor's mark-up on Item A22	%	200000.00		
A23		Inspection of manufactured/fabricated materials by inspectors appointed by the Engineer	Prov Sum	1	200000.00	200000.00
A23.1		Contractor's mark-up on Item A23	%	200000.00		
A24		Inspection of pipes at pipeyard by inspectors appointed by the Engineer	Prov Sum	1	300000.00	300000.00
A24.1		Contractor's mark-up on Item A24	%	300000.00		
A25		Accommodation for the Engineer's Representative (Prime Cost)	Prov Sum	1	105000.00	105000.00
A25.1		Contractor's mark-up on Item A25	%	105000.00		
A26		Allow provisional sum for survey by surveyor appointed by the Engineer	Prov Sum	1	55000.00	55000.00
A26.1		Contractor's mark-up on Item A26	%	55000.00		
A27		Allowance for Engineer's Representative Site Travel	Prov Sum	1	70000.00	70000.00
A27.1		Contractor's mark-up on Item A27	%	70000.00		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
A28		Provisional sum for telemetry equipment including repeater stations if required	Prov Sum	1	200000.00	200000.00
A28.1		Contractor's mark-up on Item A28	%	200000.00		
A29		Provisional Sum for final environmental rehabilitation by specialised sub-contractor	Prov Sum	1	300000.00	300000.00
A29.1		Contractor's mark-up on Item A29	%	300 000		
A30		Provisional Sum for fixing of pipes at pipeyard	Prov Sum	1	3000000.00	3000000.00
A30.1		Contractor's mark-up on Item A30	%	3000 000		
A31		Provisional Sum for Community Liaison	Sum	1	60000.00	60000.00
A31.1		Contractor's mark-up on Item A31	%	60000.00		
A32		Allowance for 2N° students for in-service training	Sum	1	150000.00	150000.00
A32.1		Contractor's mark-up on Item A31				
A33		Training allowance paid to targeted labour in terms of formal training	Prov Sum	1	200000.00	200000.00
A34		**Occupational Health & Safety**				
A34.1		OHS File and Site Specific and Hazard Identification, Risk Assessment and Risk Control	Sum	1		
A34.2		Obligation for updating and amending the risk assessments , safe work procedures, the project health and safety file , the heath and safety plan and for full compliance with all health and safety matters during construction works under the contract. This include internal health and safety audit	Sum	1		
A34.3		Portable Chemical Toilets – Male/ Female	Sum	1		
A34.4		Change Room Facilities – Male/ Female	Sum	1		
A34.5		Eating Area for employees	Sum	1		
A34.6		Health and safety Notice Board	Sum	1		
A34.7		Construction Site Signage Board	Item	2		
A34.8		Signage - PPE Required for Site	Item	2		
A34.9		Hazardous Substance Store & Signage plus signage	Sum	1		
A34.10		Fire Extinguisher 9kg DCP plus signage	Item	6		
A34.11		Regulation 3 First Aid Box Complete plus signage	Sum	1		
A34.12		Regulation 7 Blood Spill Kit	Sum	1		
A34.13		Hazardous Substance Spill Kit	Sum	1		
A34.14		Protective Clothing and Equipment				

Total Carried Forward	

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
A34.14.1		i)Protective clothing	Sum	1		
A34.14.2		ii) Hard hats	Sum	1		
A34.14.3		iii) Safe foot wear	Sum	1		
A34.14.4		iv) Eye protection	Sum	1		
A34.14.5		v) Ear protection	Sum	1		
A34.14.6		vi)Reflective vests	Sum	1		
A34.15		Perimeter hoarding	Sum	1		
A34.16		i)Excavation warning signage	Sum	1		
A34.16.1		ii)Orange net	Sum	1		
A34.16.2		iii)Danger tape	Sum	1		
A34.17		Waste Material bins	Sum	1		
A34.18		Spare Protective Clothing – i.e. Hard Hats, hearing, respiratory, eye and hand protection and reflective vests, life jackets, safety harnesses	Sum	1		
A34		Dayworks	Prov Sum	1	250000.00	250000.00
Total Carried Forward To Summary						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
B		**SECTION B: EARTHWORKS**				
	SABS 1200 C SABS 1200 DB	**SITE CLEARANCE**				
B1	SABS 1200 DB 8.3.1a	Clear vegetation and trees of girth up to 1m along route of pipeline				
B1.1		For up to 20 m width working strip for pipes DN 500 or larger	m	3 300		
B1.2		For up to 10 m width working strip for pipes smaller than DN 500	m	2 300		
B2		Clear trees and schrubs from pipe yard in controlled manner so as to not cause any damage / contamination to the pipes	ha	8.5		
B3	SABS 1200 DB 8.3.1b	Clear trees (complete with stump removals) for:				
B3.1		Girth greater than 1m but less than 2m	N°	10		
B3.2		Girth greater than 2m but less than 3m	N°	5		
B3.3		Girth greater than 3m but less than 4m	N°	2		
B4	SABS 1200 DB 8.3.1c	Remove, stockpile and maintain at approved sites, top soil to a depth of 200mm along the route of the pipeline				
B4.1		For up to 20 m width working strip for pipes DN 500 or larger	m	3 300		
B4.2		For up to 10 m width working strip for pipes smaller than DN 500	m	2 300		
B5	PSC8.2.11	Remove existing wire, timber or precast concrete fencing, set aside and maintain during construction. Reinstate after completion of works to condition not worse than the original	m	500		
B6	PSC8.2.13	Supply and erect temporary fencing as per PSC 5.3.3 to act as child proof barrier to fence off both sides of open trenches. Rate to include removal of fencing after completion of the project	m	11 200		
B7	PSC8.2.14	Remove & relocate temporary fence as per PSC 5.3.3 to act as child proof barrier to fence off both sides of open trenches.	m	11 200		
	SABS 1200 DA	**EXCAVATION : MINOR STRUCTURES**				
B8	8.3.2a	Selective bulk excavation in all material and dispose or stockpile as required for forming of terraces surrounding the structures and for the trimming of slopes, for:				
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
B8.1		Isolating valve chambers	m³	230		
B8.2		Off-take chambers	m³	120		
B8.3		Connection to tank chamber	m³	50		
B8.4		Scour valve chambers	m³	120		
B8.5		Air valve chamber	m³	210		
B8.6		Elevated tank foundation	m³	10		
B8.7		Elevated tank drain	m³	21		
B8.8		Connection to reticulation	m³	21		
B9	8.3.2(b)	Extra over Item B9 for:				
B9.1		Hard rock material (Prov)	m³	100		
B9.2		Intermediate material (Prov)	m³	300		
B10	8.3.2	Restricted excavation in all material and and dispose or stockpile as ordered, for:				
B10.1		Blinding	m³	7		
B10.2		Sump	m³	8		
B11	8.3.3b	Extra over Item B11 for:				
B11.1		Hard rock excavation (Prov)	m³	10		
B11.2		Intermediate excavation	m³	5		
B11.3		Backfill with imported selected material compacted to 93% MOD AASTHO	m³	200		
B12	8.3.4a	Import selected fill material to use for embankments around structures and compact to 96% Mod AASHTO	m³	20		
B13	8.3.4a	Import and spread topsoil to a nominal depth of 200 mm on embankments, terraces and designated areas	m²	10		
B14	8.3.10	Topsoiling to all disturbed area, rate to include excavating and transporting form stockpile	m²	50		
B15	8.3.11	Grassing of all the topsoiled areas	m²	50		
	SABS1200 DB	**EXCAVATION :PIPE TRENCHES**				
B16	8.3.2(a)	Excavate in all materials for trenches, backfill, compact or dispose of surplus / unsuitable material, for depths. No additional payment will be made for bell (fox) holes. (Rates to include where required shoring or other suitable lateral support):				
B16.1		For pipes DN500 or larger				
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
		Over and Up to				
B16.1.1		0.0 m 1.0 m	m	100		
B16.1.2		1.0 m 1.5 m	m	100		
B16.1.3		1.5 m 2.0 m	m	3 323		
B16.1.4		2.0 m 2.5 m	m	150		
B16.1.5		2.5 m 3.0 m	m	75		
B16.1.6		3.0 m 3.5 m	m	75		
B16.2		For pipes smaller than DN500				
		Over and Up to				
B16.2.1		0.0 m 1.0 m	m	248		
B16.2.2		1.0 m 1.5 m	m	2 116		
B16.2.3		1.5 m 2.0 m	m	100		
B16.2.4		2.0 m 2.5 m	m	50		
B16.2.5		2.5 m 3.0 m	m	25		
B16.2.6		3.0 m 3.5 m	m	25		
B17		Excavate by hand in confined areas for pipe trenches or to locate and expose existing services where ordered by the Engineer	m³	100		
B18	PSDB8.3.2	EO Items B19. No additional payment will be made for bell (fox) holes.				
B18.1		Hard rock excavation	m³	2 890		
B18.2		Intermediate excavation	m³	5 760		
B18.3		Boulder excavation Class A	m³	580		
B18.4		Boulder excavation Class B	m³	580		
B19		Removal of rock without the use of explosives (where ordered by the Engineer)	m³	500		
B20		Extra Over Item B17 for backfill stabilised with 5% cement where directed by the Engineer (Clause PSDB 3.5 (C))	m³	100		
B21	8.3.2c	Excavate unsuitable material from trench bottom and dispose	m³	100		
	SABS 1200 D	**Surface Finishes to Trenches**				
B22.1	8.3.10	Reinstate topsoil from stockpile to a depth of 200mm along the working strip	m²	112 000		
B22.2	8.3.11	Reistate natural grasses along the working strip	m²	112 000		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
B23	SABS1200 DB 8.3.3	**Excavation Ancilliaries**				
B23.1	8.3.3.1	Imported backfill material from commercial sources	m³	500		
B23.2	8.3.3.3	Compaction under roadways/road reserves to 98% MOD AASHTO	m³	250		
B23.3	PSDB 5.1.2.4	Supply and install sack breakers in trenches for depths:				
B23.3.1		0.5m - 1.0m	N°	10		
B23.3.2		1.0m - 2.0m	N°	10		
B23.3.3		2.0m - 2.5m	N°	10		
B24	PSDB 5.1.2.3	Build cross embankments as specified where ordered	m³	20		
		Existing Services				
B25	SABS1200 DB 8.3.5a	Services that Intersect a Trench :				
B25.1		Telkom and Electric cables (underground) (no additional payment will be made for overhead telephone and power lines or poles)	N°	20		
B25.2		Wire fence	N°	20		
B25.3		Stormwater pipes up to 800mm diameter	N°	10		
B25.4		Water mains up to 300mm diameter	N°	20		
B25.5		Sewer mains up to 300mm diameter	N°	20		
B25.6		EO Items B17 for excavating, backfilling, compacting and reinstating trenches crossing beneath (rates to incl for reinstating if damaged in any way by the Contractor) :				
B25.6.1		Wire fences	N°	10		
B25.6.2		Stormwater pipes up to 800mm diameter	N°	10		
B25.6.3		Water pipes up to 800mm diameter	N°	10		
B26	PSDB8.3.5	EO Items B17 for excavating, backfilling, compacting and reinstating trenches parallel to and within 1,0 m from :				
B26.1		Telkom and electric cables (LT) and (HT) (underground) (no additional payment will be made for overhead telephone lines or poles)	m	250		
B26.2		Wire fences	m	100		
B26.3		Stormwater pipes up to 800mm diameter	m	100		
B26.4		Water pipes up to 800mm diameter	N°	100		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
B26.5		Water mains up to 300mm diameter	N°	100		
B26.6		Sewer mains up to 300mm diameter	N°	100		
B27	SABS1200 DK	**Gabions and Pitching**				
		Supply all materials, construct and place gabions and mattresses where ordered:				
B27.1	8.2.1a	Surface preparation - Cavities filled with approved excavated rock or material	m²	20		
B27.2	8.2.2	Gabions (Rate to include costs for complete supply of all materials, filling of the cages and construction of the gabions/mattrresses):				
B27.2.1	PSDK 3.1.2.	6 x 1 x 1m galvanised wire boxes	m³	20		
B27.2.3		170 mm thick galvanised reno mattresses	m²	12		
B27.3	PSDK 3.1.3	Geotextile where ordered (Kaymat U24 or similar approved)	m²	20		
B27.4		Extra over Item B27.2 for grade 15/19 concrete screed, 50mm thick to top of mattresses where ordered	m³	2		
B28		**Gravel Roads and Parking Areas**				
	SABS1200 DM	Earthworks				
B28.1	8.3.2	Strip top soil 200mm and stockpile	m²	100		
B28.2	8.3.3 (a) (2)	Treatment of road bed to 93% MOD AASHTO	m³	10		
	SABS 1200 ME	Gravel Wearing Course				
B28.3	8.3.3	Construct wearing course with materials from commercial sources	m³	6		
B29		**Rehabilitation and Reinstatement**				
	PZ8.2	Compliance with the rehabilitation and reinstatement required by the EMPr				
B29.1	PZ8.2.1	Ripping of compacted and disturbed areas within the working strip to a depth of 150 mm	m²	56 000		
B29.2	PZ8.2.2	Handtrimming				
B29.2.1		ii) Topsoiling	m²	150		
B29.3	PZ8.2.3	Soil testing at an approved facility	N°	25		
B29.4	PZB2.4	Soil improvements required prior to vegetation re-establishment				
B29.4.1		Compost (Supplied, placed and mixed into soil)	t	10		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
B29.4.2		pH Rectifiers (Supplied, placed and mixed into soil)	t	10		
B29.4.3		Fertilizer (2:3:2) (Supplied, placed and mixed into soil)	t	2		
B29.5	PZ8.2.5	Maintenance, including weeding, watering etc.	m²	112 000		
Total Carried Forward To Summary						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
C	SABS 1200 G	**SECTION C: CONCRETE**				
	8,4	**Concrete**				
C1	8.4.2	Blinding layer in 15 MPa/19mm concrete:				
C1.1		50mm thick to horizontal surfaces	m³	9		
C2	8.4.3	Strength concrete Grade 15 MPa / 19mm:				
C2.1		Benching	m²	56		
C3	8.4.3	Strength Concrete Grade 30MPa / 19mm:				
C3.1		Sump	m³	10		
C3.2		Off-take 2A chamber	m³	8		
C3.3		Off-take 2B chamber	m³	27		
C3.4		Connection to tank chamber	m³	10		
C3.5		Scour valve chambers	m³	46		
C3.6		Elevated tank foundation	m³	10		
C3.7		Elevated tank drain	m³	10		
C3.8		Connection to Makhanyeni Reservoirs	m³	9		
C4	8.3	**REINFORCEMENT**				
	8.3.1	**High Tensile Steel Bars**				
C4.1		25mm diameter basic price	kg	26 500		
		Extra over item C4.1 for bars of the following diameters: (Prov)				
C4.1.1		a) 12mm diameter	kg	9 250		
C4.1.2		b) 16mm diameter	kg	3 000		
C4.1.3		c) 20mm diameter	kg	9 500		
	8.3.1	**Mild Steel Bars**				
C4.2		25mm diameter basic price	kg	600		
		Extra over item C4.2 for bars of the following diameters: (Prov)				
C4.2.1		a) 12mm diameter	kg	250		
C4.2.2		b) 16mm diameter	kg	250		
C4.2.3		c) 20mm diameter	kg	100		
	PSGA8.1.1.4	**FORMWORK**				
C5	8.2.1	Rough vertical plane:				
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
C5.1		Off-take 2B Chambers	m²	49		
C5.2		Off-take 2A chamber	m²	27		
C5.3		Connection to Tank Chamber	m²	33		
C5.4		Scour Chambers	m²	161		
C5.5		Elevated tank drain chamber	m²	33		
C5.6		Connection to Makhanyeni Reservoir chamber	m²	33		
C6	8.2.2	Smooth vertical plane:				
C6.1		Outside walls of Off-take 2B chambers	m²	17		
C6.2		Inside walls of Off-take 2B chambers	m²	58		
C6.3		Outside walls of Off-take 2A chambers	m²	8		
C6.4		Inside walls of Off-take 2A chambers	m²	23		
C6.5		Outside walls of connection to tank chamber	m²	12		
C6.6		Inside walls of connection to tank chamber	m²	30		
C6.7		Outside walls of scour chambers	m²	15		
C6.8		Inside walls of scour chambers	m²	193		
C6.9		Inside walls of elevated tank drain chamber	m²	30		
C6.10		Outside walls of elevated tank drain chamber	m²	12		
C6.11		Inside walls of connection to Makhanyeni Reservoir chamber	m²	30		
C6.12		Outside walls of connections to Makhanyeni Reservoir chamber	m²	12		
C7	8.2.2	Smooth horizontal plane:				
C8		Casting of pipes/specials through walls and slabs, including for formwork around pipes and fixing pipes to the designated lines and levels and tape wrapping				
C8.1		DN 700 mm pipes to 300 mm thick walls	N°	12		
C8.2		DN 200 mm pipes to 300 mm thick walls	N°	1		
C8.3		DN 150 mm pipes to 300 mm thick walls	N°	6		
C8.4		DN 150 mm pipes to 250 mm thick walls	N°	1		
C8.5		DN 100 mm pipes to 250 mm thick walls	N°	12		
C8.6		DN 80 mm pipes to 300 mm thick walls	N°	2		
C8.7		DN 80 mm pipes to 250 mm thick walls	N°	10		
	8.4.4	**UNFORMED SURFACE FINISHES**				
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
C9	8.4.4a	Wood floated finish:				
C9.1		Off-take 2B Floor Slab Chambers	m²	17		
C9.2		Off-take 2A Floor Slab Chambers	m²	7		
C9.3		Connection to Tank Chamber floor slab	m²	6		
C9.4		Connection to Tank Drain floor slab	m²	6		
C9.5		Connection to Makhanyeni Reservoir floor slab	m²	6		
C9.6		Scour Chambers floor slab	m²	51		
C10		Steel Floated finish:				
C10.1		Isolating valve Chambers roof slab	m²	17		
C10.2		Off-take Chambers roof slab	m²	10		
C10.3		Connection to Tank Chamber roof slab	m²	10		
C10.4		Scour Chambers roof slab	m²	27		
C10.5		Elevated tank drain chamber roof	m²	10		
C10.6		Connection to reticulation chamber roof	m²	10		
C10.7		Elevated tank chamber roof	m²	10		
C10.8		Connection to Makhanyeni Reservoir chamber roof	m²	10		
C11		Supply and lay screed to floors including for preparation of concrete surfaces, levelling and finishing with steel trowel:				
		50 mm thick to:				
C11.1		Off-take 2B chambers	m²	17		
C11.2		Off-take 2A chambers	m²	7		
C11.3		Connection to tank chamber	m²	6		
C11.4		Scour valve chambers	m²	51		
C11.5		Connection to Tank Drain chamber	m²	6		
C11.6		Connection to Makhanyeni Reservoir chamber	m²	6		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
	8.6	**PRECAST CONCRETE FOR AIR VALVE CHAMBERS**				
		FOR AIR VALVE CHAMBERS				
C13		Supply and install 2.8 m x 1.41 m x 0.15 m precast concrete roof slab, with 100 mm diameter air vents cast in as per DWG MD1993-03-081 (Grade 40MPa / 15mm) with galvanised bar handle. Including maverick manhole cover and frame Type 1B or similar approved	N°	6		
C14		Supply and install 2.8 m x 0.83 m x 0.15 m precast concrete roof slab, with 100 mm diameter air vents cast in as per DWG MD1993-03-081 (Grade 40MPa / 15mm)	N°	6		
C15		Supply and install 2.8 m x 0.515 m x 0.15 m precast concrete roof plank, with 2 x 25 mm diameter lifting holes (Grade 40MPa /15mm)	N°	12		
C16		Supply and install 2.8 m x 3.3 m x 0.5 m precast concrete manhole rings (Grade 40MPa / 15mm)	N°	18		
C17		Supply and install DN 1450 x 0.15 m thick precast concrete roof slab with 100 mm diameter air vents cast in as per DWG MD1993-03-081 (Grade 40MPa /15mm) with galvanised bar handle. Including maverick manhole cover and frame Type 1B or similar approved	N°	5		
C18		Supply and install DN 1250 x 0.5 m precast concrete manhole rings (Grade 40MPa/15mm) with RMCS 512 step iron or similar approved	N°	15		
		FOR SCOUR VALVE CHAMBERS				
C19		Supply and install DN 1750 x 0.15 m thick precast concrete roof slab with 100 mm diameter air vent cast in as per DWG MD1993-03-081 (Grade 40MPa/15mm) with galvanised bar handle. Including maverick manhole cover and frame Type 1B or similar approved	N°	5		
C20		Supply and install DN 1250 x 0.5 m precast concrete manhole rings (Grade 40MPa/15mm) with RMCS 512 step irons or similar approved	N°	10		
		FOR OTHER CHAMBERS				
C21		Supply and install 4.18 m x 0.515 m x 0.2 m precast concrete roof plank, with 2 x 25 mm diameter lifting holes (Grade 40MPa/15mm)	N°	2		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
C22		**Sundries**				
C22.1		Supply and cast into roof slabs "Maverick" Type 1B manhole cover and frame or similar approved	N°	2		
C22.2		Supply and cast into roof slabs 100mm diameter vent without vertical pipe (MD1993-03-081)	N°	2		
C22.3		Supply and cast into roof slabs 100mm diameter airvent with vertical pipe (MD1993-03-081)	N°	2		
Total Carried Forward To Summary						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
D		**SECTION D: PIPEWORK**				
D1	SABS 1200 LB	**Provision of Bedding**				
D1.1	PSLB8.2.1	Selected from trenches, and/or other excavations without the need for screening or other treatment:				
D1.1.1		Selected granular material	m³	75		
D1.1.2		Selected fill material	m³	75		
D1.2	PSLB8.2.1	Selected from trenches and/or other excavation incl. for screening and/or other treatment:				
D1.2.1		Selected granular material	m³	75		
D1.2.2		Selected fill material	m³	75		
D1.3	PSLB8.2.2	Supply of bedding from commercial sources, where ordered:				
D1.3.1		Selected granular material	m³	4 190		
D1.3.2		Selected fill material	m³	1 250		
D1.4		**DRAINAGE LAYER**				
D1.4.1	PSLB 1.2.1	Supply and place in trench bottom, 150mm layer of crushed stone as pipe drainage layer beneath DN700 diameter pipe (PROV)	m³	75		
D1.4.2	PSLB 1.2.2	Supply and place in trench bottom, 150mm layer of crushed stone as pipe drainage layer beneath DN200 diameter pipe (PROV)	m³	75		
D1.4.3		Supply and installation of geofabric filter material (BIDIM Grade A4 or similar) around stone (Prov)	m²	1 850		
D1.5		**CONCRETE ENCASEMENT**				
D1.5.1	PSLB 5.4	Pipe encasement in Grade 15/19 concrete, including for all formwork at river crossings as shown and where ordered by the Engineer	m³	50		
D2	SABS1200 L 1983	**PIPE LAYING:**				
		DN 700 Steel Pipes and Fittings : (All Flanges to EN 1092-1:2007 Type01, Table 14 (PN16) unless otherwise stated)				
D2.1	8.2.1 PH	Collect from pipeyard, handle, transport, lay, bed in flexible pipe bedding, test check for holidays for both internal and external linings, pressure test and flush steel pipes, fittings and specials, including nuts, gaskets and jointing material for belled and plain ends steel pipes and fittings, fillet welded, lined with 12 mm cement mortar lining and coated with Sintakote coating.				
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
D2.1.1		DN700 x 6.0mm wall thickness API 5L Grade X 42 pipes	m	3 300		
D2.1.2		EO Item D2.1.1 for cutting pipe to length to suit on site	N°	60		
D2.2		Extra over Item D2.1.1 for fabrication, installation and jointing of the following specials:				
D2.2.1		Bends (wall thickness 6mm Grade X42):				
D2.2.1.1		DN700 bends - 2 segments - from 9° to 15° - 850 C/F	N°	1		
D2.2.1.2		DN700 - 3 segments - from over 15° to less than 30° - 850 C/F	N°	1		
D2.2.1.3		DN700 bends - 4 segments - over 30° - less than 60°	N°	3		
D2.2.1.4		DN700 bends - 4 segments - over 60° - less than 90°	N°	1		
D2.2.1.5		DN700 mitre joint from 3° to 9°	N°	17		
D2.3	8.2.1 PH	Collect from pipeyard, handle, transport, lay, bed in flexible pipe bedding, test check for holidays for both internal and external linings, pressure test and flush steel pipes, fittings and specials, including nuts, gaskets and jointing material for belled and plain ends steel pipes and fittings, fillet welded, lined with 12mm cement mortar lining and coated with 3L HDPE coating.				
D2.3.1		DN200 x 4.5mm wall thickness API 5L Grade X42 pipes	m	3 360		
D2.3.2	PSL8.2.1.7	EO Item D2.3.1 for cutting pipe to length to suit on site	N°	40		
D2.4	8.2.2	Extra over Item D2.3.1 for fabrication, installation and jointing of the following specials:				
D2.4.1		Bends (wall thickness 4.5mm Grade X42):				
D2.4.1.1		DN200 bends - 2 segments - from 9° to 15° - 850 C/F	N°	5		
D2.4.1.2		DN200 bends - 3 segments - from over 15° to less than 30° - 850 C/F	N°	9		
D2.4.1.3		DN200 bends - 4 segments - from over 30° - 1650 C/F	N°	8		
D2.4.1.4		DN200 mitre joint from 3° to 9°	N°	22		
	8.2.1 PH	**DN 90 HDPE PE100, DN200 and DN 160 uPVC and Fittings**				
D2.4	8.2.1 PH	Supply, install, lay, bed in flexible pipe bedding and test				
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
D2.4.1.1		DN90 HDPE PE100 pipe PN16	m	450		
D2.4.1.2		DN110 uPVC pipe PN12	m	80		
D2.4.1.3		DN160 uPVC pipe PN12	m	40		
D3		**STEEL PIPES AND FITTINGS**				
D3.1		**Pipe Schedule of: Off-Take 2A**				
	8.2.5	Supply, fabricate, handle, lay, joint, test and disinfect steel specials including all nuts, bolts, gaskets, jointing material, preparation for welding where required and the repair and making good of all coatings and linings to manufacturer's specifications. All fittings PN25				
D3.1.1		DN700 x DN150 PE/FL scour tee; DN 700 PE barrel 1000mm long with central tangenitial flanged branch 1400mm C/F with puddle collar 325mm from flange	N°	1		
D3.1.2		DN FL 150 x 80 unequal tee 230mm C/F	N°	1		
D3.1.3		DN150 D/FL wedge gate valve with non-rising spindle and hand wheel	N°	1		
D3.1.4		DN150 dismantling joint with 4N° extension bolts to suit anchoring flange	N°	1		
D3.1.5		DN150 pipe D/FL 510mm long, with central concentric DN 15 tap for Item D3.1.16	N°	1		
D3.1.6		DN150 Aquamaster 3 magnetic flow meter, with external battery pack, pressure sensor (20 bar and 5m cable), GSM transmitter with external signal and insulating gaskts either side	N°	1		
D3.1.7		DN150 pipe D/FL 700 mm long with central puddle flange	N°	1		
D3.1.8		DN200 x 150 reducer	N°	1		
D3.1.9		DN200 dismantling jopint complete with 4N° extension bolts to suit anchoring flange	N°	1		
D3.1.10		DN 80 D/FL wedge gate valve with non-rising spindle and hand wheel	N°	1		
D3.1.11		DN80 dismantling joint complete with 4N° extension bolts to suit anchoring flange	N°	1		
D3.1.12		DN 80 pipe D/FL 400 mm long, with central concentric DN15 tap for Item D3.1.16	N°	1		
D3.1.13		DN80 Aquamaster 3 magnetic flow meter, with external battery pack, pressure sensor (20 bar and 5m cable), GSM transmitter with external signal and insulating gaskets either side	N°	1		
D3.1.14		DN80 pipe D/FL 700 mm long with central puddle flange	N°	1		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						0.00
D3.1.15		DN 90 x 80 compression flange adaptor	N°	1		
D3.1.16		DN15 nipple	N°	2		
D3.1.17		DN15 threaded brass gate valve with non-rising spindle and hand wheel	N°	2		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						0.00
D3.2		**Pipe Schedule of: Off-Take 2B**				
	8.2.5	Supply, fabricate, handle, lay, joint, test and disinfect steel specials including all nuts, bolts, gaskets, jointing material, preparation for welding where required and the repair and making good of all coatings and linings to manufacturer's specifications. All fittings PN25				
D3.2.1		DN700 X 600 PE/FL unsymmetrical tee, DN700 PE barrel 2395mm long with one end FL and other end PE with puddle flange 672mm from PE, concentric DN600 FL branch 755mm C/F, 900mm from barrel FL, and with concentric DN150 FL branch 868mm C/F and 1155mm from barrel FL, protruding at 45° below the horizontal axis to the right when viewed from that FL end	N°	1		
D3.2.2		DN600 blank FL with central DN150 FLstub 30mm long with central concentric DN15 tap for item D3.2.5 DN600 FLto be complete with 2N° 16mm diameter lifting eyes	N°	1		
D3.2.3		DN150 D/FL wedge gate valve with non-rising spindle and hand wheel	N°	5		
D3.2.4		DN150 FL model N° 150LW25/700 "variant" (or similar approved) stainless steel air valve	N°	1		
D3.2.5		DN15 nipple	N°	4		
D3.2.6		DN15 threaded brass gate valve with non-rising spindle and hand wheel	N°	3		
D3.2.7		DN700 fully flanged butterfly valve	N°	1		
D3.2.8		DN700 pipe FL/PE 2123mm long with puddle flange 674mm from PE, with concentric DN150 FLbranch 868mm C/F and 923mm from barrel FL, protruding at 45° below the horizontal axis to the left when viewed from that FLend	N°	1		
D3.2.9		DN150 FLequal tee 230mm C/F	N°	1		
D3.2.10		DN150 FL - 90° bend	N°	2		
D3.2.11		DN150 dismantling joint complete with 4N° extension bolts to suit anchor flange	N°	2		
D3.2.12		DN150 D/FL 1007mm long	N°	1		
D3.2.13		DN700 dismantling joint complete with 4N° extension bolts to suit anchor flange	N°	1		
D3.2.14		DN150 D/FL 700mm long with central puddle flange	N°	1		
D3.2.15		DN150 dispenser PE/FL pipe 200mm long	N°	1		
D3.2.16		DN80 dismantling joint complete with 4N° extension bolts to suit anchoring flange	N°	1		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
D3.2.17		DN80 pipe D/FL 400mm long, with central concentric DN15 tap for item D3.2.5	N°	1		
D3.2.18		DN80 Aquamaster 3 magnetic flow meter, with external battery pack, pressure sensor (20 bar and 5m cable), GSM transmitter with external signal and insulating gaskts either side	N°	1		
D3.2.19		DN80 pipe D/FL 700mm long with central puddle flange	N°	1		
D3.2.20		DN90 x 80 compression flange adaptor	N°	1		
D3.3		**Pipe Schedule for: Connection to Tanks**	N°	1		
	8.2.5	Supply, fabricate, handle, lay, joint, test and disinfect steel specials including all nuts, bolts, gaskets, jointing material, preparation for welding where required and the repair and making good of all coatings and linings to manufacturer's specifications. All fittings PN16				
D3.3.1		DN90 x 100 compression flange adaptor	N°	1		
D3.3.2		DN100 pipe D/FL 700mm with puddle flange 380mm from one flange	N°	2		
D3.3.3		DN100 wedge gate valve	N°	1		
D3.3.4		DN100 pipe D/FL 450mm	N°	1		
D3.3.5		DN100 dismanteling joint	N°	1		
D3.3.6		DN100 altitude control valve (Bermad 750 - 86 or similar approves)	N°	1		
D3.3.7		DN100 x 110 flange adaptor	N°	1		
D3.3.8		DN100 blank flange (orifice plate) with concentric hole drilled as follows:	N°	1		
D3.3.8.1		50Kl elevated tank at Off-take 2A 11mm	N°	1		
D3.3.8.2		50Kl elevated tank at Off-take 2B 7mm	N°	1		
D3.4		**Air Valves**				
	8.2.5	Supply, fabricate, handle, lay, joint, test and disinfect steel specials including all nuts, bolts, gaskets, jointing material, preparation for welding where required and the repair and making good of all coatings and linings to manufacturer's specifications. All fittings PN25				
D3.4.1		DN700 x DN600 PE/FL concentric tee DN700 PE barrel 2000mm long with central concentric DN600 FL branch 700mm C/f	N°	6		
D3.4.2		DN600 blank FL with central DN150 FL stub 300mm long with central concentric DN15 tap, DN600 FL to be complete with 2No. 16mm lifting eye	N°	6		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
D3.4.3		DN 150 D/FL wedge gate valve with non- rising spindle handwheel	N°	6		
D3.4.4		DN 150 Variant model no. 150LW 25/700 stainless steel air valve or similar approved	N°	6		
D3.4.5		DN200 PE/FL equal tee flange on the branch	N°	6		
D3.4.6		DN200 blank FL with central DN50 FL stub 1000mm long with central concentric DN15 tap, for item D3.4.9	N°	6		
D3.4.7		DN 50 D/FL wedge gate valve with non- rising spindle handwheel	N°	6		
D3.4.8		DN 50 Variant model no. 050LW25/200 stainless steel air valve or similar approved	N°	6		
D3.4.9		DN15 nipple	N°	12		
D3.4.10		DN15 threaded bronze gate valve with non-rising spindle and hand wheel	N°	12		
D3.5	8.2.5	**Scour Valves**				
		Supply, fabricate, handle, lay, joint, test and disinfect steel specials including all nuts, bolts, gaskets, jointing material, preparation for welding where required and the repair and making good of all coatings and linings to manufacturer's specifications. All fittings PN25				
D3.5.1		DN700 x DN150mm PE/FL scour tee with collar, DN700 PE barrel 1000mm long with central tengential flanged branch 1400mm C/F with puddle flange 325mm from flanged end	N°	3		
D3.5.2		DN 150 d/fl pipe, 650mm long with puddle flange325mm from one end	N°	3		
D3.5.3		DN 150 d/fl wedge gate valve complete with non-rising spindle and handwheel	N°	6		
D3.5.4		DN 150 jet disperser	N°	3		
D3.5.5		DN 150 FL/PE pipe 828mm long	N°	3		
D3.5.6		DN 150 dismantling joint	N°	3		
D3.5.7		DN 80 jet disperser	N°	5		
D3.5.8		DN 80 x 45 degree fl/pe bend, 230 mm C/F	N°	5		
D3.5.9		DN 80 fl/pe pipe, PE cut to suit on site and threaded	N°	5		
D3.5.10		DN 80 D/FL pipe, cut to suit on site and threaded	N°	5		
D3.5.11		DN80 D/FL pipe 1200mm with puddle flange 622mm from FL end	N°	5		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
D3.5.12		DN 80 d/fl wedge gate valve complete with non-rising spindle and handwheel	N°	5		
D3.5.13		DN80 threaded flange	N°	5		
D3.5.14		DN80 flange adaptor	N°	5		
D3.6	8.2.5	**Canal Crossing**				
		Supply, fabricate, handle, lay, joint, test and disinfect steel specials including all nuts, bolts, gaskets, jointing material, preparation for welding where required and the repair and making good of all coatings and linings to manufacturer's specifications. All fittings PN25				
D3.6.1		Extra over for instalation of DN200 pipeline above ground at the canal crossing . Wrap all exposed pipe in 5 layers of hessian cloth impregnated with cement slurry	m	32		
D3.6.2		DN200 PE/FL equal tee flange on the branch	N°	1		
D3.6.3		DN200 blamk FL with central DN32 threaded tap for item D3.6.4	N°	1		
D3.6.4		DN32 barrel nipple	N°	2		
D3.6.5		DN32 ball valve	N°	1		
D3.6.6		DN32 "Variant" Model N° 32LW25/160 stainless steel air valve or similar approved	N°	2		
D3.6.7		DN200 FL/PE pipe 560mm long with plain end welded shut	N°	1		
D3.7		**Drain from Elevated Tank**				
		Supply, fabricate, handle, lay, joint, test and disinfect steel specials including all nuts, bolts, gaskets, jointing material, preparation for welding where required and the repair and making good of all coatings and linings to manufacturer's specifications. All fittings PN16				
D3.7.1	8.2.5	DN100 pipe D/FL 920 mm long with central puddle flange	N°	4		
D3.7.2		DN100 pipe D/FL 578 mm long with central concentric DN15 tap for item D3.7.3	N°	2		
D3.7.3		DN15 nipple	N°	2		
D3.7.4		DN15 threaded bronze gate valve with non-rising spindle and handwheel	N°	2		
D3.7.5		DN100 D/FL wedge gate valve with non-rising spindle and handwheel	N°	2		
D3.7.6		DN150 dismanteling joint0	N°	2		
D3.7.7		DN100 x 110 flange adaptor	N°	4		
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
D3.8		**Connection to Existing Makhanyeni Reservoirs**				
		Supply, fabricate, handle, lay, joint, test and disinfect steel specials including all nuts, bolts, gaskets, jointing material, preparation for welding where required and the repair and making good of all coatings and linings to manufacturer's specifications. All fittings PN25				
D3.8.1		DN200 flange adaptor	N°	1		
D3.8.2		DN200 x 100 reducer	N°	1		
D3.8.3		DN100 pipe D/FL 700mm with central puddle flange	N°	2		
D3.8.4		DN100 RSV gate valve	N°	1		
D3.8.5		DN100 pipe D/FL 500mm	N°	1		
D3.8.6		DN100 Aquamaster 3 magnetic flow meter, with external battery pack, pressure sensor (20 bar and 5m cable), GSM transmitter with external signal and insulating gaskts either side	N°	1		
D3.8.7		DN100 pipe PE/FL 300mm with central concentric DN15 tap for item D3.8.10	N°	1		
D3.8.8		DN100 dismanteling joint	N°	1		
D3.8.9		DN100 PN25 altitude control valve (Bermad 750-86 or similar approved)	N°	1		
D3.8.10		DN15 nipple	N°	1		
D3.8.11		DN15 threaded brass gate valve with non-rising spindle and hand wheel	N°	1		
D3.8.12		DN150 x 100 reducer	N°	1		
D3.8.13		DN160 flange adaptor	N°	1		
D3.8.14		DN100 pipe D/FL 300mm	N°	1		
D3.8.15		DN100 blank flange (orifice plate) with concentric 32mm hole	N°	1		
D3.9		**Disconnect supply to Makhonyeni Reservoirs**				
D3.9.1		Locate connection to existing DN200, end cap, including anchor block, pipeline to the existing Makhonyeni Reervoirs	Sum	1		
D4		**SUNDRIES**				
		Corrosion Protection				
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						
D4.1	PSL8.2.20	Supply all materials, plant and labour and field wrap all buried bolted flanged welded joints and flexible joints and buried valve bodies with "Denso" tape or similar approved including 100mm on either side of fitting concrete for flanges, pipes and specials for nominal diameters:				
D4.1.1		DN200	N°	30		
D4.1.2		DN700	N°	35		
D4.2		Tape wrap pipes at all concrete and air / soil interfaces with DENSOULTRAFLEX (or similar approved) with a 55% overlap and extend a minimum 75 mm into the concrete and minimum 150 mm into the air / soil				
D4.2.1	PSL8.2.19	DN700	N°	8		
D4.2.2	PSL8.2.19	DN200	N°	4		
D4.2.3	PSL8.2.19	DN150	N°	26		
D4.2.4	PSL8.2.19	DN100	N°	10		
D4.2.5	PSL8.2.19	DN80	N°	20		
D4.3		**Markers**				
D4.3.1		Supply and install standard marker beacons as shown on Drawing 090 at all horizontal bends on pipeline and where ordered by the Engineer, incl. for painting twice with white road marking paint and concrete surround	N°	60		
D4.3.2		Supply and install extra length marker beacons in bushy areas, as shown on Drawing 090 at all horizontal bends on pipeline and where ordered by the Engineer, incl. for painting twice with white road marking paint and concrete surround	N°	20		
D4.3.3		Supply and install IV, AV, SV marker posts painted with yellow road marker paint on concrete surround	N°	25		
D4.4	PSL8.2.20	Repair, as a result of damage inflicted by supplier, external Sintakote coating complete inclusive of labour, materials, supervision and QA / QC for defects (Provisional Quantities)				
D4.4.1		Up to 650 mm² in area	N°	50		
D4.4.2		From 651 mm² to 1 000 mm² in area	N°	30		
D4.4.3		From 1 001 mm² to 150 mm² in area	N°	30		
D4.5	PSL8.2.21	Repair, as a result of damage inflicted by supplier, external 3LPE coating complete inclusive of labour, materials, supervision and QA / QC for defects (Provisional Quantities)				
Total Carried Forward						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						0.00
D4.5.1		Up to 650 mm² in area	N°	30		
D4.5.2		From 651 mm² to 1 000 mm² in area	N°	15		
D4.5.3		From 1 001 mm² to 150 mm² in area	N°	5		
D4.6	PSL8.2.22	Repair, as a result of damage inflicted by supplier, internal Cement Mortar Lining (CML) complete inclusive of labour, materials, supervision and QA / QC for defects (Provisional Quantities)				
D4.6.1		Up to 200 mm² in area	N°	150		
D4.6.2		From 201 mm² to 400 mm² in area	N°	30		
		From 401 mm² to 800 mm² in area	N°	15		
D4.7	PSL8.2.23	Repair inside lining and outside coating in terms of the specificatio, as a result of thermic welding conducted by CP / Corrosion SPecialist, to attach a monitoring cable to the crown of the pipe (Provisional Quantitiy)	N°	16		
Total Carried Forward To Summary						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
E	**SABS1200 HA**	**SECTION E: STEELWORK**				
E1	8.3.3	Supply, handle and install hot dipped galvanised ladders (in different lenghts) including all anchors, rivets, HD bolts, nuts and washers:				
E1.1		Isolating valve Chambers	N°	3		
E1.2		Off-take 2A	N°	1		
E1.3		Off-take 2B	N°	1		
E1.4		Connection to Tank Chamber	N°	2		
E1.5		Elevated Tank Drain Chamber	N°	2		
E1.6		Connection to existing Makhanyeni Reservoir Chamber	N°	1		
E1.7		Scour Chambers	N°	6		
E2		Supply and install 70mm wide Keyed Alike stainless steel Discuss 0370 Padlocks, only three keys needed. Padlocks to comply with the requirements of SANS 1533	N°	7		
E3		Supply, handle and install Green fibre glass floor grading 38 mm thick, to wet well chambers	m²	16		
E4		Supply, handle and install pipe sleds, for road crossings, as detailed on Drawing Nº MD1993-02-041	N°	14		
E5		Supply, handle and install hot dipped galvanised locking bars including the anchors, for all wet well chambers	N°	7		
E6		Supply hot dipped galvanised key for Maverick manhole covers Type 1B or similar approved	N°	2		
E7		Supply, handle and install banded Mentis grating RS40 (or similar approved) with 25mm high x 2,5mm thick bearers to control chamber sump for the Mentis grating as detailed	m²	6		
E8		**Canal Crossing**				
E8.1		Pipe support brackets including top strap insertion rubber and all bolts	N°	10		
Total Carried Forward To Summary						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
F		**SECTION F: ROAD CROSSING**				
F1	SANS 1200 LG 8.1.1-A	Road Crossing				
F1.1	8.2.4	Excavation				
F1.1.1		Excavate in soft and intermediate material for pipes at road crossing, including removal and disposal of material	m³	203		
F1.1.2	8.2.5	Extra-over to Item D1.2.1 to excavate in hard rock	m³	70		
F1.2	8.2.6	Supply and install pipe sleeve				
F1.2.1		DN 1500 Class 100 D Type SC reinforced concrete pipes	m	25		
F1.3		Miscellaneous				
F1.3.1		Brick-up ends of DN 1500 concrete pipe sleeve	N°	2		
F1.3.2	8.2.1	Extra-over to Item C2.1 for supply, lay, joint, fix and test the following pipes in the pipe sleeves (Installation as shown on Drawing MD1993-03-040)				
F1.3.3		DN 700 Grade X42 steel pipe	m	25		
Total Carried Forward To Summary						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
G	PWA	**SECTION G: STEEL ELEVATED TANKS**				
G.1	PWA8	**MEASUREMENT AND PAYMENT**				
G.1.1	PWA8.1	Detailed design and submission of drawings to the Engineer and obtaining approval thereof	Sum	2		
G.1.2	PWA8.2	Supply and deliver 10 m high stand and 50 kl tank and all appurtenances to site	Sum	2		
G.1.3	PWA8.3	Erection of tank amd stand and all appurtenances	Sum	2		
G.1.4	PWA8.4	Disinfection of internal surfaces of tank	Sum	2		
G.1.5	PWA8.5	Testing tank and pipework for watertighhtness	Sum	2		
G.1.6	PWA8.6	Submission of Certificate of Completion of the Structural System signed by a Registered Professional Engineer all as required in terms of the National Building Regulations	Sum	2		
Total Carried Forward To Summary						

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
H		SECTION H: DAYWORKS				
H.1	PAA.5.1	**Labour**				
H.1.1		(a) Unskilled workers	hr			Rate Only
H.1.2		(b) Skilled workers (Artisans)	hr			Rate Only
H.1.3		(c) Operators and drivers	hr			Rate Only
H.1.4		(d) Foreman	hr			
H.1.5		(e) Others (specify)	hr			Rate Only
H.1.5.1		(i) Surveyor	hr			Rate Only
H.1.5.2		(ii)	hr			Rate Only
H.1.5.3		(iii)	hr			Rate Only
H.2	PAA.5.2	Construction Plant				
H.2.1		(a) Lowbed transport to site	hr			
H.2.2		(b) Bulldozer and ripper	hr			
H.2.3		(c) Tipper truck (10m³)	hr			
H.2.4		(d) Tipper truck (6m³)	hr			
H.2.5		(e) Water cart (7000ml)	hr			
H.2.6		(f) Grader	hr			
H.2.7		(g) Mechanical excavator	hr			
H.2.8		(h) TLB	hr			
H.2.9		(i) Compactors	hr			
H.2.10		(j) Compressor	hr			
H.2.11		(k) Light duty vehicle	hr			
H.2.12		(l) Front end loader	hr			
H.2.13		(m) Delivering pumps complete with generators and accessories	hr			
H.2.14		(n) Mobile electric welding sets complete with generators and accessories	hr			
H.2.15		(o) Concrete mixers	hr			
H.2.16		(p) Other plant	hr			
H.2.16.1		(i)	hr			
H.2.16.2		(ii)	hr			
H.2.16.3		(iii)	hr			
Total Carried Forward To Summary						

UMKHANYAKUDE DISTRICT MUNICIPALITY
JOZINI REGIONAL COMMUNITY WATER SUPPLY SCHEME - PHASE 1
CONTRACT SCMU 003/2023/2024: CONSTRUCTION OF 5.6 km LONG 700 / 200 mm DIAMETER WELDED STEEL PIPELINES AND TWO 50 kℓ ELEVATED TANKS

SUMMARY OF SECTIONS

SECTION	DESCRIPTION	AMOUNT R
1	SECTION A: PRELIMINARY AND GENERAL	
2	SECTION B: EARTHWORKS	
3	SECTION C: CONCRETE	
4	SECTION D: PIPEWORK	
5	SECTION E: STEELWORK	
6	SECTION F: ROAD CROSSING	
7	SECTION G: STEEL ELEVATED TANKS	
8	SECTION H: DAYWORKS	
SUBTOTAL		
ADD 10% CONTINGENCIES		
SUBTOTAL		
ADD 8% ESCALATION		
SUBTOTAL		
Add 15% VAT		
TOTAL		

C2.39

C2.41

C3: SCOPE OF WORK

C3.1: DESCRIPTION OF WORK

C3.2: ENGINEERING

C3.3: PROCUREMENT

C3.4: CONSTRUCTION

C3.5: MANAGEMENT

C3.6: STANDARD SPECIFICATIONS

C3.7: PROJECT SPECIFICATIONS

C3.8 PARTICULAR SPECIFICATIONS

C3: SCOPE OF WORK

Page N°

C3.1: DESCRIPTION OF WORK C3.5
C3.2: ENGINEERING C3.7
C3.3: PROCUREMENT C3.11
C3.4: CONSTRUCTION C3.16
C3.5: MANAGEMENT C3.24
C3.6: STANDARD SPECIFICATIONS C3.42
C3.7: PROJECT SPECIFICATIONS C3.46
C3.8 PARTICULAR SPECIFICATIONS C3.130

C3.1: DESCRIPTION OF WORK

TABLE OF CONTENTS **Page N°**

C3 SCOPE OF WORK C3.5

C3.1 Description of the Works C3.5
C3.1.1 Employer's Objectives C3.5
C3.1.2 Overview of the Works C3.5
C3.1.3 Extent of the Works C3.5
C3.1.4 Location of the Works and Access C3.6
C3.1.5 Temporary Works C3.6
C3.1.6 Nature of Ground and Subsoil Conditions C3.6

C3.2 Engineering C3.7
C3.2.1 Design Services and Activity Matrix C3.8
C3.2.2 Employer's Design C3.8
C3.2.3 Drawings C3.8
C3.2.4 Contractor's Design C3.9

C3.3 Procurement C3.11
C3.3.1 Preferential procurement procedures C3.12
C3.3.2 Enhancing Participation through Labour Intensive Construction C3.13
C3.3.3 Subcontracting C3.13
C3.3.4 Umkhanyakude Municipality Code of Conduct applicable to the Procurement of Goods, Services, Engineering and Construction Works C3.15

C3.4 Construction C3.16
C3.4.1 Applicable Specifications C3.17
C3.4.2 Plant and Materials C3.17
C3.4.3 Construction Equipment C3.18
C3.4.4 Existing Services C3.18
C3.4.5 Site Establishment C3.19
C3.4.6 Permits and Wayleaves C3.22
C3.4.7 Alterations, Additions, Extensions and Modifications to the Existing Works C3.23
C3.4.8 Water for Construction Purposes C3.23
C3.4.9 Survey Control and Setting out of the Work C3.23

C3.5 Management C3.24
C3.5.1 Management of the Works C3.25
C3.5.2 Planning & Programming C3.32
C3.5.3 Sequence of the Works C3.32
C3.5.4 Community Liaison Officer C3.33
C3.5.5 Methods and Procedures C3.33
C3.5.6 Quality Plans and Control C3.34
C3.5.7 Management of the Environment C3.34
C3.5.8 Accommodation of Traffic on Public Roads Occupied by the Contractor C3.35
C3.5.9 Other Contractors on Site C3.36
C3.5.10 Accredited Skills Training C3.36
C3.5.11 Testing, Completion, Commissioning and Correction of Defects C3.37
C3.5.12 Recording of Weather C3.38
C3.5.13 Key Personnel C3.38
C3.5.14 Management Meetings C3.38
C3.5.15 Forms for Correct Administration C3.38
C3.5.16 Electronic Payments C3.38
C3.5.17 Daily Records C3.38
C3.5.18 Bonds and Guarantees C3.38
C3.5.19 Payment Certificates C3.39
C3.5.20 Permits C3.39
C3.5.21 Proof of Compliance with the Law C3.39
C3.5.22 Insurance provided by the Employer C3.39

C3.5.23 Health and Safety C3.39
C3.5.24 AIDS Awareness C3.41

C3.6 Standard Specifications C3.42
C3.6.1 Introduction C3.43
C3.6.2 General C3.43
C3.6.3 Quality Management C3.43
C3.6.4 Standard Specifications C3.44

C3.7 Project Specifications C3.46
C3.7.1 PSA: General C3.48
C3.7.2 PSAB: Engineer's Office C3.52
C3.7.3 PSC: Site Clearance C3.55
C3.7.4 PSD: Earthworks C3.58
C3.7.5 PSDB: Earthworks (Pipe Trenches) C3.66
C3.7.6 PSDK: Gabions and Pitching C3.73
C3.7.7 PSDM: Earthworks (Roads, Subgrade) C3.76
C3.7.8 PSGA: Concrete (Small Works) C3.79
C3.7.9 PSL: Medium Pressure Pipelines C3.84
C3.7.10 PSLB: Bedding (Pipes) C3.121
C3.7.11 PSM: Roads (General) C3.127
C3.7.12 PSMF: Base C3.128

C3.8 Particular Specifications C3.130
C3.8.1 PVH: Gate RS Butterfly Check Air Valves C3.131
C3.8.2 PWA: Elevated Steel Tank C3.152
C3.8.3 PAA: Dayworks Schedule C3.156
C3.8.4 PT: Training C3.160
C3.8.5 PH: Fencing C3.165
C3.8.6 PE: The Employer's Pre-Construction Health and Safety Specification C3.171
C3.8.7 PZ: Employer's Environmental Management Specification for Environmental Management of Construction Projects C3.199
C3.8.8 PVC: Fusion-Bonded Medium Density Polyethylene Coating of Steel Pipes C3.228
C3.8.9 PVA: Cement Mortar Lining of Steel Pipes C3.233

C3 SCOPE OF WORK

C3.1 Description of the Works

C3.1.1 Employer's Objectives

The Employer is uMkhanyakude District Municipality which is the Water Services Authority (WSA) and Water Services Provider (WSP) for the Jozini Local Municipality area in which the works are located.

uMkhanyakude District Municipality intends to implement the Jozini Regional Community Water Supply Scheme to assure the supply of bulk potable water to communities in the Jozini, uMhlabuyalingana and Big Five False Bay Local Municipalities with potable water provided from the Jozini Regional Water Treatment Works, which is presently undergoing testing and commissioning by others.

This contract is the second in a series to provide the initial Phase 1 components of the Jozini Regional Community Water Supply Scheme, together with a number of connections to the existing water distribution system east of Jozini to ensure immediate supply improvements in this area. Construction of the first component, to which the pipeline under this contract will be connected is scheduled to be completed in July 2018.

C3.1.2 Overview of the Works

Bulk conveyance works to be constructed under this project will convey potable water from a 16,5 Ml command reservoir to be constructed by others at KwaNdlanzi, to the north of the Phongolo River, to various existing tanks and consumers East of Jozini.

Work by others includes the construction of the 16,5 Ml command reservoir at KwaNdlanzi, a DN 800 gravity steel pipeline from the command reservoir to the Phongolo River and a DN800 riverbed crossing of the Phongolo River terminating on the south bank for the supply of potable water to this project.

The first contract in this series (Phase 1A-1 of the Jozini Regional Community Water Supply Scheme) has constructed a DN 800 gravity steel pipeline from the south bank of the Phongolo River crossing for about 1 km before reducing to a DN 700 gravity steel pipeline for a further 2 km.

This contract will establish Phase 1A-2 of the Jozini Regional Community Water Supply Scheme and will provide a continuation of the DN 700 gravity steel pipeline for a further 3,3km. The contract will also include a 2,4 km length of DN 200 steel reticulation pipelines connected to the DN700 main pipeline.

All the steel pipeline material will be supplied by the Employer from existing nearby pipe yards.

This contract will also include the supply and erection of two 50 kℓ steel elevated tanks on 10 m high stands and the supply and installation of 400 m of DN 90 HDPE pipelines to connect to the elevated tanks.

C3.1.3 Extent of the Works

The works called for under this contract comprise the following:

- Construction of a DN 700 x 3,3 km long welded steel pipeline;
- Construction of a DN 200 x 2,4 km long welded steel pipeline;
- Construction of two 50 kℓ elevated tanks on 10 m high stands;
- Construction of DN 90 x 400 m long HDPE PE100 PN16 pipelines from Off-take 2 and Off-take 2A to the 50 kℓ elevated tanks;
- Construction of approximately 11 (6 x DN 150 & 5 x DN 50) air valves and 7 (4 x DN 150 & 3 x DN 80) scour valves installations;

- Installation of a cathodic protection system for the steel pipeline (to be carried out by a selected specialist sub-contractor);
- Access roads and other appurtenant works such as erosion protection works, stream crossings, rehabilitation works, etc and;
- Accredited training to selected personnel.

Supply of steel pipe is not part of this contract. All steel pipes will be supplied by the Employer as 'free issue' and must be collected from nearby pipe yards. Special handling will be required due to the heavy weight of the pipes in the larger diameters and due to the nature of the specialized pipe coatings and linings.

The use of specialized pipe handling and pipe laying equipment, such as side booms or similar approved, shall be mandatory. Detailed requirements for the handling of pipe are stated in Project Specification PSL and elsewhere in this document.

C3.1.4 Location of the Works and Access

The works are located in the Jozini Local Municipality. The site is accessible via Jozini by road P449. The location is indicated on the plan in Section C4.4.

C3.1.5 Temporary Works

The Contractor is responsible to design and provide all temporary works required for this Contract. Temporary works shall include those works required to provide and maintain suitable access to and within the pipe yards from which pipe is to be drawn and the control of vegetation in terms of this specification. The Contractor shall be responsible to obtain the use of suitable land for the site camp and to pay all rentals due and fulfil the requirements of the landowner and others connected thereto. The Contractor shall be responsible to establish, maintain and secure his/her site office, workshop, storage facilities for pipes, plant, equipment, fittings, fuel, lubricants and all other materials required in the performance of this contract, together with all items of the requirements of the contract as described in C3 of this document.

C3.1.6 Nature of Ground and Subsoil Conditions

A geotechnical investigation of ground and subsoil conditions for a related proposed pipeline route (Jozini to Mbazwana) was carried out by Geosure (Pty) Ltd in September 2013 for the Employer. Some of the trial pits for that project were in the vicinity (but not on the site) of the works to be constructed under this contract. Logging data for five of the foregoing trial pits is included in Section C4.1. Geographic coordinates are provided for each trial hole. Chainage numbers appearing on the data in Section 4.1 bear no resemblance to chainages in this contract.

C3.2: ENGINEERING

C3.2 Engineering

C3.2.1 Design Services and Activity Matrix

Description	Responsible Party
Works designed by	Employer
Design of Alternatives proposed (if any)	Contractor
Temporary works	Contractor
Preparation of As-Built Drawings	Employer

C3.2.2 Employer's Design

The Employer will issue tender and construction drawings. Drawings issued to tenders as part of the tender documents must be regarded as provisional and preliminary for the Tenderer's benefit to generally assess the scope of work. The drawings are issued as a separate volume (Volume 2) to this document and form part of the tender.

C3.2.3 Drawings

The drawings issued to tenderers as part of the tender documents must be regarded as provisional and preliminary for the tenderer's benefit to generally assess the scope of work. The drawings are issued separately to this document.

At commencement of the contract, the Employer's Agent will deliver to the Contractor three copies of the construction drawings and any instructions required for the commencement of the works. From time to time thereafter during the progress of the works, the Employer/ Employer's Agent may issue further drawings or revisions for construction purposes as may be necessary for construction, completion and defects correction of the works. The work shall be carried out in accordance with the latest available revision of the drawings approved for construction.

The following drawings are applicable to the Contract and are bound separately:

Drawing N°	Drawing Title
MD1993-03-001	Layout Plan
MD1993-03-003	Small Scale Route Plan and Longitudinal Section DN 700
MD1993-03-004	Small Scale Route Plan and Longitudinal Section DN 200
MD1993-03-010	Bulk Main Route Plan and Longitudinal Sections (Sheet 1 of 4)
MD1993-03-011	Bulk Main Route Plan and Longitudinal Sections (Sheet 2 of 4)
MD1993-03-012	Bulk Main Route Plan and Longitudinal Sections (Sheet 3 of 4)
MD1993-03-013	Bulk Main Route Plan and Longitudinal Sections (Sheet 4 of 4)
MD1993-03-014	Off-Take 2A Route Plan And Longitudinal Sections (Sheet 1 of 3)
MD1993-03-015	Off-Take 2A Route Plan And Longitudinal Sections (Sheet 2 of 3)
MD1993-03-016	Off-Take 2A Route Plan And Longitudinal Sections (Sheet 3 of 3)
MD1993-03-040	Road Crossing Details
MD1993-03-041	Stream Crossing Detail
MD1993-03-042	Stream Scour Chamber Detail
MD1993-03-043	Canal Crossing Details
MD1993-03-060	Off-Take 2A Detail
MD1993-03-061	Off-Take 2B Detail
MD1993-03-070	Connection to Tanks
MD1993-03-080	Standard Details
MD1993-03-081	General Details
MD1993-03-082	General Details

The Contractor will be required to mark up one complete set of prints of the construction drawings with all relevant as-built information and to submit these to the Employer's Agent Representative prior to issue of the Certificate of Practical Completion.

C3.2.4 Contractor's Design

The Contractor's responsibility for design and documentation includes, but is not necessarily limited to, the descriptions below (C3.2.4.1 and following):

C3.2.4.1 Design of Alternatives

Alternatives shall not be acceptable at Tendering stage. Should the Contractor, following appointment, propose any alternative to the Employer's design, such proposal shall only be deemed valid if it is accompanied by adequate and suitable sketches or drawings detailing the extent of the alternative and the component, sufficient to establish the means of execution the work, applicable fabrication drawings, etc. and provided that such submission is also accompanied by Method Statements, and specifications where appropriate, detailing how the Contractor proposes to go about the work from the ordering of materials, organizing of plant, steps in executing the alternative proposal, together with proposed list of personnel involved, tools, health and safety measures and measures for environmental compliance.

Such alternative shall be provided adequately in advance of the proposed work to allow for sufficient consideration and consultation and shall be subject to the approval of the Employer's Agent

C3.2.4.2 Design of Temporary Works

The Contractor will be responsible for the design of all temporary works and all construction methods, including those for the tie-ins and interconnecting works and all shoring and lateral support that may be required for trenching. The Contractor will also be responsible for the preparation of method statements as required and for preparing designs for the removal, relocation and/or reconstruction of certain existing facilities on privately owned properties that will be affected by the construction of the new pipeline.

The Contractor shall be responsible for the layout of his site camp and fabrication areas, construction and other working areas, management of the pipe yards and all temporary works, including construction access, culverts and drainage. The Contractor shall also be responsible for providing and maintaining suitable access to and within the pipe yards designated for the collection of 'free issue' pipe together with the fencing and control of vegetation of the pipe yards.

The Contractor is referred to the Employer's Environmental Specification and Environmental Management Programme (EMPr) in regard to all aspects of the temporary works.

C3.2.4.3 Other Documentation Required from Contractor

<u>Construction Dossier</u>

The Contractor shall be responsible to produce a Construction Dossier for the entire pipe laying. The Construction Dossier shall track the entire process of pipe handling, testing, repairs, laying and welding through to completion and commissioning of the works and shall incorporate and integrate the construction records with the Independent Inspection Reports from the pipe supply contracts as provided by the Employer's Agent.

<u>Operation and Maintenance Manual</u>

The Contractor shall be responsible to produce the Operations & Maintenance (O & M) Manual for the Works. The O & M manual shall document all requirements for correct operation and maintenance of the works. Two draft copies of the O & M Manual shall be issued to the Employer's Agent prior to commissioning of the Works. Before the Certificate of Practical Completion is issued (after the successful completion of the Trial Operational Period) four final copies of the final approved version of the O & M Manual shall be issued to the Employer's Agent.

Binders with hard plastic covers and four-ring spring clip holders shall be used. Binders shall not be over-filled to allow use without damage to the contents. A spare binder shall be provided for every three used, marked with the contract information. At least one set shall contain original copies.

The manual shall be of a standard acceptable to the Employer's Agent. Title labels which include contract number, title, location, Contractor's name as well as the equipment or fittings used together with volume number and contents shall be fixed on the front as well as the spine of the binders.

Manuals shall be in English only, with sections of equipment arranged by labelled dividing separator sheets. Where standard literature is obtained from suppliers or manufacturers, this shall be neatly photocopied in A4 size, with the applicable sections clearly marked, omitting duplicate sections in languages other than English.

Comprehensive indexes shall be included, with separate sections (with their own index) where required, as follows:

- Record (as-built) drawings referenced to the drawings list in C3.2.3.
- Fittings and equipment supplied
- A comprehensive schedule of routine maintenance for the works.

C3.3: PROCUREMENT

C3.3 Procurement

C3.3.1 Preferential procurement procedures

C3.3.1.1 Requirements

The uMkhanyakude District Municipality wishes to empower the Local Emerging Sub-Contractors residing within the project area. It shall therefore be mandatory to sub-contract a minimum of 30% of the contract value to approved local disadvantaged companies with a registered address within the uMkhanyakude District. The conditions associated with the granting of preferences, if any, and the sanctions relating to a breach of preferencing conditions are contained in the Tender Data.

Although the Contractor is at liberty to propose other items of work for subcontracting the Employer has designated the following items from the contract as mandatory sub-contracting items reserved for Local Emerging Sub-Contractors:

1. Supply and construct pre-cast concrete valve chambers;
2. Supply and install pipeline marker posts;
3. Rehabilitation of roads disturbed by trenching;
4. Supply and erect fencing.

The administration of the mandatory sub-contract work is detailed in this Section C3.3.

C3.3.1.2 Resource standard pertaining to targeted procurement

The Employer has determined that 100% of the Contractor's unskilled labour force shall be made up from the Local Municipality area. Local labour employed on the contract shall be paid in accordance with the local labour rate and all statutory conditions of employment shall be met including registration with the Unemployment Insurance Fund.

C3.3.1.3 Contracts of Employment

All employees of the Contractor shall be issued with a written contract of employment which shall be signed by the Contractor and the employee. The contracts shall be in isiZulu and in English.

Contracts of employment shall incorporate, inter alias, the following:

- personal particulars;
- job title and job description;
- employment period, including any probation period, which probation period shall not exceed 13 weeks;
- hours of work, statutory holidays, vacation, sick leave;
- remuneration, including wage rates for overtime, and any monetary allowances and deductions applicable to any probationary period and the time after its satisfactory completion;
- method of payment;
- medical and any other social benefits;
- conditions precedent to termination of employment;

Contracts of employment shall be accompanied by a written statement of company procedures covering such matters as training, promotion and redundancy policies, procedures for dealing with grievances, disciplinary procedures, protective clothing and occupational safety, and the like.

C3.3.1.3 Induction Programme

Before starting training or regular working, all employees shall attend an induction programme at which, inter alia, methods of working, site safety procedures, environmental policies, and the employees' role in relation to them shall be addressed. The employees shall be given an introduction to the Contractor's general industrial relations policy and procedures, covering such subjects as selection for promotion and redundancy, any bonus schemes, procedures for dealing with grievances, disciplinary procedures, and the like. The Contractor shall be responsible for compiling, organising and executing this induction programme.

C3.3.1.4 In-task Training

In-task training of the workforce is a general responsibility of the Contractor to ensure that his workforce is sufficiently skilled, Health and Safety aware and environmentally compliant as per the Employer's Environmental Specification. The Contractor shall provide in-task training of local labour during the construction of the works and at this own cost. In-task training shall consist of training and guidance of team leaders, assistants, and labour in those construction activities where the labour is engaged. The in-task training shall cover all training and guidance required to ensure that the leaders and labour are able to carry out the project tasks in accordance with the requirements of the project specification.

All personnel involved in construction shall also be trained in the Employer's Environmental Management System. The in-task training shall be carried out by the Contractor's own key and skilled personnel or by a mentor appointed for the purpose and approved by the Employer.

C3.3.2 Enhancing Participation through Labour Intensive Construction

It is the intention of the Employer to enhance local employment as far as possible. Certain tasks may be suitable for use of labour intensive methods. The Contractor shall plan his works in general to make maximum use of labour intensive methods in addition to the use of plant where appropriate.

The tasks that may be suitable for use of labour intensive methods are:

- Pipeline trench excavation in soft material for trench depths not exceeding 1,5m depth;
- Placement of bedding cradle and bedding blanket;
- Backfilling of pipe trenches
- Construction of Gravelled access roads

Within four weeks of commencement the Contractor shall present a plan for utilization of labour indicating the sectors of work where labour intensive construction is proposed, the estimated labour complement and programme. This plan will be for discussion with the CLO and Employer.

Machine excavation shall be used where the classification of excavation is 'intermediate' or 'hard' and for excavation of pipe trenches beyond 1,5m in depth. Machine excavation may also be used where the community reports that the work is too hard for manual labour. The CLO will be the liaison person in this respect.

C3.3.3 Subcontracting

This sub-section covers the subcontracting of specialist work at the Contractor's choice, mandatory sub-contracting to local SMMEs and the use of selected sub-contractors identified by the Employer.

C3.3.3.1 Subcontracting at Contractor's choice

Subcontracting of specialised portions of the work is permitted in principle up to a maximum of twenty five percent (25%) in total of the approved contract value. Should the Tenderer wish to employ Sub-Contractors of his own choice for part of the works, this is to be clearly indicated in Schedule T of the Returnable Schedules, showing the full names and addresses of all proposed Sub-Contractors for which approval of the Employer's Agent is sought and stating the section of the works that each will be handling.

Subsequent to contract award the written approval of the Employer shall be required prior to the engagement of any sub-contractor not proposed in the tender and accepted by the Employer. The appointment of subcontractors shall only be formalised on the basis of the presentation of a suitable and compliant sub-contracting agreement in the CIDB format or other acceptable format.

C3.3.3.2 Mandatory Subcontracting – SMMEs

Mandatory sub-contracting to local SMME's also applies under this contract (refer C3.3.1.1). The process of mandatory sub-contract work shall be as follows:

1. The Contractor shall indicate on his programme at what stage the sub-contractors will be required for the various work items
2. The Employer's ISD Consultant shall identify eligible candidates as Local Emerging Sub-Contractors and present these to the Contractor ahead of the deadline for appointing the sub-contractors.
3. The Contractor shall select from the identified Local Emerging Sub-Contractors.

An item has been included in Section 1 (Preliminary and General) of the Bills of Quantities to enable tenderers to price for their costs associated with the use of local disadvantaged SMMEs, namely, the identification, selection, invitation of quotations, negotiations, award of a sub contract(s) and then the training and assisting and supervising of the SMME(s). It is specifically noted that the Employer's requirement for SMMEs to be engaged will not in any way relieve the main Contractor of any of his obligations in terms of the Contract.

In the event that the Employer's ISD Consultant fails to identify sufficient available candidates as Local Emerging Sub-Contractors ahead of the deadline for the employment of such sub-contractors, as shown on the Contractor's approved programme, the Contractor shall be released from the obligation of mandatory subcontract work and shall be free to appoint a sub-contractor of his own choice or to undertake the work directly using own resources.

C3.3.3.3 Selected Subcontractors

This sub-section covers specialist work for which the Employer retains the right to identify the specialised service provider to be used. The areas of work to which this may apply are described below.

C3.3.3.3.1 Cathodic Protection (CP) Installation

Details and a design of the cathodic protection installations that are to be carried out under this Contract will be prescribed by a 'Selected Sub-contractor' to the Contractor. A Provisional Sum has been included in the Bill of Quantities to cover the cost of the work to be carried out by the selected sub-contractor. The Contractor shall be responsible for co-ordination with the sub-contractor in the timely completion of these installations.

As some of the CP design can only be carried out as field measurements are taken during the construction phase under this Contract, it is not possible to provide complete details in this document of the CP installations that will be required. The following data serves to indicate the nature of the scope of work that the 'selected sub-contractor' will be required to carry out in co-ordination with the Contractor.

Temporary CP:

To prevent corrosion damage to steel pipe prior to the installation of a permanent CP system a method of temporary protection may be specified. This may comprise sacrificial anodes to be connected to the pipes or an electrical method of protection, both methods involving a continuity connection to the pipe.

Cross Bonding:

Cross bonds may be installed between the pipeline and other pipelines and/or structures. Cross bonds usually comprise copper wires/cables welded at each end to the steel pipelines.

Continuity Bonding:

As it is essential to ensure that there is electrical continuity along the full length of the pipeline as it is being installed, electrical continuity bonds will be have to be installed as the pipeline construction progresses. Electrical continuity bonds usually comprise copper wires/cables welded at each end to the steel pipelines at flanged and flexible coupled joints and also at flanges at air valve and scour valve installations. They are also required across insulating flanges and flow metering installations.

All work relating to permanent continuity bonding will be carried out by the "CP Selected Sub-Contractor". All work associated with any temporary continuity bonding required to ensure that no section of pipeline is laid such that it is discontinuous from the main pipeline shall be carried out by the Contractor at no cost to the Employer. Temporary electrical continuity bonds shall comprise two parallel 120 square mm PVC coated stranded copper cables with ends securely clamped onto the ends of the steel pipes.

Monitoring Stations:

Monitoring stations are used for the ongoing testing of CP protection levels from an above ground point on the pipeline and may be required under this contract. These monitoring stations are usually small galvanized steel boxes placed within the pipeline servitude at regular intervals (normally 500 m apart), and have within them copper wire or cable connection to the pipeline and a stationary reference cell and a metal coupon.

Test Points:

Test points will be required and usually comprise stainless steel threaded rods installed into the concrete walls of a valve chambers at regular intervals along the pipeline route. Each rod is usually located above the external ground level of the chamber to allow CP personnel to do spot checks on the pipe's protection levels without having to open the valve chambers.

Transformer Rectifier Units (TRU):

Transformer rectifier units may be required and are used to generate DC power supplies to afford protection to the pipelines. These require an AC power supply from Eskom, an attachment to the pipeline, an appropriately sized ground bed, and a stationary reference electrode.

C3.3.3.3.2 Environmental Rehabilitation by Selected Sub-Contractor

Whilst the Contractor will be required to carry out rehabilitation works as described and/or specified elsewhere in the document and/or to reinstate all areas affected by the works to conditions no worse than they were prior to the commencement of construction, the Contractor will be required to appoint a specialist environmental rehabilitation sub-contractor to carry out rehabilitation works at specific locations as described in the Environmental Management Plan to be drawn up as a product of the Environmental Basic Assessment to be undertaken.

A Provisional Sum has been included in the Bill of Quantities to cover the cost of the work to be carried out by the selected sub- contractor.

C3.3.3.3.3 Telemetry

A Provisional Sum has been included in the Bill of Quantities to cover the cost of the work to be carried out by the selected sub- contractor.

C3.3.4 uMkhanyakude Municipality Code of Conduct applicable to the Procurement of Goods, Services, Engineering and Construction Works

The Contractor shall undertake the contract in accordance with the uMkhanyakude Municipality Code of Conduct applicable to the Procurement of Goods, Services, Engineering and Construction Works. The Contractor shall make his/her own arrangements at own cost to obtain a copy of the Code of Conduct.

C3.4: CONSTRUCTION

C3.4 Construction

C3.4.1 Applicable Specifications

C3.4.1.1 Standard Specifications

The standard specifications on which this contract is based are the South African Bureau of Standards Standardised Specifications for Civil Engineering Construction SABS 1200 as listed in C3.6 of the Scope of Work. The various SANS specifications referred to in this document are listed in C3.6 and the Contractor is advised to obtain them from Standards South Africa (a division of SABS) in Pretoria.

The standardised specifications (SABS 1200) must be read in conjunction with the new SANS 1921 family of standards. In case of any discrepancy or conflict between the two, the SABS 1200 specification shall take precedence and shall govern.

Refer also to the Preface on interim situation until full suite of SANS 2001 Series of Specifications is available, on the first page of the Project Specification.

The term “project specifications” appearing in any of the SABS 1200 standardised specifications is deemed to be equivalent to the term “scope of work” in SANS Specifications.

The variations and additions to the standard specifications are prefixed PS and take precedence over the SABS Standardised Specification.

Where a particular specification is in conflict with either the variations and additions to standardized specifications or the SABS Standardised Specifications, the particular specifications shall take precedence.

C3.4.1.2 Applicable national and international standards

Wherever possible items and materials for construction of the works shall comply with the relevant South African Bureau of Standards Specifications and with the British Standards where these are applicable in the absence of local standards.

The Contractor, when using materials conforming to a Standard Specification shall if called upon furnish the Employer’s Agent with certificates of tests showing that the materials do so conform.

C3.4.1.3 Particular / generic specifications

The particular specifications are included as C3.8 and take precedence over the Standard Specifications, but not over the Project Specifications.

C3.4.1.4 Certification by Recognised Bodies

Wherever not specified otherwise, items and materials for construction of the works shall comply with the relevant South African Bureau of Standards Specifications and with the British Standards where these are applicable in the absence of local standards.

The Contractor, when using materials conforming to a Standard Specification shall if called upon furnish the Employer’s Agent with certificates of tests showing that the materials do so conform.

C3.4.2 Plant and Materials

Steel pipe in the three diameters required for the majority of the contract will be supplied by the Employer. This refers to DN700 plain ended pipe for butt welding and DN200 belled end pipe for fillet welding. All of this pipe stock is CML lined and generally FBMDPE coated, with a smaller quantity being three layer PE. This material will be drawn from existing stock in pipe yards in the locations indicated. The Contractor shall be responsible for the locating, inspection, uplifting and transport to site of the pipes to be used under the contract and shall point out any defects to the Employer’s Agent Representative. Pipes found to be defective will be replaced or repaired at the discretion of the Employer.

Any defects found prior to handling of pipes by the Contractor shall be pointed out to the Employer's Agent. Should the Employer exercise the option of repairing the defect, this will be done at the Employer's expense. A provisional sum in the Preliminary & General section of the Bill of Quantities exists for this purpose. Once the Contractor has uplifted the pipe the responsibility for quality of the pipe, including its coating and lining, shall become that of the Contractor.

Plant and materials that are to form part of the permanent works shall be required to conform to the specifications herein. Prior to acceptance of materials on the site the Contractor shall therefore submit for prior approval details of the proposed product and manufacturer, including brochures and technical information, and including typical quality test routines and validation certificates. Rejection and replacement of materials due to lack of prior approvals shall be at the contractor's expense. Delay in ordering due to late submission of information to the Employer's Agent shall be deemed to be a delay at the Contractor' own responsibility.

Certain materials are subject to inspection at the site of the manufacturer's works by an Independent Inspection Authority appointed by the Employer's Agent. The Contractor shall be responsible to arrange the timely attendance of the inspection authority. Acceptance of materials on site shall be subject to Employer's Agent approval and will generally not be granted in the absence of inadequate or missing Quality Assurance information and Material Data Sheets.

The storage of plant and materials on site is at the Contractor's responsibility. The Contractor shall take adequate precautions to safeguard the plant and equipment and shall be liable to remedy any defects or replace any plant and equipment damaged in the course of transport, handling and storage and in the process of incorporation in the works and testing up to the point of acceptance of the works by the Employer.

C3.4.3 Construction equipment

No construction equipment will be supplied by the Employer under this Contract. All construction equipment required for the completion of the works shall be provided by the Contractor.

Equipment to be used on site shall be well maintained and, if road going, in possession of valid roadworthy certificates. Leaking of fuel or lubricant, or excessive or objectionable noise or exhaust emissions, shall be adequate grounds for instruction to remove the plant from the site, which removal shall be done within 24 hours.

The Contractor shall be responsible for determining the load clearance limits existing at the time and ensuring that his construction equipment does not exceed such limits. Before moving any heavy construction traffic onto highways, roads and bridges, the Contractor shall make suitable arrangements with the appropriate government authorities and obtain their approval for the passage of such traffic.

The Contractor shall not travel tracked vehicles or plant on any bituminous sealed road surface. Only rubber tyre vehicles conforming to applicable load restrictions will be permitted to use bituminous sealed roads.

The Contractor shall take note of the work activities that are subject to mandatory Labour Intensive Construction Methods and shall make adequate allowance for hand tools and PPE sufficient to complete these work activities according to programme.

C3.4.4 Existing Services

C3.4.4.1 Known services

All known services will be shown to the Contractor. The Contractor will be required to contact all service owners and ascertain the location and status of all services irrespective of whether they are shown to him/her or not. The Contractor is responsible to confirm with the Employer's Agent Representative the location of services prior to commencing excavations.

C3.4.4.2 Treatment of Existing Services

The Contractor shall inform the Employer's Agent of all services affected or permanently affected by the works and services shall not be exposed, re-routed or modified and without the written approval of the service owner. Existing services shall be protected as required, including re-routing of traffic, hand excavation in the vicinity of buried services and strutting or otherwise supporting services that cross trenches or excavations.

C3.4.4.3 Use of Detection Equipment

Where the presence of underground cables is suspected the Contractor shall use such methods as necessary, including cable or metal detectors, to prevent unnecessary damage and consequent delay and cost of repair.

C3.4.4.4 Damage to services

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.

C3.4.5 Site Establishment

C3.4.5.1 Services and Facilities Provided by the Employer

C3.4.5.1.1 Contractor's Site Camp & Depot (Read with SANS 1921 - 1: 2004 clause 4.14)

The Employer will not provide sites for the Contractor's establishment but will indicate the possible site(s) for the Contractor's site camp and fabrication area. It shall be the Contractor's responsibility to obtain permission for the use of the land and to negotiate the terms of use with the owner(s).

The Contractor will be drawing pipe stock from pipe yards in the vicinity of the site. The location of these sites is shown in the Locality Plan. If indicated by the Employer the Contractor shall be required to provide access to and co-ordinate with other Contractors drawing pipe stock from the same pipe yards for other projects for the same Employer.

No housing is available for the Contractor's employees and the Contractor shall make his/her own arrangements to house his/her employees and to provide all necessary transport arrangements. No informal housing or accommodation on the site will be allowed.

C3.4.5.1.2 Water Supply

uMkhanyakude District Municipality is the Water Supply Authority in the area and is the owner of the existing bulk water infrastructure and the (somewhat limited) water distribution networks.

The Contractor shall make his own arrangements with the Employer for a temporary metered connection for construction purposes and for the conveying of the water to the point(s) required. The Contractor will be required to pay all connection fees and the cost of all water drawn from the Employer's water supply system at the ruling tariffs in force at the time and his tender will be held to include for all such requirements throughout the duration of the Contract.

Water for scouring, filling, testing and disinfecting the pipelines laid under this Contract, and for filling and disinfection of the elevated tank shall be treated water and will be made available by the Employer at the new Regional water treatment works site situated north of the Phongolo River.

The Employer will provide to the Contractor, at no cost, a quantity of water equivalent to three times the aggregate volume of the pipelines and tank (refer Clause PSL 7.3). All water drawn from the Employer's system, in excess of the "free issue" volume will be charged at the Employer's bulk rate per kilolitre that is charged to their bulk consumers. Tenderers are to note that an allowance should be made for the purchase of additional water for scouring of the pipeline.

The Contractor will be required to supply, install, operate and maintain at his cost, such temporary conveyance systems, pipework, pumping, and storage facilities as may be necessary to ensure sufficient supplies of water are available at all times throughout the works area and for the orderly control of supply and disposal of used water.

C3.4.5.1.3 Electricity

The Contractor shall make his own arrangements concerning the supply of power. Refer to C3.4.5.2.7.

C3.4.5.2 Facilities provided by the Contractor

C3.4.5.2.1 Site Establishment

Possible sites for establishment will be indicated at the pre-tender site visit. The Contractor shall determine his space requirements and shall be responsible to negotiate permission and terms of use of the site(s) in agreement with the respective land owner(s). The Contractor must not cut down or damage any trees nor make any excavation without the written permission of the Employer's Agent and will be required to restore the site to its original condition on completion of the works.

The Contractor shall provide and maintain at his own cost all sheds and housing necessary for the convenience of his workmen and for the accommodation and proper protection of his erection or other equipment from damage or loss. These are to be erected only on sites which shall have been approved by the Employer's Agent and they shall be removed as soon as they are no longer required for the works; and the site thereof restored to its original condition and the ground left clean and sanitary.

The Contractor shall provide the necessary ablution facilities at his camp site and the site of the works for the use of his employees. Separate toilet facilities shall be available for the sole use of the Employer's Agent or his representative(s). Buildings and fencing are to be neat and presentable and the surrounding areas must at all times be kept in a neat, clean and orderly condition. All buildings and latrines shall be in accordance with the Local and National Health Regulations and shall be kept in a clean, sanitary condition.

The Contractor shall provide security watchmen adequate to safeguard the works, plant, personnel and materials 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.

The Contractor shall pay special attention to the management and disposal of all water on site from whatever source. 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.

The Contractor shall dispose of solid waste by burying at approved site(s). Buried waste shall be covered up on a daily basis and the Contractor shall rehabilitate the site prior to practical completion. The Contractor shall dispose and cover up all surplus and unsuitable material in legal spoil areas of his own choice. He shall be responsible for all arrangements necessary to obtain access to such spoil sites.

The Contractor's Establishment shall not be considered as being complete until such time as the facilities to be provided for the Employer's Agent are fully in place. (Refer PSAA & PSAB)

C3.4.5.2.2 Equipment for Determination of Labour-Intensive Excavation (Read with SANS 1921 - 5: 2004)

The Contractor shall provide and maintain in good condition a Dynamic Cone Penetrometer (DCP) and all associated equipment for the determination of areas for Labour-Intensive excavation methods as per PSDB5.4 and for the classification of excavated materials as per Annex B of SANS1921 Part 5.

C3.4.5.2.3 Accommodation of Employees (Read with SANS 1921 - 1: 2004 clause 4.14.)

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

No informal housing or accommodation on the site will be allowed.

C3.4.5.2.4 Management of Pipe Yards

The steel pipe stock will be supplied by the Employer on 'free issue' basis from four existing pipe yards in the vicinity of the work area. The location of the pipe yards is shown in the Locality Plan. The Contractor shall be responsible for inspecting and uplifting the pipes for transport to the work site. Pipes indicated as defective shall be marked up at the point of defect and left for repair by the Employer. Once the pipe has been uplifted for transport the pipe becomes the responsibility of the Contractor and the remedying of any subsequent damage shall be for the Contractor's account.

The Contractor shall be responsible for the maintenance of the pipe yards and the access to each pipe yard, to the degree adequate to the Contractor's requirements for safe handling and transport of the pipes. This shall include access onto and around the site, drainage and control of vegetation and maintenance of perimeter fencing and firebreaks.

To lessen the risk of fire damage the whole site should be cleared and kept clear of bushes and shrubs, subject to the Environmental Specification and Environmental Management Plan. The grass on the whole site is to be cut to a height of no more than 25 mm and maintained at a height not exceeding 50 mm.

When steel pipes are moved for any reason steel pipes must be stored off the ground and secured from rolling using suitable dunnage, such as sandbags. The steel pipes may not be stacked. An average space of 400 mm should be allowed between parallel pipes, the end to end gap between pipe stacks should be 5 m and the gap between pipes and the perimeter fence should be at least 6 m which includes the 5 m wide firebreak.

C3.4.5.2.5 Storage and laboratory facilities

No storage facilities will be available or provided by the Employer. The Contractor is responsible to make suitable arrangements to deliver materials as and when required for erection purposes and when called for by the Employer's Agent, whether such call be issued on or after the delivery date offered by the Tenderer.

C3.4.5.2.6 Water

With the exception of the Jozini Town WTW there is presently no potable water supply in the immediate project area. The Contractor shall make his own arrangements for the supply of potable water for human consumption by the workforce, for pressure testing and disinfecting of pipelines, for water-tightness testing and disinfection of the elevated tank and for other constructional uses. Refer to sub-section C3.4.5.1.2 'Water Supply'.

Where the Contractor wishes to make use of potable water supply (Jozini Town WTW) the Contractor's responsibility shall include to provide a suitable connection, if so approved, including a suitable flow meter. This connection shall be capped or removed to the satisfaction of the Employer's Agent upon completion of the construction works. All costs in regard to supply of water shall be deemed to be included in the rates for the establishment and dis-establishment of the site facilities. The Contractor will be required to supply, install, operate and maintain at his cost, such temporary pipework and storage facilities as may be necessary to ensure sufficient supply.

The Contractor will also be required to pay all connection fees and for the cost of all water drawn from the water supply authority's system at the ruling tariffs and his tender will be held to include for all such requirements throughout the duration of the Contract.

Water for human consumption shall be required to conform to SABS 241 for potable water. The Contractor shall be responsible for his arrangements for supply and treatment of water to required quality standards and to demonstrate the acceptable quality of the water by means of an analysis certificate from an accredited laboratory.

C3.4.5.2.7 Electricity

The Contractor shall make his own arrangements concerning the supply of power. The Contractor will be required to pay all the requisite connection and consumption charges for whatever temporary power supplies he may require for his use on the site. No direct payment will be made for the provision of power. The cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which this service is required, or in the Contractor's preliminary and general items as the case may be.

C3.4.5.2.8 Telecommunication services

The Contractor is to provide his own telephone facilities on site. No telephone will be required for the use of the Employer's Agent or his representative. An item has been included in the Bill of Quantities to cover the costs of the Employer's Agent Representative cellular phone calls for the duration of the Contract.

C3.4.5.2.9 Vehicles and equipment

No vehicles will be required for use by the Employer or his Representative.

C3.4.6 Permits and way leaves

The Employer will obtain the necessary approvals and the Contractor will be required to comply with the authorities and landowners' / occupiers' requirements at all times.

The Contractor will be required to take cognisance of, and comply with, the general wayleave and 'permission to occupy' requirements of the authorities and land owners / occupiers during the construction of the works. Specific wayleave requirements are listed immediately following this section.

The Contractor will be required to confirm that permission has been granted and that the occupiers and all affected parties have been informed of the Contractor's intentions before commencing work on each property.

C3.4.6.1 Eskom's Wayleave Conditions

Eskom has prescribed the following conditions:

"No excavation may be carried out within a 10m radius of the foot of any Eskom structure measured from the inner edge of trench. Where civil work is done outside of this radius the soil must be suitably sloped and protected so as not to cause erosion in or onto the 10m radius of undisturbed soil.

Operators of vehicles and machinery must be made aware of danger of working beneath power lines.

No explosives may be used within 500m of Eskom structures without prior consent (with 14 working days notice required).

No exposure of foundations of Eskom structures is permitted.

Clearances from live conductors must be maintained as per Regulation 15 of the Electrical Machinery Regulations (OHS Act No. 85 of 1993)

No dumping of rubble, earth etc is allowed within the Eskom servitude area.

Changes in ground level may not infringe statutory clearances to conductors.

After any change in ground level, the surface to be rehabilitated and stabilized to Eskom's satisfaction."

C3.4.6.2 Designated Working Strip and other Working Areas

The working strip width as stated in C3 or as shown on drawings shall apply to this contract. The Contractor is alerted to the fact that certain landowner, statutory and utility owner permissions that apply to the contract apply solely within the working strip and other designated working areas and that carrying out work or using a travelling way outside of these designated areas without prior permission may result in delay and/or financial and other sanctions that may not constitute valid grounds for claim for disruption, delay and financial complication.

The Contractor shall therefore be required to obtain the permission of the Employer's Agent in writing before establishing stockpiles, set-down and storage areas, carrying out temporary or permanent works and for travelling/transportation other than on formal roads.

Measurements for payment for site clearance, rehabilitation and all other activities shall apply solely to areas within the working strip and other designated working areas unless expressly provided for in writing.

C3.4.7 Alterations, Additions, Extensions and Modifications to Existing Works

The Contractor must satisfy himself that the layout of the existing structures and plant is compatible with the proposed works, and must advise the Employer's Agent of any conflicts.

Alterations to existing services will require prior written authorisation by the Client.

C3.4.8 Water for construction purposes

The Contractor shall make his own arrangements regarding water for construction purposes and shall be responsible to provide suitable transport as well as abstraction arrangements.

C3.4.9 Survey control and setting out of the works

The Contractor will be responsible for the setting out of the works.

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 are disturbed by the Contractor or his/her employees, the Contractor shall have them replaced by a registered land surveyor at his/her own cost.

C3.5: MANAGEMENT

C3.5 Management

C3.5.1 Management of the works

C3.5.1.1 Applicable SANS 1921 Specifications

The following SANS 1921 Construction and Management requirements for works standards and associated specification data are applicable:

SANS 1921-1 General engineering and construction works
SANS 1921-2 Accommodation of Traffic on Public Roads
SANS 1921-6 HIV/AIDS Awareness

C3.5.1.2 Particular and Generic Specifications

The applicable Particular Specifications and Generic Specifications are included in section C3.8 of this specification.

C3.5.1.3 Specification Data

The specification data applicable to these SANS 1921 standards is as follows:

Standard	Clause	Essential Data
SANS 1921-1	4.1.7	The requirements for drawings, information and calculations for which the Contractor is to be responsible are detailed in the project specifications.
	4.2.1	The responsibility strategy assigned to the Contractor for the works is A.
	4.2.2	The Structural Engineer for the works is Royal HaskoningDHV.
	4.3.1	The planning, programme and method statements are to comply with the following: 1) The programme shall be prepared in bar (Gantt) chart form, preferably using a project management software tool such as *Microsoft Project* and shall be issued to the Employer's Agent in both hard copy and electronic format. The programme shall be structured to cover all items of work including all work to be done by sub-contractors and shall clearly indicate the critical path 2) The programme must clearly show the milestone dates to be achieved taking the indicative construction sequences into account. 3) The programme shall be updated whenever the circumstances of the work execution change and whenever instructed by the Employer's Agent. Each revision of the programme shall be marked with a sequential revision number. The Contractor's programme shall be subject to approval by the Employer's Agent. 4) Method statements shall be prepared by the Contractor for any procedures proposed by the Contractor for use in the contract as well as in accordance with the requirements of the project specifications.

Standard	Clause	Essential Data
SANS 1921-1	4.4	The Contractor will be solely responsible for the production of work that complies with the Specifications to the satisfaction of the Employer's Agent. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system on site. The Contractor's QA system shall be open to audit by the Employer's Agent 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 QC&QA system. His attention is drawn to the fact that it is not the duty of the Employer's Agent or the Employer's Agent Representative to act as foreman or surveyor.
	4.5	The Contractor will be required to verify the accuracy of all survey control provided on the drawings or in the form of beacons previously placed on the site. Prior to setting out, the Contractor shall also check the invert levels of all existing tie-in channels, manholes, pipes etc. against those provided on drawings and immediately report any inconsistencies to the Employer's Agent in writing. The Contractor shall be held directly responsible for any errors in setting out of the works arising from use of the survey control or existing invert levels provided.
	4.5.1	It is important that, during construction, the Contractor checks all levels from time to time and satisfies himself as to their accuracy prior to placing of concrete as no concrete work will be accepted where tolerances have been exceeded, particularly where it interferes with the hydraulics of the flow through the works. The maintenance of gravelled temporary deviations and existing gravel roads used for construction shall include the watering of roads daily in the dry season for reduction of dust.
	4.6	An item has been included in the Schedule of Quantities to cover all work in dealing with water.
	4.12.2	The samples of materials, workmanship and finishes that the contractor is to provide and deliver to the Employer are: 1) Pipes and Jointing methods 2) Pipe coatings and corrosion protection of pipes and fittings 3) Repair and make-goods of pipe coatings and linings 4) Welding procedures 5) Proof of Welders' qualifications 6) Pipe bedding materials 7) Concrete aggregate 8) Concrete sand 9) Concrete mix designs 10) Reinforcing The fabrication drawings that the Contractor is to provide and deliver to the Employer are those for all fabricated fittings, specials and bends, the reservoir ladders and any prefabricated items that the Contractor proposes to use in the permanent works.

Standard	Clause	Essential Data
SANS 1921-1	4.14.3	The office accommodation, equipment, accommodation for site meetings and other facilities for use by the employer and his agents are as designated in SABS 1200 AB (refer PSAB). 1) Safety helmets, gumboots and other necessary safety equipment for the sole use of the employer and his agents 2) Survey equipment as per PSAB 4.2 3) No testing laboratory is required on site for use by the Employer's Agent
	4.14.5	Toilet facilities are required for the Employer and his agents.
	4.14.6	The requirements for the provision and erection of sign boards are: 1) As per SABS 1200 AB and C4
	4.17.1	The requirements for the termination, diversion, or maintenance of existing services are: 1) Support in-situ of existing water mains up to and including DN 300 crossing pipe trench 2) Deviation of small diameter water house connection pipes and fittings. 3) Support in-situ of existing stormwater drain pipes up to and including DN 600 crossing pipe trench 4) Deviation and relocation of electrical power cables as domestic power connections – work is to be carried out by the responsible utility owner under the overall co-ordination of the Contractor. Provisional sums are provided for this purpose. 5) Temporary deviation and accommodation of traffic
	4.17.2	Where public services must be interrupted on account of the works, it shall be the Contractor's responsibility, in conjunction with the appropriate Authority to ensure that all users affected by the interruption are given due and sufficient notice of the date, time and duration of the interruption.
	4.17.3	Services which are known to exist on the site are: 1) Telephone line and electricity lines 2) Buried power cables 3) Water pipelines 4) Stormwater pipes and catchpits 5) Roads and tracks The approximate positions of some of the known underground services, which may be affected by the Works, have been shown on the drawings. The exact location or number or existence of these services cannot be guaranteed and the Contractor will be required to confirm the locations and status of all services with all service owners irrespective of whether they are shown on the drawing or not.
SANS 1921-1	4.17.5	If unknown services are found undamaged, they shall then be deemed to be known services with the provisions pertaining to known services becoming applicable.

Standard	Clause	Essential Data
	4.17.6	Where a service has been located and exposed, the Contractor shall take every care in ensuring that the excavation containing the service is barricaded and protected against collapse and that the service is adequately protected against damage. Should the existing service become damaged by the Contractor or any third party due to negligence on part of the Contractor, then the cost of its repair along with any consequential costs shall be borne by the Contractor.
	4.17.7	Existing known services or services that have been proved by the Contractor, which are damaged by the Contractor, shall be repaired by the service provider and all costs of the repair shall be borne by the Contractor.
	4.18	The additional health and safety requirements of the Employer are as specified in the health and safety specification included in C3.8 of this document.
	4.18.2	The site office area, pipe yard, the servitude/working strip and all other construction zones shall be fenced off to prevent unauthorized entry to the site. Gates shall be provided by the Contractor as required for construction access purposes. The Contractor shall be held responsible for the control of access at these gates at all times as well as to the worksite during removal and re-erection of fencing. No other opening in the fence shall be permitted and the Contractor shall be responsible for monitoring the fencing on a daily basis and repairing any such opening within the same day that it is detected. Notices in two official languages (English and isiZulu) shall be attached to the fence where appropriate to indicate that the site is for personnel employed on the Contract only and that unauthorised entry is forbidden. The temporary fencing shall comprise 2m high Bonnox 4 x 4 Mesh fencing, Bonnox pattern 1972/4, with straining posts and straining wires as required and according to supplier's directions and with mesh spacing not exceeding 100mm in both the vertical and horizontal directions. Chevron tape shall be interwoven in a zig zag pattern from the top to the bottom of the fence thereby clearly marking off the working area. At weekends or holidays the site must be completely closed off to the public. It is the responsibility of the Contractor to ensure that the sites are closed off. Standard type farm gates can be used for access points and locked when the Contractor is not in attendance. All fencing and gates must be maintained until the work is complete and shall then be removed. In proximity to residential areas the Employer's Agent may specify the addition of plastic square mesh to the temporary fencing, or equivalent method, to acts as a childproof barrier to prevent child access to pipe trenches.
	4.22	The work to be undertaken by selected subcontractors comprises the supply and installation of cathodic protection devices and equipment, the environmental rehabilitation of the site and provision and installation of telemetry equipment.

Standard	Clause	Variations
SANS 1921-1	4.1.10	Where reference is made to “SANS 2001”, substitute with “SABS 1200”

Standard	Clause	Additional Clauses
SANS 1921-1	4.4	The Contractor is required to set up and maintain a Quality Management system and Quality Assurance process. The requirements are detailed elsewhere in this document.
	4.5	The Contractor is required to submit Method Statements for specific items of work as identified in this specification and wherever the Contractor proposes his own approach or method of working. In order to avoid delays to work Method Statements must be submitted well in advance of the proposed work (at least 10 working days or such suitable time as agreed with the Employer’s Agent Representative) and are subject to the approval of the Employer’s Agent.
	4.6 (e)	The Contractor is to ensure that stormwater runoff or any groundwater seepage is controlled by means of temporary earthworks, cofferdams, pumping equipment, well-pointing, de-watering equipment etc. to keep the works free of water.
	4.6 (f)	Dealing with all water during construction from whatever source will include for by-pass arrangements for dealing with all possible flows whether or not the existing flow path is being interfered with during installation of pipework.
	4.7.4	No blasting will be permitted within 10 m of any structure, pipeline or service unless the Contractor can satisfy the Employer’s Agent that his proposed blasting methods and controls are such that no damage will be caused to the adjoining structure, pipeline or service. The Contractor will be required to provide equipment for and take vibro-recordings at no additional cost to the Employer.
	4.8.1	The Contractor shall be responsible for protection from damage to any structures or services that might be affected by the excavations or works.
	4.8.2	Notwithstanding whatsoever special construction methods, equipment or materials are used by the Contractor to protect the structure or service from damage, all work will be measured for payment on the assumption that normal excavation had been carried out and the Contractor shall therefore make allowance for the additional costs in his tendered rates.
	4.9.5	The provision of security for the Contractor’s site establishment, plant and personnel at all times is the sole responsibility of the Contractor and no claims for payment for additional security measures taken during the contract will be entertained.
	4.9.6	The Contractor is to comply with the Environmental Management Plan and Employer’s Environmental Management Specification included as a Particular Specification in Section C3.8.
	4.17.8	The Contractor shall confine his so carry out all his operations as not to encroach on, or interfere with, trespass on, or damage adjoining land, buildings, properties, road structures, pipelines, places and things, in the vicinity of the Works and outside of the site boundary.

Standard	Clause	Essential Data
SANS 1921-2	4.3.2 4.10.1	The Contractor shall design all temporary culverts. The Contractor shall provide the following minimum traffic-control facilities: a) flagmen with traffic STOP and GO signs b) road signs, channelization devices and New Jersey type movable barriers c) all construction vehicles and plant used on the works must be equipped with rotating amber flashing lights and warning boards with the words CONSTRUCTION VEHICLE in 250 mm high red letters on a white background.

Standard	Clause	Variations
SANS 1921-2	4.3.2	**Variations** The Contractor shall be responsible for the design of all temporary deviations.

Standard	Clause	Essential Data
SANS 1921-5	4.2.1	The means of determination of method of Excavation (i.e. by hand or machine excavaton) shall be as per PSDB5.4.1. The depth of trenches which are to be excavated by hand is less than or equal to 1,5m and providing that the ground is stable.

Standard	Clause	Essential Data
SANS 1921-6	4.2.1 a) 4.2.1 a)	A qualified service provider is one that appears on the list of recommended service providers, which is available from all regional offices of the Department of Public Works. The HIV & AIDS awareness programme is to be repeated at 6 monthly intervals for the duration of the Contract (including the initial one at the start of the Contract).

Standard	Clause	Variations
SANS 1921-6	4.3.2	The HIV & AIDS Awareness Champion and the Employer's representative shall certify the report and schedule described in 4.3.1 whenever a claim for payment is issued to the Employer.

Standard	Clause	Additional Clauses
SANS 1921-6	4.1 f)	Appointing an HIV & AIDS Awareness Champion within 14 days of site handover from amongst the workers (which could include the Community Liaison Officer). The champion should be able to speak, read and write English, speak and understand the local languages spoken by the Workers and shall be on site at all stages of the construction period. The Contractor shall ensure that the Awareness Champion has been trained by the Service Provider on basic HIV & AIDS information, the support services available and has the necessary skills to handle questions regarding the HIV & AIDS programme in a sensitive and confidential manner. The Awareness Champion shall be responsible for: • Liaising with the Service Provider to assist in organising awareness workshops • Filling condom dispensers and monitoring condom distribution • Handing out information booklets • Placing and maintaining posters
	4.1 g)	Provide information about the names of the closest service providers to be displayed on a poster of size not smaller than A2.
	4.2.3 c)	Understand and communicate the purpose of voluntary HIV & AIDS testing and counselling.
	4.2.3 d)	Recognise the importance of caring for people living with HIV & AIDS and be familiar with the various treatments available, including treatment of opportunistic infections.
	4.2.3 e)	Understand and communicate the rights and responsibilities of those living with HIV & AIDS in the workplace and the importance of non-discrimination.
	5	**Sanctions** In the event that the Contractor fails to satisfy the requirements of this specification, the Employer may apply sanctions which include the rejection of claims for payment as being incomplete or the withholding of completion certificates (interim or final).

C3.5.2 Planning and Programming

C3.5.2.1 Preliminary Programme

The Tenderer 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.

In drawing up his programme, the tenderer is to take into account the following:

The Contractor shall allow time for co-ordination of piping tie-ins to the existing system.

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.

C3.5.2.2 Construction Programme (GCC Clause 5.6)

For the purpose of this clause, "construction programme" means the Programme of the Works to be submitted in terms of Clause 5.6 of the Conditions of Contract and used to plan and organise the work. In terms of the GCC the accepted programme is a key resource for effective decision making in the contract regarding rights and responsibilities and the basis of adjudication of claims. Due to the contractual role fulfilled by the accepted programme, failure by the Contractor to submit a suitable programme, to pursue approval and to keep the programme up to date may prejudice the Contractor's prospects of defending his obligations or enforcing his rights under the contract.

On award of the Contract, the successful Contractor is to prepare a detailed construction programme covering the duration of the project. The programme is to show the dates by which access, permissions and information from other parties is required and should show all activities (including temporary and permanent works) the inter-dependencies been activities and must highlight which are critical path activities. With reference to Clause 5.6.1 the Initial Programme must be provided prior to commencement of the works. Adjusted programmes of works may be required from time to time as stated in Clause 5.6.1.

In addition to the Construction programme, when directed, the Contractor shall promptly furnish a detailed sub-programme of the construction programme for particular sections of the Permanent Works.

C3.5.2.3 Software Application for Programming

The construction programme shall be prepared using Excel Format (*.xls/.xlsx) or MS Projects Format (*.mpp) and showing at least the minimum detail as described in Clause 5.6.2 of the General Conditions of Contract 2010.

C3.5.3 Sequence of the works

The Contractor can choose his own sequence of construction, bearing in mind the availability of water for the pressure testing of pipelines and the water-tightness testing of the elevated tank.

The Contractor must practice progressive reinstatement and remediation in line with the Particular Specification for Environmental Management and EMP. Finishing and tidying must not be deferred to the end of the Contract. All finishing and tidying shall be carried out to the best advantage of the project as a whole, and in close co-operation with other parties and residents.

On no account will spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily impede the activities of others or impact on the environment. In the event of this occurring, the Employer shall have the right to withhold payment for as long as may be necessary in respect of the relevant Works in the areas concerned without prejudicing the rights of others to institute claims against the Contractor on the grounds of unnecessary obstruction.

C3.5.4 Community Liaison Officer

The Employer will identify a person to be employed by the Contractor as Community Liaison Officer (CLO) for the duration of the Contract. The CLO shall be employed on a full day basis, for the duration of the contract and shall be paid at a rate of 200% of the Civil Engineering Industry minimum wage rate. In addition, all statutory conditions of employment in respect of UIF, Workmen's Compensation etc. shall be met. An amount is provided in the BoQ for the remuneration of the CLO by the Contractor.

The CLO will be required to work under the direction of the Client's ISD officer.

The primary role of the CLO will be liaison and facilitation of communication which shall include *inter alia*:

- Assist in all aspects related to the recruitment of local labour, and advise them of their rights
- Act as liaison between the Contractor and community on the application of Labour Intensive Construction Methods as set out in this document
- Act as a source of information for the community and the Ward Councilors on issues related to the Contract
- Liaise with a Project Committee, as anticipated in the EMP, for community representation
- Keep the Contractor advised on community issues
- Keep the Contractor advised on any issues pertaining to local security (where applicable)
- Assist in setting up any meetings/negotiations with affected parties
- Keep a diary and record details of labour/community issues that may arise
- Monitor and report on general Health and Safety issues on site
- Assist in HIV & AIDS awareness programmes
- Attend contract site meetings and report on labour/community issues

The CLO shall have no authority to issues any instructions to the Contractor. The CLO shall be neutral to all parties and endeavour to remain impartial should any conflict arise.

Responsibility for identifying a pool of suitable labour shall rest with the CLO, although the Contractor shall have the right to choose from the pool. The Contractor (and subcontractors) shall have the right to determine the total number of labourers required at any one time, which may vary throughout the contract.

The Contractor shall have the right to replace labour that is not performing adequately and the replacement of any labourer shall be done in conjunction with the CLO.

Local labour employed on the contract shall be paid in accordance with the local labour rate and all statutory conditions of employment shall be met.

C3.5.5 Methods & Procedures

C3.5.5.1 Management & 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. Discharge of water onto landowner property or onto roads that may lead to nuisance or damage shall not be acceptable. 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.

C3.5.5.2 Disposal of Spoil or Surplus Material (Read with SANS 1921 - 1: 2004 clause 4.10)

The Contractor will be responsible for the disposal of material and making all arrangements in connection therewith. The Contractor shall dispose of all surplus and unsuitable excavated material in designated spoil areas.

C3.5.5.3 Length of Trenches not Backfilled and not Rehabilitated

The recommended maximum length of open trenches at any one time is 500 m in order to limit the safety risk to surrounding communities.

In areas immediately adjoined by residential properties the Contractor will not be permitted to excavate any new pipe trenches once the maximum limit for open trench in a particular area has been reached, without the permission of the Environmental Control Officer. A maximum of three working fronts for pipelaying will be permitted.

C3.5.5.4 Length of Pipeline not Pressure Tested

The maximum length of pipeline which is not pressure tested that will be allowed at any given time during construction is 2000 m. The Contractor will not be permitted to excavate any new pipe trenches once the maximum limit for “un-pressure tested” pipeline has been reached unless otherwise authorised by the Employer’s Agent.

C3.5.5.5 Determination of Haul distances

The Contractor shall be responsible to plan his work and logistics so as to minimise his costs of haul of imported materials and spoil. No payment will be made for overhaul on this contract unless provision is made for in specific items.

C3.5.6 Quality Plans and Control

The Contractor will be solely responsible for the production of work that complies with the Specifications to the satisfaction of the Employer’s Agent. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system on site. The Employer’s Agent 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. Any shortcomings in the quality control process shall be rectified timeously and shall be a precondition for the further approval of the affected work.

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 Employer’s Agent or the Employer’s Agent representative to act as foreman or surveyor.

C3.5.7 Management of the Environment

(Read with SANS 1921-1: 2004 clause 4.19 and the Environment Particular Specification (PZ) and the applicable Environmental Management Programme (EMPr).

The maintenance in good condition of the environment on the site at all times to the extent reasonably possible and the rehabilitation of the site according to the EMPr is the responsibility of the Contractor and all activities in this regard shall be deemed to be included in the Contractor’s rates with the exception of the activities covered by payment items in Clause PZ8 and those activities listed under the scope of the Environmental Rehabilitation specialist sub-contractor.

Nonetheless the overall responsibility to comply with the Environmental Specification and EMPr shall be that of the Contractor and nothing shall relieve him of this responsibility unless so stated explicitly in the contract or in authorised correspondence pursuant to the contract administration. The Contractor is alerted to the existence of statute law regulating the integrity of the environment, and that sanctions for non-compliance apply under statute law in addition to the sanctions contained in this contract.

The Contractor shall pay special attention to the following:

(a) Clearing of Vegetation

The Contractor shall not destroy, remove or clear trees, timber or shrub to any extent greater than that approved. The Contractor shall not carry out any activity outside the areas defined for clearing unless otherwise approved by the Environmental Control Officer. Organic matter removed may not be disposed of without a waste disposal licence.

(b) Soil Erosion

The quality of topsoil in stockpiles will be maintained by measures including contamination from other materials, minimizing stockpiling periods and prevention of soil erosion by surface runoff or wind. Monitoring for erosion and soil erosion risk will be undertaken regularly to ensure that any erosion that occurs is mitigated as soon as possible.

(c) Risk of Faunal Injury and Death

The trenches will be kept open for the minimum period necessary to undertake the works. Temporary fencing or barriers will be placed along the trenches in all populated areas and in areas that are likely to be used as crossing points along the corridor.

(d) Pollution Prevention

With particular regard to Sanitation, Solid Waste Facilities, Fuels, Hazardous Substances and other Liquid Pollutants as elaborated in the Particular Specification for Environmental Management.

(e) Rehabilitation

The contract provides for the final environmental rehabilitation to be performed by a specialist sub-contractor to the main Contractor, according to a defined scope and the cost thereof is provided for in a provisional sum. The Contractor is alerted however to the contractual requirement for progressive reinstatement throughout the course of the contract and the main Contractor shall bear the overall and final responsibility to ensure that the site and its surrounds are rehabilitated to the condition in which they were prior to commencement of construction activities and in accordance with the EMPr attached hereto.

(f) Working in watercourses

Working in watercourses is strictly controlled by the Environmental Specification and EMPr and sanctions apply to non-conformances. Cofferdams shall be constructed around trenched areas in watercourses using sealed plastic bags filled with sand and means of conveyance must be provided for the flow of water to bypass the excavation. The flow of rivers is not to be restricted.

C3.5.8 Accommodation of Traffic on public roads occupied by the Contractor (Read with SANS 1921 – 1: 2004 clause 4.13 and SANS 1921 – 2: 2004)

C3.5.8.1 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.

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.

C3.5.8.2 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 Employer's Agent 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 design, construct and maintain all temporary access and haul roads to the various working areas. 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.

C3.5.8.3 Traffic Safety Officer

Where warranted by traffic conditions on or near the site, the Contractor shall nominate a suitable member of his staff as traffic safety officer to be responsible for the arrangement and maintenance of all the measures for the accommodation of traffic for the duration of the project. Duties of the traffic safety officer shall be as set out in SANS 1921 Part 2 and shall also be in compliance with the Occupational Health and Safety Act No 85 of 1993 and the Construction Regulations 2003, including the Particular Safety Specification.

C3.5.9 Other Contractors on Site

The Employer may permit other contractors employed on its other projects to draw pipe stock from the pipe yards in use under this contract. The Contractor shall accord such other contractors opportunity at reasonable times, during working hours, and following notice of not less than two working days, to access the pipe yards for the purpose of uplifting pipes. The Contractor shall record such activities by others and shall obtain signatures against any materials withdrawn or damages or loss caused to the Employer's or Contractor's property.

Any damages or loss alleged to have been caused by activities by other parties so authorised on the site shall not be recognised unless the Employer's Agent is notified timeously and with supporting documentary or photographic evidence.

C3.5.10 Accredited Skills Training

Apart from the Contractor's own in-task training of his workforce it is the intention of the Employer that Accredited Skills Training will also be provided under this contract. The training may be conducted on site or at a remote training venue, at the Employer's discretion. The Employer may elect to specify on-site training. Therefore the Contractor will be required to provide office space and associated water and sanitation facilities for training as well as construction materials for practical training.

The Employer will notify the Contractor in writing of the name and details of an Accredited Skills Training Facilitator to be appointed by the Contractor. The Training Facilitator will conduct the training, which will take place adjacent to the worksite in a suitable area to be provided by the Contractor for the purpose of training and set aside for that purpose.

It is intended that Skills Training will be provided in any or all of the following disciplines:

- Trench Excavation and Supervision;
- Pipelaying;
- Steel Fixing;
- Formwork and Concreting;
- Basic Construction Hand;
- Bricklaying and block laying;
- Finishing Hand;
- Task Based Labour Administration
- Understanding the Scope of Works and Specifications;
- Labour Recruitment and Management;
- Contractor's Responsibilities and Requirements;
- Payroll Management and Implementation;
- Basic Tender and Contract Pricing
- Community Liaison and Facilitation

Candidates for Skills Training will be identified from individuals who have a minimum schooling level of Grade 10, preferably Grade 12. Training may also be identified for those that are undergoing, or who have undergone, training at a University of Technology or FET College.

The Employer will notify the Contractor in writing of the names of candidates to be accepted for Accredited Skills Training. The Contractor shall employ such candidates according to his full and normal conditions of employment for unskilled labour for the duration of training.

Upon completion of the training the employment of the trainees shall terminate and the Contractor shall not be obliged to keep the trained personnel in his employ. However he may re-employ candidates on an individual basis by mutual agreement.

The Contractor shall also pay the fees and charges of the accredited trainer according to the agreed scale.

The Accredited On-Site Skills Training is further described in Particular Specification PT. The cost of Accredited On-Site Training is an item in the Bill of Quantities and the cost is to be reclaimed by the Contractor via the Payment Certificates. The item shall be deemed to cover all the Contractor's costs in relation to provision of training as outlined in this section and in Particular Specification PT

C3.5.11 Testing, Completion, Commissioning and Correction of Defects

C3.5.11.1 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 Employer's Agent.

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 Employer's Agent. 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.

C3.5.11.2 Acceptance control

The process control test results submitted by the Contractor for approval of materials and workmanship may be used by the Employer's Agent for acceptance control. However, before accepting any work, the Employer's Agent may have further control tests carried out by a laboratory of his choice. The cost of such additional tests will be paid for in the contract, but tests that failed to confirm compliance with the specifications, will be for the account of the Contractor.

C3.5.12 Recording of weather

The Contractor shall be permitted to take his own rainfall measurements on site subject to the Employer's Agent approval, but access to the measuring gauge(s) shall be under the Employer's Agent's control. The Contractor is to provide and install all the necessary equipment for accurately measuring the rainfall as well as to provide, erect and maintain a security fence plus gate, padlock and keys at each measuring station, all at his own cost.

C3.5.13 Key Personnel

The Contractor's Key Personnel for this contract shall be the Contracts Director, Construction Manager, Contracts Site Agent, Health & Safety Officer.

C3.5.14 Management meetings

The Contractor and such other persons as may be nominated by the Employer's Agent shall be required to attend periodic site meetings, the date and place for which will be set by the Employer's Agent in consultation with the Employer and Contractor.

The main purpose of the site meetings will be to review and discuss progress and programme, and all persons attending the site meetings must be empowered to act on behalf of the organisations they represent.

C3.5.15 Forms for Correct Administration

C3.5.15.1 Report on Employment Generation

The Contractor shall provide to the Employer's Agent, monthly, in a form approved by the Employer, a detailed breakdown of his personnel days worked, and those of any Subcontractors currently employed at the Site to conform with EPWP reporting requirements.

The breakdown shall also include details of the following:

- employee name and ID number
- gender and age group
- job category, with skill classification, or speciality;
- job title;
- number of employees in each job category or with that job title;
- trainees in each job category;
- classification of employees by origin (local/imported)

C3.5.16 Electronic Payments

Payment of employees by electronic funds transfer will be permitted provided that the bank or financial institution that is proposed for the transfer of funds is adequately represented in Jozini, including the provision of ATM facilities.

C3.5.17 Daily Records

The Contractor is to provide a triplicate site diary book, which is to be kept on site, for the purpose of keeping daily records in respect of work performed on the site and all significant events. The Employer's Agent Representative will keep the top copy on his records and the Contractor will take the middle copy and the third copy will remain in the site diary book which will be kept on site for the duration of the Contract.

C3.5.18 Bonds and Guarantees

Requirements for a Performance Bond are indicated in section T.2. The original bond document will be retained by the Employer and will be released in accordance with Clause 6.2 of GCC 2015.

C3.5.19 Payment Certificates

The Contractor shall submit invoices at monthly intervals in terms of Clause 6.10.1 of GCC2015 in respect of works completed during the preceding period and materials on site. The work shall be measured according to the format of the BoQ and measurements should be taken together with the Employer's Agent Representative and are subject to agreement as to the status of work completed. The Contractor will submit his invoice, together with invoices and other supporting documentation to the Employer's Agent in terms of Clause 6.10.2. The Employer's Agent will process the Contractor's invoice within 7 days of receipt (refer Clauses 6.10.3 & 6.10.4 of GCC) to produce a Payment Certificate and will deliver this to the Employer.

The Payment Certificate will be scrutinised by the Employer prior to payment within 28 days of receipt of the Certificate from the Employer's Agent, provided that the date of submission is such as to comply with the Employer's payment cycle as notified to the Contractor. The Contractor must ensure that, allowing for the time allowed for processing Certificates by the Employer's Agent, his invoice is submitted in good time to allow for the payment cycle to be met.

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.

C3.5.20 Permits

The Employer requires no special permits for the Contractor's personnel other than those required by the statutory authorities. This includes, but is not necessarily limited to, Work and Residence permits for non-South African nationals, Blasting Certificate for the use of explosives and permits from the Department of Energy and Mineral Affairs in respect of mining and exploitation of natural resources including sand and aggregates.

C3.5.21 Proof of Compliance with the Law

The Contractor is referred to the Returnable Schedules in Section T.2. The Contractor shall be required to maintain evidence of the continued validity of all aspects to which he has witnessed compliance at the time of submission of his tender, as well as any permits required by nature of his operation. The Contractor will be deemed to have granted the Employer the right of inspection of such documentation in the possession of the Contractor at any time as well as to make his own independent investigations where necessary.

C3.5.22 Insurance Provided by the Employer

The Employer is not providing Principal Controlled Insurance for the works that are the subject of this contract.

C3.5.23 Health and safety

C3.5.23.1 Health and safety requirements and procedures

C3.5.23.1.1 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 2014 issued on 07 February 2014 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 by executing the Agreement form C1.5 included in Section C1: Agreements and Contract Data.

C3.5.23.1.2 Health and Safety Specifications and Plans to be submitted at tender stage

(a) Employer's Health and Safety Specification

The Employer's Health and Safety Specification is included in this document as part of the Particular Specifications.

Contractors are to take note of the aspects identified in the specification requiring attention in the pricing of the tender and in the preparation of the H&S Plan:

(b) Contractor's Health and Safety Plan

The successful Tenderer shall, on receipt of notification that he has been awarded the contract, submit without delay his own documented Health and Safety Plan 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 9 to 30;

(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 7);

(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 8 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 2014.

The Contractor's Health and Safety Plan must take into account the residential nature of the surrounding area and particularly the presence of children.

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.

C3.5.23.1.3 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.

Items that may qualify for remuneration will be specified in the Safety Specifications included or in the Project specifications.

C3.5.23.2 Protection of the Public

The Contractor is alerted to the fact that the construction site traverses commercial and residential communities. The Contractor in all his planning is to take account of the potential hazard to residents, particularly children and is to take every precaution to avoid injury.

The site office area, pipe yards, the working strip and all other construction zones shall be fenced off to prevent unauthorized entry to the site. Gates shall be provided by the Contractor as required for construction access purposes. The Contractor shall be held responsible for the control of access at these gates at all times as well as to the worksite during removal and re-erection of fencing.

In populated areas and where directed by the Employer's Agent the Contractor shall also supply, install and maintain temporary fencing on both sides of the working area (servitude) and around the perimeter of all agreed additional working areas during construction for prevention of unauthorised access and shall remove on completion of the works.

C3.5.23.3 Barricades and Lighting

Requirements for barricading and lighting are stated Clause 4.18.2 of the Contract Data (section C3.5.1.3, to be read in accordance with in SANS 1921-1 Clause 4.18.2) as well as under the applicable Standard Specifications for each construction activity as modified in the Project Specifications (section C3.7).

C3.5.24 Aids awareness

C3.5.24.1 Service Provider

The Contractor shall engage a qualified service provider (i.e. one that appears on the list of recommended service providers, which is available from all regional offices of the Department of Public Works) to conduct an HIV & AIDS Awareness programme.

The HIV & AIDS awareness programme is to be repeated at 6 monthly intervals for the duration of the Contract (including the initial one at the start of the Contract).

C3.5.24.2 Sanctions

In the event that the contractor fails to satisfy the requirements of this specification, the employer may apply sanctions which include the rejection of claims for payment as being incomplete or the withholding of completion certificates (interim or final).

C3.6: STANDARD SPECIFICATION

C3.6 Standard Specifications

C3.6.1 Introduction

The Standard Specification gives a general description of the requirements to be met, and sets out the relevant specifications relevant to the Contract as well as other relevant and additional clauses. In certain clauses the standard specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in the project specifications.

C3.6.2 General

All materials, and components used in the manufacture and fabrication of plant to be supplied under this Contract, shall be the best quality and suitable for the purposes for which they are intended.

C3.6.3 Quality Management

C3.6.3.1 Applicable Quality Assurance Standards

The Tenderer shall provide a co-ordinated and formally documented statement of his quality management system, including quality management objectives, policies, organisation and procedures, for the compulsory implementation of SABS 0157 Code of Practice for Quality Management Systems, Part III. The same applies to Part II of the said Code of Practice which must be implemented on certain selected items only. However, although Part II will not be implemented in all instances it will not exempt the Contractor of compliance with the quality requirements laid down in the tender documents. Monitoring and control by the Employer's Agent may be done at any time on any material.

The Contractor shall submit with his tender an assessment report on his quality management and quality control system issued by an independent Quality Assurance Authority approved by the Employer's Agent. The inspection on which this assessment report is based shall have taken place not more than 12 months prior to the closing date for this tender.

Responsibility for and all associated costs of compliance with this sub-clause shall rest with the Contractor.

C3.6.3.2 Quality Assurance Enhancement

Should the Contractor or any of the proposed sub-contractors not comply with Sub-Clause C3.6.3.1 at the time of tender, a Contract may be awarded subject to a written undertaking to enhance his own and/or Sub-Contractor's quality assurance system to the satisfaction of the Employer's Agent before commencement of the contract.

C3.6.3.3 Quality Assurance Staff

The Contractor shall satisfy the Employer's Agent that a quality specialist together with sufficient and suitably qualified staff will be assigned to control the quality of the material used by each sub-contractor engaged in the supply of critical and major components and sub-assemblies.

C3.6.3.4 Employer's Agent Quality Assurance Representative/Inspector

The Employer's Agent may elect to appoint an independent quality assurance representative to act in a surveillance capacity on his behalf for part or all of the contract.

The Employer's Agent's Quality Assurance Representative will be a selected Sub-Contractor and will be paid by the Contractor under this Contract for all tests passed by the Inspector and certified by the Employer's Agent. The Inspector will not act as the quality controller for the Contractor or his Sub-Contractors and accordingly any tests failing inspection will be for the account of the Contractor. Similarly the costs of all inspections arising following any failed tests will be for the account of the Contractor.

C3.6.3.5 Classification of Material

Part II of the above-mentioned Code of Practice, i.e. a quality system for manufacture and installation, will apply only to certain critical material, products and services if and where indicated hereunder in this document.

C3.6.3.6 Sub-Letting

All enquiries made and contracts placed by the Contractor for critical components shall require that sub-contractors comply with the requirements of the preceding sub-clauses. Responsibility for and all associated costs of compliance shall rest with the Contractor. In instances where SABS 0157 is not applicable, Tenderers must indicate what equivalent alternative Code of Practice is being implemented.

C3.6.3.7 Disqualification

Tenderers who do not include the formally documented statements called for in Sub-Clause C3.6.2.1 and who do not respond in terms of Sub-Clause C3.6.2.2 above may be disqualified.

C3.6.4 Standard Specifications

C3.6.4.1 Standardised Specifications

The following standard specifications shall apply:

A	1986	-	GENERAL
AB	1986	-	ENGINEER'S OFFICE
C	1982	-	SITE CLEARANCE
D	1988	-	EARTHWORKS
DB	1989	-	EARTHWORKS (Pipe Trenches)
DK	1996	-	GABIONS and PITCHING
DM	1981	-	EARTHWORKS (Roads, Subgrade)
GA	1982	-	CONCRETE (Small Works)
HA	1990	-	STRUCTURAL STEELWORK (Sundry Items)
HC	1988	-	CORROSION PROTECTION OF STRUCTURAL STEELWORK
L	1983	-	MEDIUM PRESSURE PIPELINES
LB	1983	-	BEDDING (Pipes)
M	1996	-	ROADS (General)
MF	1981	-	BASE

(Note 1 - "SABS" has been changed to "SANS, without change to the contents of the specifications).

Preface on Interim Situation until Full Suite of SANS Series Specifications are Available

The Bill of Quantities is based on the SABS 1200 system of specifications and measurement.

Where SANS specifications are available, these have been incorporated into the "Contract" section of this document.

Where overlapping specifications from the SANS 2001 series of specifications occur the appropriate SABS 1200 specifications have been incorporated into the Project Specifications.

In such cases, the requirements of the SABS 1200 specifications shall prevail over the requirements of the SANS specification(s).

The payment clauses in the Bill of Quantities are based on the SABS 1200 series of specifications for consistency and the Tenderer is required to ensure that he has priced all of the requirements pertaining to the SABS specifications.

The variations and additions to the standardised specifications (Project Specifications) as well as the Particular Specifications are included as C3.7 and C3.8 respectively. The variations, are prefixed PS, and take precedence over the SABS Standardised Specification.

Where the particular specifications are in conflict with either the variations and additions to standardized specifications or the SABS Standardised Specifications, the particular specifications shall take precedence.

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 1921-1 (2004):	Construction and Management Requirements for Works Contracts Part 1: General Engineering and Construction Works
SANS 1921-2 (2004):	Construction and Management Requirements for Works Contracts Part 2: Control of Traffic on Public Roads
SANS 1921-6 (2004):	Construction and Management Requirements for Works Contracts Part 6: HIV / AIDS Awareness

The standardised specifications (SABS 1200) must be read in conjunction with the new SANS 1921 family of standards. In case of any discrepancy or conflict between the two, the SABS 1200 specification shall take precedence and shall govern.

Refer also to the Preface on interim situation until full suite of SANS Series of Specifications is available, on the first page of the Project Specification.

The term “project specifications” appearing in any of the SABS 1200 standardised specifications is deemed to be equivalent to the term “scope of work” in SANS Specifications.

C3.6.4.2 Certification by recognised bodies

Wherever possible items and materials for construction of the works shall comply with the relevant South African Bureau of Standards Specifications and with the British Standards where these are applicable in the absence of local standards.

The Contractor, when using materials conforming to a Standard Specification shall if called upon furnish the Employer’s Agent with certificates of tests showing that the materials do so conform.

C3.7: PROJECT SPECIFICATIONS

C3.7 PROJECT SPECIFICATIONS

TABLE OF CONTENTS **Page**

C3.7.1 PSA: General..... C3.48
C3.7.2 PSAB: Engineer's Office..... C3.52
C3.7.3 PSC: Site Clearance..... C3.55
C3.7.4 PSD: Earthworks..... C3.58
C3.7.5 PSDB: Earthworks (Pipe Trenches)..... C3.66
C3.7.6 PSDK: Gabions and Pitching..... C3.73
C3.7.7 PSDM: Earthworks (Roads, Subgrade)..... C3.76
C3.7.8 PSGA: Concrete (Small Works)..... C3.79
C3.7.9 PSL: Medium Pressure Pipelines..... C3.84
C3.7.10 PSLB: Bedding (Pipes)..... C3.121
C3.7.11 PSM: Roads (General)..... C3.127
C3.7.12 PSMF: Base..... C3.128

C3.7.1 PSA : GENERAL
(Applicable to SABS 1200 A – 1986)

PSA 3 MATERIALS

PSA 3.1 Quality and Samples

Add to the Sub-Clause:

No used or recycled material may be used in the Works unless expressly authorised by the Employer's Agent.

All materials to be provided under this Contract shall bear the mark of the South African Bureau of Standards wherever such materials are the subject of an SABS standard.

Materials bearing the SABS mark will not be subjected to tests to determine whether they comply with the relevant specifications. The Employer's Agent may in his discretion require any material not bearing such mark to be tested in accordance with the relevant specifications; should he do so the Contractor shall arrange for such tests to be carried out at the Contractor's cost by the South African Bureau of Standards or other approved body. Should the tests prove that any material complies with the Specifications, the Contractor will be reimbursed the value of the testing body's account for carrying out the tests required by the Employer's Agent.

Samples of concrete aggregates are to be delivered to an approved laboratory.

PSA 4 PLANT

PSA 4.1 Silencing of Plant

Delete the words:

" Machinery and Occupational Health and Safety Act 1983 (Act No 6 of 1983)"

And replace with:

"Occupational Health and Safety Act, 1993".

PSA 4.2 Contractor's Office, Stores & Services (Refer SANS 1921-1 Clause 4.14)

Add to the Sub-Clause:

Neither housing nor shelters are available for the Contractor's employees, and the Contractor shall make his own arrangements to house his employees and transport them to site.

The Employer will indicate possible areas for establishment of a site camp(s). It shall be the Contractor's responsibility to negotiate terms of use with the landowners and land users at the applicable site(s) to enable him to erect his site offices, workshops and storage facilities. The Contractor shall ensure that, in addition to his own requirements, 500 square meters of space is provided within his secured area for skills training purposes. The temporary facilities and ablution facilities shall comply with the requirements of the Local Authority.

On completion of the Works or as soon as the Contractor's facilities are no longer required the Contractor shall remove such facilities and clear away all surface indications of their presence. The site is to be rehabilitated as described elsewhere.

PSA 4.3 Suitability of Constructional Plant (New sub-Clause)

Add new Sub-Clause:

If the Employer's Agent considers that any constructional plant in use is in any way inefficient or is inadequate in capacity to complete the Works properly or on time, he shall have the right to call upon the Contractor to provide such additional plant or equipment as may be required to meet the needs of the works.

PSA 5 CONSTRUCTION

PSA 5.1.2 Preservation and Replacement of Beacons and Pegs subject to the Land Survey Act (Refer SANS 1921 - 1 Clause 4.15)

Add to the Sub-Clause :

The Employer's Agent will arrange for any pegs that are missing to be replaced at the Contractor's expense.

All survey reference marks shall be clearly marked and protected by the erection of three fencing standards.

All plot boundary pegs shall be painted and marked with fencing droppers.

PSA 5.4 Protection of Overhead and Underground Services (Refer SANS 1921-1 Clause 4.17)

Delete title and substitute the following :

Protection of Visible and Underground Services (Refer SANS 1921-1 Clause 4.17)

PSA 5.6 Pollution

Add to the Sub-Clause :

The Contractor shall take all reasonable measures to minimise any dust nuisance, noise, pollution of streams and inconvenience to or interference with the public or others arising out of the execution of the Works.

PSA 5.7 Safety (Refer SANS 1921-1 Clause 4.18)

Add to the Sub-Clause :

All work and particularly work carried out in the proximity of buildings, bridges, tanks or other structures shall be carried out in conformance with the regulations framed under the Occupational Health and Safety Act, 1993 and the Minerals Act, Act 50 of 1991, including shoring where necessary, to ensure the safety of structures that are at risk. This clause shall be read in conjunction with the Particular Specification for health and safety.

The Contractor shall enter into an agreement on Occupational Health and Safety as per the pro forma bound into this document.

The Contractor shall make available for the duration of the contract safety helmets, gumboots and any other necessary safety equipment for sole use by the Employer's Agent and his representative(s).

PSA 5.9 Protection of Structures (new sub-clause)

Where work is carried out in the proximity of buildings, bridges, buried services, tanks, wall or other structures, the Contractor shall take all necessary precautions required in terms of the regulations framed under the Occupational Health and Safety Act, (Act Nº 85 of 1993) to ensure the safety of structures and services that are at risk.

PSA 5.10 Working Width (new sub-clause)

For the major part of its length, the working strip for the DN700 pipeline is deemed to be 20m and the working strip for the DN200 pipeline is deemed to be 10m.

The working width along the route of the pipeline is reduced to a width less than the deemed width in certain areas due to the proximity of buildings, other structures, road reserve restrictions, etc. Such restricted working areas have been designated as 'restricted width' and relevant items are included in the Bill of Quantities.

In all areas of restricted working width the Contractor shall take all additional precautions as necessary and as required in terms of the applicable regulations for the protection of adjacent structures, avoidance of intrusion into streams and other designated areas for protection, including shoring where necessary, and shall adopt such working methods as are necessary to achieve the completion of all the stages of the works, safely and without undue nuisance, within such reduced working width.

PSA 6 TOLERANCES

PSA 6.2 Degrees of Accuracy

Add to the Sub-Clause :

Generally, Degree of Accuracy II shall be applicable to the whole of the Works, unless specified otherwise (refer specifically to PSD 6 and PSG 6).

PSA 7 TESTING

PSA 7.2 Approved Laboratories

Add to the Sub-Clause :

"The Contractor shall establish a testing laboratory equipped in such manner that it may be deemed by the Employer's Agent to be an approved laboratory. Alternatively, he may use the services of an established testing laboratory which the Employer's Agent has approved. The Employer's Agent shall be given free access to the testing laboratory."

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.2.1 Fixed-Charge and Value-Related Items

Add to the Sub-Clause :

The amount, if any, by which the sum of the fixed-charge and value-related items exceeds three percent of the net total tendered amount (excluding allowances for contingencies and price escalation) shall be regarded for payment purposes as time-related items and will be paid in accordance with Clause 8.2.2. (refer to Clause C2.1 (e) of the Pricing Instructions)

PSA 8.2.2 Time-related Items (refer to Clause C2.1 (e) of the Pricing Instructions)

Re-word the third and fourth lines to read:

"incremental amounts (calculated by the division of the remainder of the tendered sum by the number of remaining months of the duration of construction as assessed by the Employer's Agent) will be"

Add to the Sub-Clause :

Notwithstanding the provisions of Sub-Clause 8.2.2, an approved extension of time will not qualify the Contractor to receive any payment for that portion of fixed charge and value-related items which has become regarded as "time-related" items in terms of PSA 8.2.1 above.

PSA 8.4.2.2 Temporary Works – Dealing with Water on Works

Add to the Sub-Clause :

The sum in PSA 8.4.2.2 (h) shall cover the cost of providing, operating and maintaining the necessary equipment and other temporary works for dealing with groundwater in trenches and excavations.

C3.7.2 PSAB : ENGINEER'S OFFICE (Applicable to SABS 1200 AB - 1986)

PSAB 2 INTERPRETATIONS

PSAB 2.1(b) Supporting Specifications

Delete the Sub-Clause and substitute the following :

SABS 1200 A

PSAB 2.3 Definitions

Delete the first two lines and substitute the following :

For the purposes of this specification the definitions given in SABS 1200 A shall apply:

PSAB 3 MATERIALS

PSAB 3.1 Nameboards

In the 3rd line delete “South African Institution of Civil Engineers” and substitute with “Consulting Engineers South Africa”.

PSAB 3.2 Office Building(s)

Delete the first sentence and substitute the following:

Where required, the Contractor shall supply and furnish one air-conditioned 'Kwikjack' (6 m x 3 m) office for the sole use of the Employer’s Agent and his staff. The office is to be erected at the Contractor’s offices.

Add to the Sub-Clause :

In addition to the furnishings listed under sub-items (a) to (i), the following shall be provided and properly maintained :

(j) electrical installation is to include a light and one 15A plug point plus an adequately sized air conditioning unit (for heating and cooling) for each room.

(k) one refrigerator of at least 100 litre capacity

(l) one kettle of at least 2 litre capacity

(m) one tea set comprising six cups and saucers, six teaspoons, one teapot, one sugar bowl and one milk jug

(n) covered parking for four vehicles

(o) un-covered parking space for two vehicle

(p) two “Barhold” or similar wall mounted racks each with 6 clamps suitable for hanging A0 sized drawings

(q) one large meeting table

(r) ten additional chairs

PSAB 4 PLANT

PSAB 4.1 Telephone

The Contractor shall not be required to provide a telephone for the sole use of the Employer's Agent or his Representative.

PSAB 4.2 Survey Equipment (New Sub-Clause)

The Contractor shall provide the following survey equipment on the Site from the commencement to the completion of the Works :

- One 'Total Station'
- One automatic reading Engineer's level plus tripod
- One levelling staff (5 m long, 1 cm graduations)
- One staff angle bubble
- One metal change-point for levelling
- One separate plumb-bob
- One spirit level (one metre long)
- One hammer (2 kg) with steel or wooden pegs as necessary
- Two 50 m steel tape
- Three 5,0 m (or longer) retractable steel tape

The 'Total Station' may be shared by arrangement between the Contractor and the Employer's Agent or his representative on Site. All other survey equipment shall be for the sole use of the Employer's Agent Representative and his staff. The Contractor shall keep the equipment continuously insured against any loss, damage, or breakage and he shall indemnify the Employer's Agent and the Employer against any claims in this regard. Upon completion of the Works the survey equipment as listed above shall revert to the Contractor.

The Contractor shall maintain the equipment in good working order and keep it clean until the completion of the Works.

PSAB 4.3 COMPUTER EQUIPMENT

The Contractor shall provide a laptop computer, of approved manufacture and of standard acceptable to the Employer and pre-loaded with Windows 7 Pro 64, MS Office 2010, AutoCAD Map 3D 2012, 3G contract and A3 printer/fax/scan/copier; 12 megapixel digital camera and Garmin eTrex 20 navigation device and an A4 printer/scanner/copier, of approved manufacture and of standard acceptable for the sole use of the Employer's Agent (or his Representative) for the duration of the Contract.

The Contractor shall keep this equipment continuously and comprehensively insured and shall indemnify the Employer and the Employer's Agent against any claims in this regard. The Contractor shall maintain this equipment in good working order until the completion of the Works, whereupon ownership of said hardware and software shall revert to the Employer.

PSAB 5 CONSTRUCTION

PSAB 5.2 Engineer's Office (Refer SANS 1921-1 Clause 4.14)

Add to the Sub-Clause:

The toilet facilities provided for the sole use of the Employer's Agent or his representative(s) shall include hand washing facilities and shall be maintained in a hygienic and sanitary condition and shall be removed on completion of the Works. The facilities provided shall conform to the local health authority's requirements as applicable and the Contractor shall pay all sanitary fees and charges.

PSAB 5.5 Survey Assistants

Delete the first sentence and substitute the following :

The Contractor shall make available to the Employer's Agent two suitably trained labourers for use on and about the site on survey and other work directed by the Employer's Agent at all reasonable times.

PSAB 5.6 Computer Equipment (New sub-clause)

Add new sub-clause:

The Contractor shall ensure that adequate supplies of consumables (paper and ink cartridges) are available on site at all times. The amounts paid by the Contractor will be recoverable from the Employer – a Provisional Sum has been included in the Bill of Quantities to cover these costs.

PSAB 8 MEASUREMENT AND PAYMENT

PSAB 8.1 Scheduled Items

Delete the first sentence and substitute the following:

Items will be scheduled in terms of Sub-Clauses 8.3.2 & 8.4.2 of SABS1200 A.

PSAB 8.2.1 Fixed and Time-related Charges

Delete the first sentence and substitute the following:

The terms of Sub-Clause 8.4.2 of SABS 1200 A shall apply.

Add to the Sub-Clause:

The Tenderer is to include, under the Time-Related Charges, a Prime Cost Sum of R350,00 per week for a period of time equal to the Time for Completion of the Contract to cover the cost of the Employer's Agent telephone calls and internet access.

C3.7.3 PSC: SITE CLEARANCE (Applicable to SABS 1200 C – 1980 As Amended 1982)

PSC 3 MATERIALS

PSC 3.1 Disposal of Material

Add to the Sub-clause:

Material obtained from clearing must be disposed of off site by the Contractor at his expense. Disposal of combustible material by burning will not be permitted. The Contractor will be held responsible for observing the by-laws and regulations of the relevant local authority and for any injury to persons and damage to property caused by any fire starting on site, in his camp, or a fire started for any reason by his employees, regardless of whether such injury or damage is the direct or indirect result of such fire.

PSC 5 CONSTRUCTION

PSC 5.2.3.2 Individual Trees

Delete the second sentence of the Sub-Clause and substitute the following:

The amount of the penalty payable by the Contractor for the removal or damage by him of a tree designated for preservation shall be as stated in the Employer's Environmental Management Specification and/or Environmental Management Plan (EMP).

PSC 5.3 Clearing

Add the following new Sub-Clauses:

PSC 5.3.1 Restoration of Fences onto Servitude Boundary (New Sub-Clause)

Where existing fencing is encroaching on the pipeline servitude, such fencing shall be removed prior to construction and re-erected to a condition no worse than that pertaining prior to the removal, on the formal cadastral boundary all as indicated on the respective land plans. For the period that the fence or wall is dismantled and not yet re-erected, the Contractor shall erect, at the end of each day's operations, a temporary fence to close the gap in the existing fence or wall and shall maintain adequate security to prevent use of the temporary fence as a point of access by unauthorised persons.

PSC 5.3.2 Temporary Fencing Closures (New Sub-Clause)

Where the pipeline route crosses an existing fence or wall, a section of fencing or wall not exceeding 10,0 m in length may be removed temporarily during construction and thereafter reinstated to a condition no worse than the original condition as soon as the pipeline has been installed and backfilled in the immediate vicinity of the crossing. For the period while the existing fence or wall is dismantled, the Contractor shall erect, at the end of each day's operations, a temporary fence to close the gap in the existing fence or wall and shall maintain adequate security to prevent use of the temporary fence as a point of access by unauthorised persons.

PSC 5.3.3 Demarcation Fencing of Pipeline Servitudes in populated areas (New Sub-Clause)

In populated areas and where directed by the Employer's Agent the Contractor shall also supply, install and maintain temporary fencing on both sides of the working area (servitude) and around the perimeter of all agreed additional working areas during construction for prevention of unauthorised access and shall remove on completion of the works. The fencing shall comprise 2m high Bonnox 4 x 4 Mesh fencing, Bonnox pattern 1972/4, with straining posts and straining wires as required and according to supplier's directions and with mesh spacing not exceeding 100mm in both the vertical and horizontal directions. Chevron tape shall be interwoven in a zig zag pattern from the top to the bottom of the fence thereby clearly marking off the working area.

Gates shall be provided by the Contractor at all points as required for construction access purposes. The Contractor shall be held responsible for the control of access at these gates at all times as well as to the worksite during removal and re-erection of fencing. No other opening in

the fence shall be permitted and the Contractor shall be responsible for monitoring the fencing on a daily basis and repairing any such opening within the same day that it is detected. Notices in two official languages (English and isiZulu) shall be attached to the fence where appropriate to indicate that the site is for personnel employed on the Contract only and that unauthorised entry is forbidden.

PSC 5.3.4 Childproof Barrier (New Sub-Clause)

In proximity to residential areas, and wherever ordered, the Contractor shall provide and fix to the demarcation fencing described in PSC 5.3.3 above, approved and substantial plastic square mesh to act as an additional childproof barrier and shall remove it on the completion of the works."

PSC 5.4 Grubbing

In the fourth line delete “200mm” and substitute 300mm.

PSC 5.6 Conservation of Topsoil

Add to the Sub-Clause:

All topsoil shall be conserved for later use by stockpiling, clear of the working area.

PSC 5.8 Demolition of Structures

Add the following new Sub-Clauses:

“PSC 5.8.1 Removal and Re-Erection of Structures

Where the Contractor is directed to dismantle structures to facilitate construction and thereafter to re-erect the same structures, the structure shall be erected at the same location, or such other location as may be required by the owner within the same property, using the same or similar materials as those set aside when removing the structure. The acceptance of the work by the Employer’s Agent and certification for payment shall be subject to the Contractor submitting to the Employer’s Agent documentary evidence of the owner’s satisfaction that the re-erected structure, the over-riding consideration being that it shall be in a condition no worse than that pertaining prior to its removal.

The tendered rates shall include for the provision of a detailed photographic and written record of the structures before dismantling commences and following re-erection.

PSC 5.8.2 Demolition of Building Structures

Where the Contractor is directed to demolish structures, the Contractor shall provide a Method Statement for the approval of the Employer’s Agent. Entering upon the premises for the purpose of the demolition shall not commence before the Contractor has received a release form, duly authorised by representatives of the Employer’s Agent and the Employer’s Agent, in which any special conditions applicable to the demolition are documented”.

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.2 Scheduled Items

PSC 8.2.9 Transport Materials and debris to unspecified sites and dump

Delete the sub-clause and substitute:

The cost of cartage to the approved disposal site(s) shall not be paid separately and shall be deemed to be included in the Contractor’s rates for site clearance.

PSC 8.2.10 Remove Topsoil to a Nominal Depth of 150 mm and Stockpile

Delete from the sub-clause heading the words: 'to a Nominal Depth of 150 mm'
Add to the Sub-Clause:

The topsoil shall be conserved for later use by stockpiling clear of the working area.

PSC 8.2.11 Fences (New Sub-Clause)

Separate payment will be made for dealing with fences in the manner specified in PSC 5.3.1 above as scheduled.

PSC 8.2.12 Restoration of Fences onto Servitude Boundary (New Sub-Clause)

Payment will be made per linear metre of temporary fencing installed in the manner specified in PSC 5.3.1 above, and the rate shall include for maintaining such fencing in good condition, including daily surveillance and repair, throughout the duration of construction and removal on completion of the works.

PSC 8.2.13 Temporary Fencing Closures (New Sub-Clause)

Payment will be made per linear metre of temporary fencing installed in the manner specified in PSC 5.3.2 above, and the rate shall include for maintaining such fencing in good condition, including daily surveillance and repair, throughout the duration of construction and removal on completion of the works.

PSC 8.2.14 Removal and Re-Erection of Structures (New Sub-Clause)

Separate payment will be made for removing and re-erecting structures in the manner specified in PSC 5.8.1 above as scheduled and including for the costs of photographic and written records.

PSC 8.2.15 Demolition of Building Structures (New Sub-Clause)

Separate payment will be made for demolishing structures in the manner specified in PSC 5.8.2 above as scheduled and including for the cost of removal of rubble to an approved spoil site, backfilling any excavations and compacting to 90% mod AASHTO and shaping the ground level in line with the natural terrain.

PSC 8.2.16 Saw cut existing asphalt (New Sub-Clause)

The existing asphalt is to be cut from surface to the underside of the asphalt layer and not into the lower levels. The payment shall be made for the length of each saw cut.

PSC 8.2.17 Removal of existing asphalt (New Sub-Clause)

After the existing asphalt layer is saw cut, the contractor shall remove the layer and dispose of at an approved dump site. The payment shall consist of removing the layer by hand and disposing at the approved dump site.

PSC 8.2.18 Demarcation Fencing (New Sub-Clause)

Payment will be made per linear metre of temporary fencing installed in the manner specified in PSC 5.3.3 above, and the rate shall include for maintaining such fencing in good condition, including daily surveillance and repair, throughout the duration of construction and removal on completion of the works.

PSC 8.2.19 Childproof Barrier (New Sub-Clause)

Separate payment will be made as an extra-over for the installation of plastic mesh on the demarcation fencing to provide a childproof barrier in the manner specified in PSC 5.3.4 above and the rate shall include for maintaining such barrier in good condition throughout the duration of construction so as to serve its intended purpose and removal on completion of the works.

C3.7.4 PSD : EARTHWORKS (Applicable to SABS 1200 D - 1990)

PSD 3 MATERIALS

PSD 3.2.1 Material suitable for Embankments and Terraces

Embankment material shall be compacted to 90% modified AASHTO density.

PSD 4 PLANT

Add the following new Sub-Clauses:

PSD 4.5 Restriction on use of Plant (New Sub-Clause)

Where the Contractor finds it impractical to use mechanical plant for excavation or to complete portions of the work due to restrictions caused by difficult access or the presence of existing structures, pipelines or services shown on tender drawings, the Contractor will be deemed to have satisfied himself as to the alternative requirements when entering rates against the appropriate items in the Bill of Quantities as no claim for extra payment based on the inability to use plant in such circumstances will be considered.

PSD 4.6 Vibration loadings from use of Plant (New Sub-Clause)

The onus will be on the Contractor, when proposing to use heavy plant or equipment to complete work in close proximity to a existing structures, pipelines or services, to determine the effect of the vibration loading from the plant or equipment on the supporting ground or foundation and the structure, pipeline or service and take all necessary steps to ensure that the stability or integrity of the element concerned is not compromised by the particular selection and use of plant or equipment.

Any damages caused to existing elements directly or indirectly arising out of the use of plant and equipment in close proximity shall be made good, to the satisfaction of the Employer's Agent by the Contractor at his own expense.

PSD 5 CONSTRUCTION

PSD 5.1.1.1 Barricading and Lighting (Refer SANS 1921-1 Clause 4.18.2 and 4.18.3)

Delete the Sub-Clause and substitute :

Without limiting any obligation which the Contractor may have in terms of any Act, Ordinance or other legislation, the Contractor shall ensure that all excavations which are accessible to the public or which is adjacent to a public road or thoroughfare, or by which the safety of persons may be endangered are protected as set out in clause 13 of the General Safety Regulations of the Occupational Health and Safety Act, 1993 and that watchmen are employed to ensure that barricades, barriers and lights are effective at all times.

Trench excavations shall be adequately protected by means of fences or barricades so as to enclose the spoil and the excavations, as approved by the Employer's Agent. Fences shall have at least two horizontal double sided 'red/white' chevron tapes approved by the Employer's Agent. The tapes shall be stretched tightly between supports along both sides and ends of the excavation at levels approximately 0,45 m and 1,25 m above the ground. The supports shall consist of poles or iron standards securely planted in solid ground at not more than 10 m centres so as to enclose the spoil and the excavations.

Bridges for vehicles and/or pedestrians shall be provided along the route of the work as and where may be considered necessary by the Employer's Agent. They shall consist of a number of suitably sized steel plates laid across open excavated trenches. They shall be protected on each side by a stout two rail timber safety barrier, at least 1m high, consisting of 150 x 75 mm timber verticals set firmly into the ground, 75 mm x 50 mm rails securely fastened to them. At least 4 lamps or reflective markers must be provided at each crossing.

Where construction is in, or across public roads, barricades or barriers and temporary road signs shall be erected. All such signs and positioning thereof shall comply with the requirements set out in Road Note 13 read in conjunction with the SA Road Traffic Signs Manual.

PSD 5.1.1.2 Safeguarding of Excavations (Refer SANS 1921-1 Clause 4.18.3)

In sub-clause a) delete the words “Machinery and Occupational Safety Act” in the third and forth lines and substitute “regulations to the Occupational Health and Safety Act, 1993”

PSD 5.1.1.3 a) Explosives (New Sub-Clause) (Refer SANS 1921-1 Clause 4.7)

Notwithstanding Sub Clause 5.1.1.3 the Employer’s Agent shall be notified at least 48 hours beforehand of the Contractor’s intention to use explosives on site.

It shall be incumbent on the Contractor to make himself aware of the restrictions to blasting imposed by electric transmission or telephonic lines and other similar services. Where the presence and location of electric transmission or telephonic lines etc, are known or are shown on the Employer’s Agent’s drawing at tender stage the Contractor must make allowance in his rates and programmes for restrictions and delays which may result from restrictions imposed by the authorities.

PSD 5.1.1.3b) Use of Explosives (New Sub-Clause) (Refer SANS 1921-1 Clause 4.7)

Generally, the Contractor will be permitted to use explosives for breaking up rock and hard material during excavations, for demolishing existing structures and for such other purposes where it may normally be required, subject to the following conditions:

a) The Employer’s Agent or Inspector of Explosives shall have the power to prohibit the use of explosives in cases where in his opinion, the risk of injury or damage to persons, property or adjoining structures is too high. Such action by the Employer’s Agent shall not entitle the Contractor to any additional payment for having to resort to other less economical methods of construction unless otherwise provided in the Contract Data or Bill of Quantities.

b) Should blasting be necessary, the Contractor shall take every precaution to protect the Works and persons, animals and property in the vicinity of the site. The Contractor will be held responsible for any injury or damage caused by any blasting operations and shall make good such damage at his own expense.

c) The requirements for the Explosives Regulations Act (Act 26 of 1956) and the requirements of the Inspector of Explosives shall be complied with. In addition, where applicable, the requirements of Chapter 9 of the Regulations published in terms of the Mines and Works Act (Act 27 of 1956) and the requirements of the Government Mining Engineer shall be complied with.

d) A copy of each blasting permit issued to workmen, and of each permit issued to the Contractor to cover the purchase, storage and transport of explosives, shall be handed to the Employer’s Agent. The Contractor shall grant the Employer’s Agent access to all records maintained for the Inspector of Explosives or the Government Mining Engineer, as the case may be.

e) Before any blasting is undertaken, the Contractor, together with the Employer’s Agent shall examine and measure up any buildings, houses or structures in the vicinity of the proposed blasting and establish and record together with the owners thereof the extent of cracking or damage that may exist before commencement of blasting operations. The Contractor shall produce a photographic record of neighbouring structures before blasting commences. These structures will be pointed out by the Employer’s Agent. It shall be the responsibility of the Contractor to make good at his own expense any further damage to such houses, buildings or structures which is a result of the blasting.

f) Where there is reasonable danger of damage to power and telephone lines or any other property, the Contractor shall suitably adapt his methods of blasting, the size of the charges and use adequate protective measures such as cover blasting in order to limit the risk of damage as far as possible.

g) When blasting to specified profiles, the Contractor shall so arrange the holes and charges that the resulting exposed surfaces are as sound as the nature of the material permits. The Contractor shall make good at his own expense any additional excavation necessitated by the shattering of rock in excess of any overbreak allowance specified in the Specification Data or in any other specification or given on a drawing.

PSD 5.1.1.3c) Limitations for Blasting (New Sub-Clause)

a) Approval of methods and keeping of records

No blasting work may be carried out prior to the Employer's Agent approval being given in writing.

Prior to starting any drilling for the first section of blasting, the Contractor shall submit for approval to the Employer's Agent, details of the proposed overall methods of blasting that will be used on site, including spacing, depth and pattern of holes, charging levels (kg/m^3), spacing and positioning of relays, method of blast initiation, precautions to prevent 'fly rock', maximum charge per relay, traffic arrangements during blasting, and any other details he may consider relevant. These details shall be submitted in writing and supported with sketches at least 7 days before the commencement of drilling and blasting.

The Employer's Agent will evaluate these details in relation to the given limitations and prior to giving his approval, will indicated to the Contractor any changes that may possibly be needed to comply with the limitations.

For all subsequent blasts, the Contractor shall, at least 24 hours beforehand, notify the Employer's Agent of the intention to blast and at the same time shall note if any changes will be made relative to the approved method.

The Employer's Agent reserves the right to order the Contractor to modify his method of drilling and blasting, or to employ reduced blasting, without thereby invalidating the Contract. The Contractor shall have no claim for extra payment, over and above his tendered rates, due to his being ordered to use such a different method of drilling or blasting or reduced charges, regardless of any prior approval by the Employer's Agent of any previous method.

After every blast, the Contractor shall, within 24 hours, submit to the Employer's Agent details of the actual total mass of explosives used, the approximate volume of material loosened and the maximum simultaneous mass of explosives detonated (maximum charge per relay).

Notwithstanding any approval given by the Employer's Agent, the Contractor shall at all times be responsible for the safety of the Works, persons, animals and property in the vicinity of the Site during blasting operations.

b) *Vibrations*

Blasting vibrations are caused by the transmission of the shock wave from the explosion charge through the material being blasted. This shock wave could cause damage to structures in the vicinity of the blasting if the vibrations are not limited to acceptable levels. Damage to structures is closely associated with peak particle velocity of the ground vibrations in the vicinity of the structure. Advisable maximum levels for peak particle velocity are given in Table 2.

Table 2 - Maximum Particle Velocities (Vibration)

Maximum peak particle velocity (mm/s)	Effect on people and buildings
0,5	Threshold of human perception unlikely to cause damage of any type
5	Limit for blasting adjacent to historical monuments
25	Limit for blasting near private dwellings in order to reduce disturbance to residents to a minimum
50	Limit for blasting adjacent to residential structures on good foundations
84	Limit for property owned by concern doing the blasting (ie. minor plaster cracks acceptable)
120	Recommended maximum level for blasting adjacent to sturdy reinforced concrete structures

The peak particle velocity V is related to the distance D from the blast and the maximum mass of explosive E instantaneously detonated (maximum charge per relay) by the general equation:

$$V = \left(\frac{k}{D}\right)^m xE^n$$

where k, m and n are constants for a particular set of circumstances. V is in mm/s, D is in metres and E is in kilograms. Experimentation has shown that n = 0,5 but k and m have to be determined for each site by means of vibration measurements. However blasting can be safely conducted without vibration measurements or expert advice if the following relationship is used:

$$V = \left(\frac{1150}{D}\right)xE^{0.5}$$

which gives the maximum charge levels for V = 50 mm/s listed in Table 3.

Table 3 - Maximum Charge Levels

Minimum distance from nearest blast hole structure (m)	**Maximum charge mass per relay (kg)**
10	0,19
20	0,76
30	1,7
40	3,0
50	4,7
60	6,8
70	9,3
80	12,1
90	15,3
100	18,9

Only *detonating relays of at least 20 milliseconds delay interval shall be used.*

The above relationship can be used to calculate charge mass for other velocity limits. However, if higher charge levels have to be used for practical reasons, expert advice and possibly vibration measurements will be required.

Notwithstanding the above blasting limits, the Contractor shall at all times be responsible for the safety of the Works, person, animals and property in the vicinity of the Site during blasting operations.

PSD 5.1.1.3d) Negligence (New Sub-Clause)

The Contractor shall be liable for all damages to services caused as a result of the Contractor's negligence.

PSD 5.1.2.2 Detection, Location and Exposure (Refer SANS 1921-1 Clause 4.17)

Add to the Sub-Clause:

All existing services on the site may not be shown on the Drawings or be visible on the site. The Employer's Agent may order excavation by hand in order to search for and expose services. An item has been included in the Bills of Quantities to cover the cost of such work if so ordered by the Employer's Agent.

Where a service is damaged because of the Contractor's negligence, he shall be liable for the costs involved in the repair of the service and any other costs consequent upon the interruption of the damaged services.

PSD 5.1.4.3 Excavated Material Not to Endanger or Interfere (Refer SANS 1921-1 Clause 4.10)

Delete the sentence: "If the necessity ……..will be borne by the Employer."

PSD 5.1.6 Road Traffic Control

Delete from the fifth, sixth and seventh lines all words following "stated in the project specification".

An item has been included in the Bills of Quantities to cover the relevant costs.

PSD 5.1.7 Excessive Pollution (New Sub-Clause) (Refer SANS 1921-1 Clause 4.19)

The Contractor shall take all reasonable measures to minimize excessive noise and dust nuisance, pollution of streams and inconvenience to or interference with the public or others because of the execution of the works.

PSD 5.2.2.1 Excavation for General Earthworks and for Structures (Refer SANS 1921-1 Clause 4.10)

Add to the Sub-Clause :

(f) Where outside shuttering is ordered by the Employer's Agent, the excavations shall be carried out for an extra width of not more than 600mm all around the structure, measured from the base of the face to be shuttered, to allow for the shuttering to be fixed, this extra excavation and refilling where necessary is to be measured and paid for under quantities allowed for this purpose in the Schedule. Outside shuttering shall be used for the construction of all major structures unless ordered otherwise by the Employer's Agent.

(g) Where permanent concrete is to be placed against an excavated face, the excavation shall be trimmed to ensure that there is no projection greater than 20mm protruding into the excavation profile.

PSD 5.2.2.3 Disposal

Delete the second sentence and substitute :

"He shall dispose of surplus and unsuitable material in areas approved by the Employer's Agent".

PSD 5.2.3.1 Embankments

In the fourteenth line delete “600mm” and substitute “300mm”

In the seventeenth line delete “300mm” and substitute “150mm”

On the twentieth line delete the sentence starting ‘Each layer shall be .... ‘ and substitute the following :
Each layer shall be compacted to achieve 90% modified AASHTO density except where indicated otherwise on the Drawings.

PSD 5.2.4.2 Topsoiling

Delete the Sub-Clause and substitute:

Where scheduled, topsoil shall be placed on all surfaces and on embankments and shall be lightly compacted by wheeled vehicles or by tamping, and trimmed neatly to the required lines grades and levels. The final thickness of topsoil after compaction shall be at least 100mm. Prior to topsoiling, the surfaces to be topsoiled shall be prepared by pulling horizontal ruts into the soil with the tines of a front-end loader or other suitable method to retard erosion of the topsoil.

PSD 5.2.4.3 Grass or other vegetation

Add to the Sub-Clause :

The surface of topsoiled embankments, terraces and other designated areas are to be planted with fine sturdy approved grass as specified elsewhere. The grassed areas are to be fertilized and watered until the area is fully covered with grass.

PSD 5.2.5.1 Freehaul

Delete the Sub-Clause and substitute :

All haul will be regarded as freehaul. No overhaul will be paid under this contract.

PSD 5.5.5.2 Overhaul

Delete the Sub-Clause.

PSD 6 TOLERANCES

PSD 6.3 Excavation by Mechanical Means (New Sub-Clause)

Where bulk excavation is carried out by earthmoving equipment, such excavation will only be allowed to within a level of 300mm, or less as ordered by the Employer’s Agent, above the general level to which the ground has to be reduced, the balance of the bulk excavation being carried out by hand or by other means approved by the Employer’s Agent.

PSD 7 TESTING

PSD 7.4 Tests to the Contractors Account (New Sub-Clause)

The Contractor shall make arrangements with a soils testing laboratory to undertake the following tests and to pass the test results to the Employer’s Agent. The costs of such tests shall be included in the rates tendered for the appropriate item in the Bills of Quantities.

a) Material imported from outside the Contract Site as working surfaces, subgrade improvement or for fill material

One CBR and indicator test per 200m³ of compacted material brought on site, (river sand will normally be exempted from this requirement). A sample and one CBR and indicator test of the material proposed for importation shall be submitted to the Employer’s Agent for approval prior to the commencement of importation.

b) Fill material in place

One density and moisture content per 100m³ of compacted fill

c) Compacted subgrade or finished level

One density and moisture content per 200m² of compacted surface area.

Should any of the above density tests fail to comply with the specified requirements, the Contractor shall at his own expense remedy the failure and submit a new test to the Employer's Agent.

PSD 7.5 Determination of Compaction (New Sub-Clause)

Determination of the standard of compaction achieved shall be carried out in accordance with Standard methods of testing road construction materials published by the Department of Transport Division of National Roads, Publication TMH.1.

PSD 7.6 Tests at the Employer's Request (New Sub-Clause)

Where CBR, indicator tests and the like are required on materials from within the Contract Site the Contractor shall also make arrangements with a soils testing laboratory to undertake these tests, the costs of which have been allowed for in the Bills of Quantities as a provisional sum. Payment for such tests will be per sample tested and reported to the Employer's Agent.

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.1.1 Basic Principles

Delete the first sentence and substitute:

"The basic principles of measurement and payment for all earthworks are that the rates tendered for excavation shall cover the cost of excavating and re-use of the excavated material in backfilling, forming embankments, etc., including any necessary additional offloading, stock-piling and reloading and the cost of disposal of any".

In the eighth line delete "Drawing D-2" and substitute "Fig D-2"

PSD 8.1.2 Basic Principles

Delete the first line of the first sentence and substitute :

"Excavations which are required to be backfilled, or partially backfilled, will be measured as if taken out"
Delete the fifth and sixth lines and substitute :

"other such structures, the volume will be measured from the finished outline of the concrete, or the blinding to the concrete (as the case may be), as shown on the Drawings.

PSD 8.3.2 Bulk Excavation

Delete the second sentence and substitute :

"The rate shall cover the cost of complying with all precautions required in terms of 5.1 in addition to the cost of excavation, offloading to stockpile, stockpiling and reloading as may be necessary, spreading or backfilling, compacting and watering"

"Drawing D-1" in the fifth line and in the last line to read "Fig D-1"

PSD 8.3.3 Restricted Excavation

"Drawing D-2" in the first line to read "Fig D-2"

PSD 8.3.4 Importing of Materials

Delete sub-clauses (b) and (c).

Add the following sub-clauses

PSD 8.3.4 (d) for embankment construction

The rate shall cover the cost of royalties (if any) and acquiring suitable material, loading, transporting with freehaul distance, unloading, spreading in layers not exceeding 150mm thick, watering, compacting to 90% Mod AASHTO density, trimming slopes of embankment to required outline all in accordance with the Specifications. The rate shall also include for carrying out density testing and the disposal of any surplus material.

PSD 8.3.4 (e) for backfilling around structures

The rate shall cover the cost of royalties (if any) and acquiring suitable material, loading, transporting with freehaul distance, unloading, spreading in layers not exceeding 150mm thick, watering, compacting to 90% Mod AASHTO density, trimming upper surfaces to the required outline all in accordance with the Specifications.

PSD 8.3.14 Overbreak (New Sub-Clause)

Where hard rock is encountered in bulk or restricted excavations, the Contractor shall be reimbursed for excavation and refilling with concrete Grade 10/40 under the base and for the relevant grade of concrete for the structure walls for an excess of 200mm thickness beyond the scheduled excavation line. If a blinding layer is indicated then the 200mm shall be taken from the uppermost surface of the blinding layer.

No additional items have been provided for reimbursement of any additional excavation, concrete infill and/or formwork over and above the allowance stated. The Contractor is required to make his own estimate of any additional costs he feels may be required and these are to be included in the above mentioned items. The method of measurement shall be on the basis of the area of rock encountered within the nett outline of the structure only and regardless of actual excavated levels..…..... Unit m^3

C3.7.5 PSDB : EARTHWORKS (PIPE TRENCHES)
(Applicable to SABS 1200 DB - 1989)

PSDB 2 INTERPRETATIONS

PSDB 2.1 Supporting Specifications

Add New Sub-Clause:

PSDB 2.1.3 Specification for Labour Intensive Methods

SANS 1921 Part 5 shall also apply in the case of labour-based excavation.

PSDB 3 MATERIALS

PSDB 3.1 Classes of Excavation

Add to the Sub-Clause :

The classification of materials in respect of areas designated for hand excavation shall be as per Annex B of SANS 1921 Part B (Tables B.1 & B.2).

PSDB 3.3 Selected Granular Material

Delete the Sub-Clause and substitute :

Selected granular material shall be material of a granular, non-cohesive nature that is singularly graded between 0,6 mm and 10 mm, is free-draining and has a compactibility factor (as determined by the test given in Section LB of Part 3 of SABS 0120) not exceeding 0,4.

(for bedding material (padding) for steel pipes see PSLB 3.3)

PSDB 3.4 Selected Fill Material

Delete the Sub-Clause and substitute :

The category ‘Selected Fill Material’ shall apply to HDPE piping only. For steel piping all material up to the underside of backfill shall be measured as selected granular. (for bedding material (padding) for steel pipes see PSLB 3.3)

Selected fill material for HDPE piping shall be a sandy clay material having a PI not exceeding 6 and that is free from vegetation and from uncrushable lumps and stones of diameter exceeding 20mm.

PSDB 3.5(a) Backfill Material

In the third line delete "150mm" and substitute "100mm".

PSDB 3.5(b) Backfill Material

In the second line delete “PI not exceeding 12” and substitute “PI not exceeding 6”.

PSDB 3.5(c) Cement Stabilised Backfill (New Sub-Clause)

Where scheduled, or directed by the Employer’s Agent, backfill shall be stabilised with 5% cement by mass. The backfill material shall have a plasticity index not exceeding 10 and all material must pass through a sieve of aperture size not exceeding that specified in SABS 1200 LB, Sub-Clause 3.2, as amended.

The dry materials shall first be mixed in a concrete mixer, whereafter sufficient water is to be added to produce the stiffest consistency available for placing and compacting with vibrators.

PSDB 3.6 Materials for Reinstatement of Roads and Paved Areas

Delete the Sub-Clause and substitute:

Material used in the reinstatement of roadways shall fall into the following relevant categories:

(a) Foundation material recovered from the excavation of trenches across existing roadways which, if so instructed by the Employer's Agent, shall be set aside and re-used as sub-base material.

(b) New material which shall conform to the requirements of:
(i) Clause 3.2.1 of SABS 1200 ME for the Subbase
(ii) Clauses 3.2 and 3.3 of SABS 1200 MF for the Basecourse
(iii) Clause 3.2.2 of SABS 1200 ME for the Gravel Wearing Course
(iv) Clause 3 of SABS 1200 MH for the asphalt surfacing

PSDB 3.7 Selection

Delete the second sentence and substitute the following :

The Contractor is not required to use selective methods of excavating but shall, if so instructed by the Employer's Agent, screen or otherwise treat excavated material in order to produce material suitable for the bedding cradle or the bedding blanket.

PSDB 4 PLANT

PSDB 4.1 Excavation Equipment

In the first line delete "The Contractor" and substitute : "In sections deemed to be excavated by mechanical means, the Contractor"

Add to the Sub-Clause :

Should any portion of a pipe trench exceed the specified depth, the Contractor will be held responsible for any additional costs which may arise as a result of such over-excavation. Concrete filling or imported compacted fill may be ordered by the Employer's Agent to be placed below the bottom of the trench.

PSDB 4.3 Compaction Equipment

Add to the Sub-Clause :

In sections designated to be compacted by labour-based methods hand stampers shall be used as per requirements of Clause 4.3 of SANS 1921 Part 5.

PSDB 5 CONSTRUCTION

PSDB 5.1.1 General

Add to the Sub-Clause:

In the case of Labour Intensive Methods the method of excavation of trenches is subject to determination according to the method described in PSDB 5.4.1.

PSDB 5.1.2.3 Sloping Ground

Delete the Sub-Clause and substitute :

The Contractor shall be responsible throughout the duration of the Contract, inclusive of the Defects Liability Period, for the provision of all soil erosion preventative measures necessary to protect the trenches, pipes and land utilised by the Contractor during the Contract from any adverse effects of soil erosion, settlement, scour, etc., resulting from the construction of the Works.

Cross embankments, generally extending across the full width of the working strip, consisting of low earth mounds shaped to rounded form and so oriented as to have a fall of 1% along their length, shall be constructed with compacted material having a minimum density of 90% modified AASHTO density and minimum dimensions and maximum spacings dependent on the slope of the ground along the length of the pipeline, as indicated in the following table :

Slope of Ground	Minimum Height	Minimum Base Width	Maximum Spacing
0% - 2%	No cross-embankments required		
2% - 5%	300 mm	1,2 m	55 m
5% - 10%	300 mm	1,2 m	40 m
10% - 15%	375 mm	1,5 m	30 m
Greater than 15%	450 mm	1,7 m	20 m

The height of the cross-embankments for a distance of 1 metre on either side of the trench centreline shall be raised 150mm above the remainder of the cross-embankment to allow for settlement. In order to form a satisfactory drainage channel upstream of each cross-embankment (at a slope of 1%) the crown over the backfilled trench shall be removed for a distance of 0,5m upstream of the cross-embankment.

Cross-embankments shall be constructed to the same minimum standards and dimensions indicated above wherever artificial slopes have been formed on the working strip or other areas used during construction and, with the approval of the Employer's Agent, are permitted to be so left.

Payment will be made for the construction of cross-embankments in accordance with Sub-Clause 8.3.4(c), provided construction thereof has been either ordered or approved by the Employer's Agent prior to the commencement of such construction.

PSDB 5.1.2.4 Cross-Walls in Trenches (New Sub-Clause)

In steeply sloping trenches (longitudinal slope > 15 %) and where otherwise ordered by the Employer's Agent, the Contractor shall place sacks of earth as sack breakers or cross walls around and above the pipe up to ground level, prior to backfilling, as a soil erosion measure. Such sacks shall be filled with selected material free of stones in excess of 50mm maximum dimension. One sack breaker shall consist of these sacks packed tightly against the trench bottom, pipe and actual trench sides, and against each other to form a solid cross wall at least 0,5m thick from the bottom of the trench to the surface.

An item has been included in the Bills of Quantities to cover the cost of the supply, installation and maintenance of sack breakers.

PSDB 5.2 Minimum Base Widths

Add to the Sub-Clause :

Trench sides shall be as near vertical as possible in order to minimise the quantity of backfill material required and to avoid possible difficulties where pipelines have to be installed parallel to existing services, fences, hedges, etc and to minimise the loading on the pipe.

The base width for trenches for cables, ducts and unbedded flexible continuous piping, of external diameter less than 125mm laid at a depth not exceeding 1,5m, shall be equal to the external diameter of the cable, duct or pipe, plus a side allowance of 200mm on either side.

PSDB 5.4 Excavation

Add to the Sub-Clause :

Where a pipe is to be laid in a vertically-sided trench with temporary side support, it is necessary to ensure that the compacted bedding and backfill is hard up against the soil forming the trench side by withdrawing the temporary supports stage by stage as the backfill rises up the trench.
Where the pipe trench crosses surfaced roads, the Contractor shall neatly cut two parallel grooves into and through the "black top" before excavating between the grooves. The grooves are to be set back at least 200 mm from the edge of the excavation face to prevent ravelling of the cut edge. The cost of this operation, where not scheduled separately, will be held to be covered in the general rates for excavation.

PSDB 5.4.1 Determination of Method of Excavation (New Sub-Clause):

Trenches for pipelines shall be excavated by either mechanical means or by hand, determined as follows:

Trial holes of minimum dimensions 1,0 x 1,0 m shall be excavated by hand along all pipeline routes at 50 m intervals ahead of the Contractor's programme for trench excavation. The trial holes shall be 800 mm deep or less if intermediate or hard rock material is encountered.

If intermediate or hard rock material is encountered in the top 800 mm of excavation at such trial holes, then excavation may be deemed to be carried out by mechanical means, the length of such excavation determined on the basis of other trial hole findings.

If soft material only is encountered at such trial holes, then excavation may be deemed to be carried out by hand up to a maximum depth of 1,5m, the length of such excavation determined on the basis of other trial hole findings. The consistency of the material shall be determined as per Table 1 of SANS 1921-Part 5 and the Classification of excavated material shall be as per Annex B of SANS 1921-Part 5 (Tables B.1 & B.2).

If intermediate or hard rock material is encountered in those stretches set aside for hand excavation on the basis of the trial hole findings, then the Contractor may be allowed to remove the intermediate or hard rock material by mechanical or whatever means, the rate for which is to include for backfilling and re-excavating (if necessary).

PSDB 5.5 Trench Bottom

Add to the Sub-Clause :

Where steel pipes are laid in waterlogged conditions and/or where so instructed by the Employer's Agent a 150mm thick layer (See PSLB 5.2.5) of imported single sized stone (19mm size unless otherwise instructed by the Employer's Agent) with a geofabric filter surround ("bidim" Grade A4 or similar approved) shall be constructed under the bedding layer specified for the pipes.

PSDB 5.5.1 Jointing Holes (New Sub-Clause)

Jointing holes shall be cut of sufficient length and depth to allow for the proper making or bolting of pipe joints and to ensure that joint collars or sleeves do not rest on the trench bottoms. After the pipework has been inspected, tested and approved by the Employer's Agent, the jointing holes shall be refilled with selected soft material free from stone and then rammed to provide a continuous uniform support for the pipework. No specific payment will be made for forming and refilling holes, the cost of which is deemed to be included in the tendered rates.

PSDB 5.6.1 Backfilling - General

Add to the Sub-Clause:

Notwithstanding the requirements of Sub-Clauses 5.6.1 and 5.6.6, no pipe joint or pipe fitting shall be covered by either blanket or backfill material prior to the successful completion of the visual inspection and pressure testing of the relevant section of the pipeline.

All backfilling shall be carried out by hand and the Contractor must price his tender accordingly. No mechanical plant shall be used in backfilling without prior written consent of the Employer's Agent.

PSDB 5.6.2 Material for Backfilling

Delete fourth, fifth and sixth lines and substitute the following :

Hard rock material shall not be used for, or incorporated into, the backfill above the bedding layers without the Employer's Agent approval.

PSDB 5.6.3 Disposal of Soft Excavation Material

Add to the Sub-Clause :

Surplus material or unsuitable material shall be disposed of off site by the Contractor.

PSDB 5.6.4 Disposal of Intermediate and Hard Rock Material

Delete the Sub-Clause and substitute :

Surplus intermediate and hard rock material from trench excavations shall be disposed of off site by the Contractor.

PSDB 5.6.8 Transport for Earthworks for Trenches

Delete the Sub-Clause and substitute :

The requirements of Sub-Clause 5.2.5 of SABS 1200 D as amended and as applicable shall apply.

(Refer also PSD 5.2.5.1 & 5.2.5.2)

PSDB 5.7.2 Areas subject to Traffic Loads

Add to the Sub-Clause:

for an extent of 2 m on either side of the carriage-way at each crossing.

PSDB 5.9.4 Bitumen Roads: Sub-Base and Base

Add to the sub-clause:

Each Tenderer shall include in his tender allowances to cover the costs of reinstating all surfaces and inclusive of all layers to their conditions pertaining before the commencement of construction.

Items have been included in the Bill of Quantities to cover the reinstatement of certain surfaces (concrete and/or asphalted/gravel driveways and/or roads) and for payment purposes, the area of those specific surfaces shall be calculated from the product of the length of the trench and the specified trench width plus 400 mm (refer PSDB 5.4).

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.1.4 Basic Principles

Delete the Sub-Clause and substitute :

Except that the volume will be computed as specified in 8.2.3, the requirements of Sub-Clause 5.2.5.1 (Freehaul) of SABS 1200 D as amended and as relevant, shall apply to freehaul.

No additional payment will be made for excavating and backfilling bell (fox) holes as the cost of that work will be deemed to be included in the rates for trenching.

PSDB 8.3.2 Excavation

Delete Sub-Clause and substitute:

a) Excavation in all materials for trenches and dispose of surplus material. Rate to include for all temporary works including trimming, shoring and dewatering as required.

b) Extra-over item (a) above for:

(1) Excavation in Intermediate material .....Unit : m^3

(2) Excavation in Hard rock material.....Unit : m^3

(3) Excavation in Boulder Class A material.....Unit : m^3

(4) Excavation in Boulder Class B material.....Unit : m^3

Separate items will not be provided for depth increments. Volume will be computed from the trench width determined in accordance with 8.2.3 and the depth from the top of the intermediate or hard rock excavation, as the case may be, either to the bottom of the same material or to the bottom of the trench as specified in (a) above, whichever is the lesser (see Drawing DB-5).

The rates shall cover the cost of the excavation and handling of the material as classified and the disposal of rock and other surplus or unsuitable material.

Measurement of Extra Over for (3) and (4) above will not apply to any length of trench in soft material more than 2 m long. Surplus boulder material from trench excavation shall where applicable, be disposed of to the designated spoil areas except where shown otherwise on the drawings.

PSDB 8.3.3.1 Make up deficiency in Backfill Materials

Payment for imported, graded stone laid under pipelines in accordance with PSDB 5.5 shall be paid for under either Sub-Clause 8.3.3.1(a) or (b) or (c) as scheduled.

PSDB 8.3.3.4 Overhaul

Delete the Sub-clause and substitute :

All haul will be regarded as free haul. There will be no overhaul payment in this contract.

PSDB 8.3.4(c) Cross Embankments (New Sub-Clause)

Payment for cross embankments will be by volume of embankment constructed in accordance with the specification. Unit : m^3

PSDB 8.3.5 Existing Services that Intersect or Adjoin a Pipe Trench

Add to the end of the Sub-Clause :

(v) all work involved in locating the service by hand excavation
(vi) notifying and attending upon the proprietor of the service
(vii) supporting and protecting the service while the pipeline is installed, inspected, tested and backfilled.

PSDB 8.3.6.2 Grassing (New Sub-Clause)

Grassing..... Unit : m^2

Approved grass shall be planted after topsoiling has been completed. The planted area shall be neatly trimmed, fertilised and watered. The Contractor shall ensure that the planted areas are not permitted to dry out. Any grass that fails to grow shall be replaced by the Contractor, at his own expense, with fresh grass, until satisfactory cover is obtained. The rate shall cover the supplying, planting and maintenance of grass, all in accordance with this specification.

PSDB 8.3.8 Sack Breakers (New Sub-Clause)

Sack breakers shall be installed from the bottom of the bedding to 300 mm below finished ground level. ..... Unit : No

PSDB 8.3.9 Excavate Trial Holes to Determine Method of Excavation (New Clause)

Excavation by hand of trial holes of minimum dimensions 1,0 x 1,0 m to depth of 800 mm, or less if intermediate or hard rock material is encountered, along all pipeline routes at 50 m intervals. Including use of DCP for classification of material.

Including backfilling of the trial holes when notified by the Employer's Agent.

Hand excavation of trial hole..... Unit No

C3.7.6 PSDK : GABIONS AND PITCHING (Applicable to SABS 1200 DK - 1996)

PSDK 3 MATERIALS

PSDK 3.1.1 Stone

Add to the Sub-Clause:

Stone that is hard and unweathered may be selected from the earthwork excavation. Where no suitable stone is available from excavation the supply shall be at the Contractor's option. The transport of the stone shall be included in the rate for supply.

The stone shall be subjected to both the weathering and the durability tests (see Sub-clauses 7.3 and 7.4).

PSDK 3.1.2 Gabion cages

Add to the Sub-Clause:

The wire used for the fabrication of gabion boxes and mattresses and for lacing and bracing operations shall be to SABS 675 and galvanised for Class A – heavy galvanised mild steel wire. No PVC coating will be required.

The gabion baskets and mattresses shall be as follows:

Gabion boxes constructed of double twisted, hexagonal wire mesh gabions of nominal 80 mm mesh, with 3,4 mm o/d frame wire and 2,7 mm o/d mesh wire. Complete with partitions at 1 m centres. All wire is mild steel to SANS 1580 - 2005, Class A, zinc coated by heavy duty hot dip galvanising to SANS 675 - 2007.

Each basket shall be complete as described in SANS 1200 DK.

PSDK 3.1.3 Geotextile

Add to the sub-clause:

The filter blanket shall consist of "non woven" spun bound polyester fabric having a mass of 210 g/m^2, permeability of 0,003 m/s and multi-direction tensile strength of 16 000 N/m such as KAYMAT Grade U24.

The filter blanket must be attached to the gabion wall, basket or mattress by an approved method of fastening, which must ensure that the blanket will stay in position during construction of the infilling behind the gabion wall. The material to be used as fill immediately adjacent to the gabion wall must have good drainage properties to ensure that there is no build up of pore pressure behind the wall and be free of sharp rocks that could damage the filter blanket.

PSDK 3.2.1 Stone

Add to the Sub-Clause :

Medium pitching, as stated in Table 2 of 3.2.1 shall be used in this contract.

PSDK 3.2.3 Wire netting

Add to the Sub-Clause:

Wire netting for gabion and mattress cages shall be hexagonal steel wire mesh strengthened by selvedges of heavier wire and by mesh diaphragms that divide the cases into 1 m compartments.

Nominal 80 mm mesh shall be used for gabion cages with 2,4 mm diameter galvanised steel wires.

Nominal 60 mm mesh shall be used for mattress cages with 2,0 mm diameter galvanised steel wires.

Selvedge wire shall be galvanised and the diameter shall be in accordance with Table 3 of SABS 1200 DK.

PSDK 5 CONSTRUCTION

PSDK 5.1.2 Lacing of Cages

Add to the Sub-Clause:

Each diaphragm shall be connected in the same manner to the sides and top panels in addition to the bottom panel. All gabion and mattress cages shall be connected to adjacent gabion and/or mattress cages by lacing the adjacent selvages together with galvanised steel wire.

PSDK 5.1.3 Type of cage (New Sub-clause)

The size of cages for gabions and mattresses shall be as shown on the drawings and measured in the Schedule of Quantities.

PSDK 5.1.4 Diaphragms (New Sub-clause)

Each diaphragm shall be connected in the same manner to the sides and top panels in addition to the bottom panel.

PSDK 5.2.2 Geotextile or Geomembrane (New Sub-clause)

(c) Filter blankets may be required behind the gabion baskets in order to prevent leaching of the embankment material through the gabion retaining structure and revetments. The Employer's Agent may order, in writing, that the inside face of the gabion wall shall be lined with a filter blanket.

PSDK 5.2.3 Assembly

Add to the Sub-Clause:

All gabion and mattress cages shall be connected to adjacent gabion and/or mattress cages by lacing the adjacent selvedges together with 2,0 mm dia. galvanised steel wire. The lacing shall be in accordance with Sub-Clause 5.1.2.

PSDK 5.2.4 Rockfilling

Add to the Sub-clause:

Particular care shall be taken in the filling gabions and mattresses so as to ensure that the voids in the rockfill are reduced to the minimum that can be reasonably achieved. In order to minimise the voids in the rockfilling, the filling shall proceed in layers not exceeding 300 mm deep and each layer shall be rodded and barred so as to compact the rockfill before filling of the next layer commences. Where appropriate, hand packing of selected rock particles shall be carried out.

PSDK 5.2.4.2 Mattresses used in revetments and aprons

Add to the Sub-clause:

Where gabions and mattresses are placed in exposed positions the rock particles forming the exposed faces shall be specially selected so as to present a fair and even surface.

PSDK 5.3.4 Wired Pitching

Add to the Sub-Clause:

The areas in which wired or grouted wire pitching is to be used will be indicated on site by the Employer's Agent.

PSDK 5.3.6 Rock Bolsters (New Sub-Clause)

Where rock bolsters are specified or directed by the Employer's Agent (in particular below the outlet of stormwater pipe culverts), the rock shall be dumped or pushed into place as indicated by the Employer's Agent. The heap of rock shall conform to the dimensions, i.e. length, width, height ordered by the Employer's Agent, to a tolerance of 300 mm.

PSDK 8 MEASUREMENT AND PAYMENT

PSDK 8.2.3 Extra-over 8.2.2 for Packing Selected Stone for Exposed Face

Add to the Sub-Clause:

The method of selecting and packing stone for exposed faces as scheduled shall be as specified in Sub-clause 5.2.7 - Special Finish.

C3.7.7 PSDM: EARTHWORKS (ROADS, SUBGRADE) (Applicable to SABS 1200 DM - 1981)

PSDM 2.1 INTERPRETATIONS- Supporting Specifications

SABS 1200 A and SABS 1200 D are applicable to this contract.

PSDM 3 MATERIALS

PSDM 3.2.1 General

Add to the Sub-Clause:

The nomenclature used for the classification of various material types to be used in the designated pavement layers is that defined in the NITRR documents TRH4 and TRH14.

PSDM 3.3.1 Selection – General

Add to the Sub-Clause:

Should insufficient materials of a quality acceptable for use in the selected layer be found in the excavations the balance of the material required for the selected layer shall, when instructed by the Employer's Agent, be obtained from the Contractor's own source.

PSDM 3.4 Road Foundation Layers (New Sub-Clause)

The proposed gravel road foundation specification is:

- Rip and compact in situ roadbed material to 90% mod AASHTO density
- 150 mm imported G7 wearing surface compacted to 93% Mod AASHTO density

PSDM 5 CONSTRUCTION

PSDM 5.1.1 Safety, Existing Services, Stormwater, etc and Nuisance

Add to the Sub-clause:

All existing services may not be shown on the drawings or be visible to the Contractor on site. The Employer's Agent may order excavation by hand to expose such sources.

Where service is damaged because of the Contractor's negligence, he shall be liable for the repair of such service and shall bear all costs involved in the repair and other costs or losses due to the interruption of the services.

PSDM 5.1.2 Accommodation of Traffic (To be read in conjunction with SANS 1921-Part 2)

Add to the Sub-Clause:

The Contractor shall accommodate traffic on the existing roads. The Contractor is required to construct detour roads where sections of road are temporarily closed.

Work adjacent to existing roads must be properly barricaded – see PSD.

The Contractor shall provide signs for the temporary accommodation of traffic as required.

PSDM 5.2 Methods and Procedures

PSDM 5.2.2.5 Disposal of Surplus or Unsuitable Material

Add to the Sub-Clause:

Surplus and unsuitable material shall be disposed of as instructed by the Employer's Agent.

PSDM 5.2.8.1 Freehaul

Add to the Sub-Clause:

All movement of cut and fill material, borrow material and surplus material will be regarded as freehaul.

PSDM 5.2.8.2 Overhaul

Delete the Sub-Clause.

PSDM 8 MEASUREMENT AND PAYMENT

PSDM 8.2.1 Earthworks Measurement

Add to the Sub-Clause:

Earthworks will be measured by volume in compacted embankment once only as compacted fill from cut or borrow, whichever is applicable. Uncompacted fill from cut, material placed to stockpile or to spoil will be measured insitu as excavation.

PSDM 8.3.4 Cut to Fill, Borrow to Fill

Add the words: "and in borrow pits" after the words "road prism" in the second line of the payment paragraph.

Add the following:

"The rate shall also cover the cost of selection of suitable material in the borrow pit."

"The rate for borrow to fill does not include the cost of excavating, loading and unloading or anything which is covered by Item 8.3.4 of SABS 1200 D."

PSDM 8.3.5 Selected Layer compacted to 93% of Modified AASHTO Maximum Density

Replace this item with the following:

PSDM 8.3.5.1 Selected Layer from Borrow Pit (New Sub-Clause)

Selected layer compacted to 90% of modified AASHTO density Unit : m^3

The rates shall cover the cost of procuring, furnishing, transporting and placing the selected layer material and compacting the material to the specified densities."

PSDM 8.3.14 Borrow Pits

Replace the words: Sub-clause 8.3.6(b) of SABS 1200 D or Sub-clause 8.3.4 of SABS 1200 DA, as applicable" with Sub-clause 8.3.4(a) of SABS 1200 D."

Add the following items:

PSDM 8.3.14.1Material from Designated Borrow Pits (New Sub-Clause)

(a) Royalties payable on material from designated borrow pits ..... Unit : PC Sum

The amount allowed shall be expended in accordance with Clause 6.6 of the General Conditions of Contract and will be used to reimburse the Contractor for royalties paid to the landowner for material borrowed and used as subgrade and subbase.

(b) Percentage on amount paid to landowner for borrow material .....Unit : %

The percentage tendered shall include full compensation for any charges for labour, profit, transport, establishment and other charges the Contractor may wish to include.

PSDM 8.3.17 Accommodation of Traffic (New Sub-Clause) (to be read in conjunction with SANS 1921-Part 2)

Accommodation of traffic ..... Unit : Sum

The tendered sum for the accommodation of traffic shall include full compensation for all items of cost necessary for such accommodation and the construction and maintenance of bypasses, including existing roads used as bypasses during the construction period. It shall also include full compensation for traffic control, the provision of traffic signs and, where necessary, communications equipment required to regulate traffic, for the construction of any necessary temporary drainage works, for the maintenance of all drainage works, arranging for the moving of services and subsequent reinstatement thereof, attending to traffic problems and complying with the requirements of the Road Traffic Ordinance and the relevant local authorities.

Payment shall be made in equal monthly instalments from the date of commencement of such work to the end of the contract period.

C3.7.8 PSGA : CONCRETE (SMALL WORKS) (Applicable to SABS 1200 GA - 1982)

PSGA 2 INTERPRETATIONS

PSGA 2.3(a) General

Add to the Sub-Clause:

Adverse weather : Cold weather or weather in which:
(a) the ambient temperature is above 25^0C, or
(b) the relative humidity is low, or
(c) the wind velocity is high

or weather in which any combination of these three conditions occurs, and which tend to impair the quality of fresh or hardened concrete or otherwise causes the concrete to have abnormal properties.

PSGA 2.3(b) Quality

Add to the Sub-Clause:

Consistency : The extent, as measured by the slump test, to which fresh concrete resists flow or deformation.

PSGA 2.3(d) Exposure Conditions (New Sub-Clause)

Mild Conditions : Conditions under which the concrete is protected from the weather and exposed only to air.

Moderate Conditions : Conditions under which the concrete is:

(a) sheltered from severe rain and is not subject to freezing when wet, or
(b) buried in non-aggressive soil, or
(c) continuously under fresh water

Severe Conditions : Conditions under which the concrete is exposed or subjected to any of the following:

(a) driving rain
(b) alternate wetting and drying out
(c) freezing when wet
(d) fresh water (at the water-line)
(e) splashing or spraying with fresh water
(f) corrosive fumes or heavy condensation of water
(g) aggressive soil
(h) salt-laden air

PSGA 3 MATERIALS

PSGA 3.2.1 Applicable Specifications

The standard cement specifications SABS 471, SABS 626, SABS 831, SABS 1466 and SABS 1491, have been withdrawn and are replaced by SANS 50197-1: Common cements, and SANS 50413-1: Masonry cement. These specifications will be applicable to this Contract and the descriptions and types of cements, where specified, will be based on the designations as defined in these specifications.

Add to the Sub-Clause:

Unless agreed to otherwise by the Employer's Agent, the cement used on the works shall be either Type Cem 1, Type Cem 11/A-S or Cem 11/B-S (all of minimum strength Class 32,5).

PSGA 3.2.2 Storage of Cement

Add to the Sub-Clause:

Cement and other cementitious materials shall not be kept in storage for longer than two months without the Employer's Agent permission.

PSGA 3.4.4 Admixtures (New Sub-Clause)

Unless approved by the Employer's Agent, neither admixtures nor air-entraining agents shall be used in any concrete.

PSGA 3.4.5 Sand (New Sub-Clause)

Sand from a source selected by the Contractor and approved by the Employer's Agent after testing will be used under this Contract.

PSGA 4 PLANT

PSGA 4.4.2 Finish

Delete sentence and substitute:

The quality of the finished surface of the concrete shall be as scheduled.

PSGA 5 CONSTRUCTION

PSGA 5.1.2 Fixing

Add to the Sub-Clause:

Welding reinforcement as a means of securing it against displacement will not be permitted.

PSGA 5.1.3 Cover

Add "(with a tolerance of +10mm –0)", between "30mm", and "unless" in the second line of the Sub-Clause.

In second line read "40mm" for "30mm"

PSGA 5.2.1 Classification of Finishes

Delete the eighth and ninth lines of the Sub-Clause.

PSGA 5.2.1(a) Classification of Finishes - Rough

Add to the Sub-Clause:

The finish of the concrete is to be within the tolerances of Degree of Accuracy III as set out in Sub-Clause 6.4.

PSGA 5.2.1(b) Classification of Finishes - Smooth

Add to the Sub-Clause:

The finish of the concrete is to be within the tolerances of Degree of Accuracy II as set out in Sub-Clause 6.4.

PSGA 5.2.3 Removal of Formwork

Add to the Sub-Clause:
The minimum times for removal of formwork from concrete containing blast furnace cement given in Table 1 of SABS 1200 GA apply also to members of concrete made from a blend of equal parts of Ordinary Portland Cement and other cementitious materials.

PSGA 5.2.5 Fixing Blocks for Reinforcing and Fixtures in Concrete (New Sub-Clause)

Fixing blocks for the attachment of fixtures may be embedded in concrete provided that the strength and other desirable features such as appearance of the member are not, in the opinion of the Employer's Agent impaired thereby.

The Contractor shall be responsible to provide samples of fixing blocks as proposed for use in the contract in good time for the Employer's Agent inspection. The acceptance of such blocks shall be subject to Employer's Agent approval.

PSGA 5.4.1.2 Consistency

Delete the third line and substitute the following:

Employer's Agent in respect of prescribed mix and/or strength concrete.

PSGA 5.4.1.4 Prescribed Mix Concrete

Delete the Sub-Clause and substitute the following:

The grades of prescribed mix concrete are designated Grades 20, 15 and 10 and are composed of cement, sand and stone, as specified hereinbefore, proportioned as follows:

Grade	Size of Stone (mm)	Cement (kg)	Sand (m^3)	Stone (m^3)
20/19	19	50	0,110	0,140
15/19	19	50	0,130	0,140
10/38	37,5	50	0,160	0,200

While the proportion of cement to the combined quantity of sand and stone must remain constant for each grade of concrete, as set out above, the relative proportions of sand and stone are to be adjusted, if required by the Employer's Agent, so as to obtain the most suitable consistency of concrete, due to allowance being made for the bulking of sand due to moisture.

The addition of water shall be regulated by the use of properly calibrated containers, only sufficient water being added as will, in the opinion of the Employer's Agent, afford a workable mix.

The fine and coarse aggregates approved for use in strength concrete Grades 30 and 25 are to be used for prescribed concrete mixes Grades 20 and 15.

PSGA 5.4.1.5 Strength Concrete

Add to the sub-clause:

The grade of strength concrete is designated Grade 25 (25 MPa) and Grade 30 (30 MPa).

The concrete mix for the abovementioned grade of strength concrete is to be designed by an approved laboratory. At least four weeks before placing any concrete on the Works, the Contractor shall supply and deliver to the approved laboratory, at his own cost, samples of the aggregates he proposes to use in the concrete mix. While the proportion of cement to the combined quantity of sand and stone will remain constant for each grade of concrete, as set out above, the relative proportions of sand and stone may be adjusted to achieve the required strength. The laboratory will be bound by the requirements of this Specification which are to guide the Tenderers in pricing the grade of strength concrete. The Contractor is to allow in his rate for strength concrete an amount to cover the fees and charges levied by the approved laboratory in designing the strength concrete mix.

PSGA 5.4.1.6 Ready-mixed Concrete

Delete the Sub-Clause and substitute the following:

Concrete produced at a central concrete production facility other that at the site of the Works shall only be accepted for use in the Works with the prior and express approval of the Employer's Agent. The Contractor shall submit in good time, in support of his proposal, a concrete design mix, together with test results of the aggregates proposed and test results for the design mix when using the aggregates proposed, in the format as provided by the Employer's Agent. When such approval has been given concrete cubes and all other applicable tests shall be made on site and the test results obtained by the facility concerned will be used for reference purposes only.

PSGA 5.4.5.5 Adverse Weather Conditions (See PSGA 2.3(a)) (New Sub-Clause)

Under adverse cold weather conditions, effective measures shall be taken to ensure that the temperature of the concrete, from the time of placing until it has hardened (i.e. about 24 h), is maintained at not less than 5°C. If the atmospheric temperature in the vicinity of the concrete is below 2°C or is expected to fall below 2°C during the curing period (see Sub-Clause 5.4.7), water shall not be used for curing. All surfaces shall be protected from ice or frost damage.

When the ambient temperature is above 32°C, the temperature of the concrete when deposited shall not be allowed to exceed 32°C. Under adverse hot weather conditions, the Contractor shall take all reasonable steps to reduce to a minimum the placing temperature of the concrete. Stockpiles of aggregates and all metal surfaces in contact with aggregates and concrete shall be shielded from the direct rays of the sun or cooled by being sprayed with water, and windbreaks shall be erected, if necessary, to prevent the initial rapid drying-out of concrete which would otherwise occur before normal curing procedures can be undertaken.

Concrete shall not be placed during periods of heavy or prolonged rainfall.

PSGA 5.4.7 Curing and Protection

Add to the Sub-Clause:

(d) continuously spraying the exposed surfaces with water;

(e) covering the concrete with waterproof or plastic sheeting firmly anchored at the edges.

The Contractor should base his method on water curing. The use of a curing compound shall not be allowed unless with the written approval by the Employer's Agent.

PSGA 5.4.8.2 Concrete Surfaces

Concrete surfaces shall be finished as indicated in the Schedule.

PSGA 6 TOLERANCES

PSGA 6.1.1 General

Read “Degree of Accuracy II” for “Degree of Accuracy III” in the third line.

PSGA 8 MEASUREMENT AND PAYMENT

PSGA 8.1.1.4 Formwork

Add to the first line between the words “concrete” and “and” the following:

“including forming fillets or splays up to 20 x 20mm”

PSGA 8.4.1 Prescribed Mix Concrete

Delete from the Sub-Clause all but the first sentence.

Add to the Sub-Clause:
Where scheduled, the rate shall include for all shuttering and finishing.

C3.7.9 PSL : MEDIUM-PRESSURE PIPELINES (Applicable to SABS 1200 L – 1983)

PSL 2 INTERPRETATIONS

PSL 2.4 Abbreviations

Add to the Sub-Clause:

"CML": Cement Mortar Lining
"FBMDPE: Fusion bonded medium density polyethylene."

PSL 3 MATERIALS

PSL 3.1 General

Add to the Sub-Clause:

"Steel pipes of diameter DN200 and above will be supplied by the Employer as "free issue.

Details of the pipes that will be made available by the Employer to the Contractor under this Contract are given in Clause C3.4.2."

PSL 3.1.1 Materials Control (new sub-Clause)

Add new Sub-Clause:

PSL 3.1.1.1 Checking Material Lists and Drawings (new sub-Clause)

Add new Sub-Clause:

Not more than 4 weeks after the contract has been awarded the Contractor shall complete his check of the Materials Lists against the drawings and advise the Employer's Agent of any shortages or omitted items.

If any variations in the contract are authorised, the Contractor shall ensure that any additional items to be supplied by the Employer and the Contractor are ordered in good time so as not to cause delay to the works.

The Contractor shall check the delivery timing of all items and ensure that it is in line with the Contract programme. Any critical items that could be delivered late are to be brought to the attention of the Employer's Agent.

The delivery status of materials is to be checked and followed up upon by the Contractor throughout the contract.

PSL 3.1.1.2 Materials Control –General (new sub-Clause)

Add new Sub-Clause:

The Contractor is held responsible for the inspection and control on site of all the materials and equipment for the duration of the Contract. Once material and equipment has been accepted, any subsequent damage shall be made good to the satisfaction of the Employer's Agent at the expense of the Contractor. Damage to internal linings and external coatings that are necessary and incidental to good welding practices and the manufacturing of pipe specials are excluded.

Any item damaged beyond repair shall, at the discretion of the Employer's Agent, either be replaced at the Contractor's expense or the value reimbursed in full to the Employer.

PSL 3.1.1.3 Acceptance of Pipes, Fittings and Materials (new sub-Clause)

Add new Sub-Clause:

Before acceptance of any pipes, fittings or other items of equipment the Contractor is to carry out a thorough inspection to ensure that the materials have been delivered undamaged and are as ordered.

Pipes shall be checked for:

- Identification
- Certification
- Soundness and Internal lining
- Ends bevelled correctly
- Circumference according to specification and within tolerance

Inspection of pipe fittings, valves and other equipment shall include, but is not limited to:

- Identification
- Certification
- Material schedule and rating
- Lining, where specified
- Coating where specified
- Circumference according to specification and tolerance
- Damage to items – example flange faces

Defective items shall not be accepted, but marked, quarantined and immediately reported to the Employer's Agent.

If accepted, the Contractor shall take the required steps to ensure that all delivery documentation together with signed acceptance notes is filed in the Construction Dossier.

PSL 3.1.1.4 Material Storage (new sub-Clause)

Add new Sub-Clause:

The Contractor shall store all items so that no damage occurs whilst awaiting installation. Where practical, items are to be stored in lockable containers for protection from the weather and pilferage.

All piping, pipe fittings and equipment stored outside or awaiting installation are to be protected from the weather and storm water and soil wash and stored on pre-prepared surfaces. Pipes taken over from the Employer shall receive the required attention in order to ensure safe storage in yards, protected from fires, vandalism and incidental damage that can reasonably be prevented.

PSL 3.1.1.5 Handling Pipe, Fittings and Equipment (new sub-Clause)

Add new Sub-Clause:

Strict supervision shall be maintained at all times when handling pipes and equipment. Particular attention is to be given to correctly rated lifting gear, slings and lifting beams. All lifting gear is to be inspected regularly for signs of wear and tear in terms of the relevant Safety Legislation and Clauses. Equipment is to be lifted at the recommended points specified by the manufacturer. Pipe is to be lifted with a lifting beam and slings, which shall be fitted at quarter points around the pipe. Due care shall be taken when fitting and placing slings to ensure that ancillary items do not get crushed during lifting. Pipe coating is to be protected by padding or otherwise from scuffing damage during lifting.

The equipment utilized for lifting pipes is subject to approval by the Employer's Agent and all equipment judged unsuitable according to this specification or found to be unsuitable in practice shall be removed from site and replaced at the Contractor's expense. It is prohibited to handle pipes using chains or any other device involving metal contact with the pipe coating.

The Contractor shall ensure that all lifting equipment complies with the relevant safety regulations at all times.

Wet sponge tests shall be done to detect holidays on internal linings of the pipes.

The Contractor shall, at his own expense, test each and every surface area, that is internal as well as external coating during construction as per this specification. Testing for holidays shall be done after inclusion of materials, manufactured specials and equipment, as well as pipes, into the permanent works. Any defects found shall be repaired and the costs for remedial work shall be deemed to be included in the tendered rates for the construction of the pipeline. These tests and results shall be recorded on the Quality Control Plan as approved by the Employer's Agent.

PSL 3.2 AC Pipes and Specials

Delete the Sub-Clause in its entirety.

PSL 3.4 STEEL PIPES, FITTINGS AND SPECIALS

PSL 3.4.1 General

Add to the Sub-Clause:

"Steel pipes of diameter DN200 and above that are to be used on this contract shall be supplied by the Employer as free issue" and shall be collected by the Contractor at the pipe yards indicated by the Employer's Agent. All fittings and specials supplied by the Contractor under this Contract shall be to the dimensions and details shown on the drawings or as scheduled in the Bills of Quantities. Each piece shall have its relevant item number stamped and painted onto the exterior surface prior to despatch from the manufacturer's premises.

Steel pipes DN 150 and smaller shall be manufactured in accordance with SABS 62.

SANS 719

Steel pipes supplied by the Employer shall be checked for acceptance by the Contractor in accordance with SANS 719 and including the integrity of the coatings and linings.

PSL 3.4.2 Pipes of Nominal bore up to 150 mm

Delete: "medium class, shall be screwed"

and substitute:

"heavy class, shall have plain ends, be galvanized,"

PSL 3.4.3 Pipes of Nominal Bore over 150 mm

Delete the Sub-Clause in its entirety.

PSL 3.4.4 Fittings and Specials

Add to the Sub-Clause:

"All bends, fittings and specials shall be manufactured from straight pipe specified elsewhere unless otherwise stated in the Bills of Quantities.

All steel bends, fittings and specials shall be fabricated to the dimensions and details shown on the drawings and/or described in the Bills of Quantities.

The sides of taper pieces shall diverge at an angle of not more than 11° to each other.

The bend, fitting, and special fabricator shall supply written confirmation that all hand welding was carried out by coded welders.

Individual bends, fittings and specials smaller than DN 200 shall be hot-dip galvanised to heavy duty grade in accordance with SABS 121:2000 after fabrication. Where a hot dipped galvanised fitting is to be welded to a coated and lined pipe, the galvanising is to be abraded off prior to welding. The external coating at the welded joint is to be primed and coated with an approved anti corrosion system.

Bends, fittings, and specials of DN 200 and larger shall have the internal lining and external coating made continuous ("made good") as specified elsewhere for welded joints on coated and lined pipes.

Bends, fittings and specials shall be manufactured and tested in accordance with the specification for straight pipe and additionally with Section 8 of BS EN 10311: 2005 and BS 10224: 2002. The nominal dimensions of each bend, fitting and special required are itemised in the Bills of Quantities and/or on the drawings and 'exact length' tolerances shall be adhered to. All plain ends on bends, fittings and specials shall have the plain ends prepared for butt welding except those plain ends that are to be jointed with adaptor joints.

Bends shall generally be of the segmented type except where otherwise stated or shown on the drawings.

The bend, fitting, and special fabricator shall supply written confirmation that all hand welding was carried out by coded welders.

The Contractor will be responsible for the provision of strengthening webs, crotch plates, gussets etc as may be necessary to prevent excessive deflection or deformation of fittings and specials when subjected to hydraulic pressure tests, and the tendered rates for the work will be deemed to include for the design and provision of this reinforcing wherever necessary. All crotch plates, wrappers, collars and gussets to be provided by the Contractor under this Contract are to be manufactured from API 5L Grade X42 steel.

Bends shall be fabricated in accordance with the Table below.

DN700 Deflection of Angle	
Up to and including 3°	One pipe end scarfed on site
Exceeding 3° and up to and including 9°	Mitre cut (two pipe ends scarfed on site)
Exceeding 9º but less than 15º	2 segment bend
15º and larger but less than 30º	3 segment bend
30º and larger but less than 60 º	4 segment bend
60º and larger but less than 90º	5 segment bend

DN200 Deflection of Angle	
Up to and including 3°	One pipe end scarfed on site
Exceeding 3° and up to and including 9°	Mitre cut (two pipe ends scarfed on site)
Exceeding 9º but less than 15º	2 segment bend
15º and larger but less than 30º	3 segment bend
30º and larger but less than 90 º	4 segment bend

Pipe Reinforcement Details in Table below.

REINFORCEMENT FOR STEEL TEE PIECES (i.e. Crotch Plates, Wrappers & Collars)						Minimum Required Dimensions						
Item No	**Main Pipeline Description**	**Approximate Location along Main Pipeline (Chainage, metres)**	**Structure whose junction requires reinforcement**	**Approximate Invert Level (msl)**	**Design Pressure (Max possible pressure occurrence) (metres)**	**Type of Reinforcement Required**	**Width (w) (mm)**	**Overall width (W) (mm)**	**Thickness (mm)**	**Width (a) (mm)**	**Lateral Diameter (b) (mm)**	**Lateral Diameter (c) (mm)**
1	DN 700, X42 Steel 6mm thick, gravity flow	156	Scour Valve	104	207	Collar	80	320	4.5			
2	DN 700, X42 Steel 6mm thick, gravity flow	311	Air Valve	106	205	Crotch Plate			16	175	340	340
3	DN 700, X42 Steel 6mm thick, gravity flow	471	Scour Valve	103	208	Collar	80	320	4.5			
4	DN 700, X42 Steel 6mm thick, gravity flow	619	Air Valve	119	192	Crotch Plate			16	175	340	340
5	DN 700, X42 Steel 6mm thick, gravity flow	901	Air Valve	138	173	Wrapper	310	1230	6			
6	DN 700, X42 Steel 6mm thick, gravity flow	1493	Scour Valve	109	202	Collar	80	320	4.5			
7	DN 700, X42 Steel 6mm thick, gravity flow	1790	Air Valve	114	197	Crotch Plate			16	175	340	340
8	DN 700, X42 Steel 6mm thick, gravity flow	1852	Scour Valve	114	197	Collar	80	320	4.5			
9	DN 700, X42 Steel 6mm thick, gravity flow	2225	Air Valve	127	184	Wrapper	310	1230	6			
10	Off Take 2B	Ch 2225m on the DN 700mm	150 mm T- branch	127	184	Collar	110	420	6			
11	DN 700, X42 Steel 6mm thick, gravity flow	2395	Air Valve	128	183	Wrapper	310	1230	6			
12	DN 700, X42 Steel 6mm thick, gravity flow	2572	Air Valve	125	186	Wrapper	310	1230	6			
13	DN 700, X42 Steel 6mm thick, gravity flow	2902	Scour Valve	118	193	Collar	80	320	4.5			
14	DN 700, X42 Steel 6mm thick, gravity flow	3055	Air Valve	118	193	Crotch Plate			16	170	340	340

REINFORCEMENT FOR STEEL TEE PIECES (i.e. Crotch Plates, Wrappers & Collars)						Minimum Required Dimensions						
Item No	**Main Pipeline Description**	**Approximate Location along Main Pipeline (Chainage, metres)**	**Structure whose junction requires reinforcement**	**Approximate Invert Level (msl)**	**Design Pressure (Max possible pressure occurrence) (metres)**	**Type of Reinforcement Required**	**Width (w) (mm)**	**Overall width (W) (mm)**	**Thickness (mm)**	**Width (a) (mm)**	**Lateral Diameter (b) (mm)**	**Lateral Diameter (c) (mm)**
15	DN 700, X42 Steel 6mm thick, gravity flow	Off Take 2B	T- branch (150mm branch) (Its Off the DN 700, next to CH 00, DN 200mm)	126	185	Collar	80	320	4.5			
16	DN 200, X42 Steel 4.5mm thick, gravity flow	172	Air Valve	133	178	Wrapper	110	420	4.5			
17	DN 200, X42 Steel 4.5mm thick, gravity flow	1061	Scour Valve	92	219	Collar	45	180	4.5			
18	DN 200, X42 Steel 4.5mm thick, gravity flow	1086	Air Valve	93	218	Wrapper	110	420	4.5			
19	DN 200, X42 Steel 4.5mm thick, gravity flow	1101	Air Valve	92	219	Wrapper	110	420	4.5			
20	DN 200, X42 Steel 4.5mm thick, gravity flow	1123	Scour Valve	91	220	Collar	45	180	4.5			
21	DN 200, X42 Steel 4.5mm thick, gravity flow	1337	Air Valve	91	220	Wrapper	110	420	4.5			
22	DN 200, X42 Steel 4.5mm thick, gravity flow	1810	Scour Valve	83	228	Collar	45	180	4.5			
23	DN 200, X42 Steel 4.5mm thick, gravity flow	2323	Air Valve	124	187	Wrapper	110	420	4.5			

Bends greater than 90º shall be fabricated from combinations of items from the table above.

Shop drawings of bends, fittings and specials shall be submitted to the Employer's Agent for approval prior to manufacture.

All flanged bends, fittings and specials shall be hydraulically tested at the fabricator's premises to the same pressure that they will be subjected to during the hydraulic testing of the completed pipeline. No visible signs of leakage will be permitted."

PSL 3.4.5 Puddle Collars and Anchoring Flanges (New Sub-Clause)

Add new Sub-Clause:

"Puddle collars and anchoring flanges used as pipe anchorages shall be of the same dimensions as corresponding flanges but those cast into concrete walls are to be undrilled. The collar/flange shall be capable of transmitting a longitudinal force 33% greater than the internal hydraulic pressure to be applied when testing, multiplied by the area of the bore and, under that condition, the stress in the material shall not exceed its yield stress.

Where puddle collars are shown on the drawings as being 20 mm thick, those collars are not required to transmit thrust, their purpose being to assist with the waterproofing of the concrete chambers by increasing the path that ground water might have to take to enter the chambers.

Where polyethylene pipes are cast into concrete structures, they shall be specially prepared and adapted by positioning a custom-made tight-fitting natural rubber sealing sleeve around the circumference of the pipe and in the case of structured-wall pipe creating shear keys through removing small segments of the outer wall. The rubber seal shall be 10 mm thick and 200 mm wide or 80% of the width of the wall and shall be 60 to 65 shore hardness, with a vulcanised joint. It shall need to be stretched over the pipe circumference to ensure a tight fit."

PSL 3.4.6 Closure Pipes (New Sub-Clause)

Add new Sub-Clause:

"Closure pipes, which are to be cut on site to the exact lengths, shall have the diametrical tolerances specified for the pipe ends applied over the full length of the pipe. Closure pipes shall be supplied in standard lengths."

PSL 3.4.7 Welding Tests at fitting Fabrication Shop(s) (New Sub-Clause)

Add new Sub-Clauses:

"PSL 3.4.7.1 Qualification Tests for Welding Procedures

Only appropriately coded welders may be used.

The qualification tests for welding procedures shall be carried out generally in accordance with the requirements of the American Petroleum Institute API 1104. The detailed procedure to be adopted during manufacture shall be established and the quality of the welds so produced shall be determined by carrying out one transverse tensile weld test and two guided cold bend tests on suitable coupon plates.

The tests are to be carried out either before fabrication of fittings is commenced.

The coupon plates shall be prepared either from plates of the same material as the pipe and welded in a similar manner to that to be used during production, or by cutting suitable specimens from a pipe selected at random by the Employer's Agent from the first production. The coupon plate for the tensile weld test and those for the guided cold bend tests shall be prepared in accordance with the requirements of SANS 719.

The qualification tests shall be considered satisfactory if:

a) The weld has a joint efficiency greater than 95% of the minimum specified tensile strength of the parent metal and,

b) The bend test specimens are capable of being bent around a former with a diameter equal to six times the nominal thickness of the plate to an angle of 180 degrees without developing a crack, except at the arrises of the specimen, of length or width greater than 3 m.

Failure to pass the above qualification tests shall result in the rejection of any pipes welded with the procedure used and the preparation of a new qualification of procedure test.

Any changes in the electrode case type used or change of flux used shall require a qualification test before approval of the procedure is granted.

PSL 3.7 OTHER TYPES OF PIPES

PSL 3.7.2 Polyethylene Pipes

Add to the Sub-Clause:

"HDPE and LDPE pipes shall be of the classes scheduled. Jointing of pipes shall be by means of welding, by bolting up welded-on flanges or by the use of approved external compression type fittings (‘Plasson’ or similar approved)."

PSL 3.8 JOINTING MATERIALS

PSL 3.8.2.1 Flexible Couplings

Delete the Sub-Clause and substitute the following:

"Where ordered, steel flexible couplings are to be of the "Viking Johnson"/"Klamflex"/ ”Aqualok” or similar approved type without central registers, each comprising one centre collar, two special flanges, two rubber rings and hot dipped galvanised mild steel bolts.

Steel couplings shall be assembled strictly in accordance with the manufacturer's instructions and all bolts shall be torqued to the value recommended by the manufacturer. On completion of hydraulic pressure testing of the installation, the entire joint shall be protected as described in Clause PSL 3.9.3.6.

The tendered prices for laying and jointing are to include for the supply of all necessary materials, plant and labour to complete the joint.

Flexible couplings shall conform generally to BS 10311: 2005 for slip-on type couplings and shall be of approved manufacture. They shall be capable of being tightened and released without damaging or improperly distorting the rubber seating rings and shall be designed to prevent the rubber rings being blown out under pressure or sucked in under vacuum.

Each coupling is to be capable of withstanding the test pressure applicable to the pipes with which they are to be used without exceeding a stress in the steel of 67% of the yield point.

Mild steel couplings shall be protected by an approved epoxy coating system such as an approved solvent-free epoxy (SFE) system such as "Nordbak 1" or similar approved system and applied within 4 hours of abrasive blast cleaning the metal surfaces of the coupling in accordance with ISO 8501-1 Grade Sa 2,5. Nuts, bolts and washers shall be hot dipped galvanised. The plain end of the pipe shall be properly prepared, and in the case of steel pipes before corrosion protection, so as to accept the flexible coupling.

Adaptor couplings and anchoring adaptor joints shall comply with the above specification for flexible couplings and be of a similar design, but one end shall be flanged to enable connection of plain ended pipes to flanged joints. The adaptor joints are to be complete with bolts and nuts for connecting the flanged joint to the anchoring flange situated generally 300 mm to 400 mm from the plain end of pipe. All bolts, nuts and washers are to be hot dipped galvanised. In order to anchor the plain ended pipe to the flanged joint all of the bolts for the flanged joint are to pass though the anchoring flange and are to be fitted with nuts and washers at the flanged joint and on either side of the anchoring flange."

PSL 3.8.3 Flanges and Accessories

PSL 3.8.3.1 Bolted Connections (New Sub-Clause)

Add new Sub–Clause:

"All flanges, gaskets, bolts, nuts washers and other appurtenances required for the execution of the work under this Contract shall be supplied and installed by the Contractor under this Contract and shall comply with the following:

- The sizes and drillings shall generally comply with SANS 1123 as shown on the drawings or as scheduled in the Bills of Quantities.
- Flanges cut from steel plate shall be machined flat on the front face, but with a raised face.
- No machining need be carried out on the back face (except where insulating flanges are to be installed) provided that face is sufficiently flat to ensure square bedding of the bolt heads and nuts and provided that all weld reinforcement is removed.
- Temporary end covers shall be provided by the Contractor for protection of flanges, and prepared plain ends of pipes and fittings to prevent damage to internal lining during transportation and during handling on site.
- All piping and flanged surfaces shall be cleaned before connections are made.
- The (raised) faces of flanges that are in to be in contact with gaskets shall be masked and shall not be painted or coated. The mating flange shall then receive one coat of an approved rust inhibitor. Care shall be exercised to ensure that after the application of all coatings there are no runs or drips on the mating surfaces of the flanges and that the flange profiling is clearly visible over the entire face. Excessive coating build up in flange bolt holes that could snag bolts will not be permitted.
- Flanged joints shall be connected with the specified bolts, nuts and washers all of which are to be supplied by the Contractor.
- All bolts, tie-bolts, nuts and washers shall be galvanised to SANS 121: 2011 and shall comply with the relevant requirements of SANS 135: 2011 and SANS 136: 2008 where applicable.
- The length of each bolt shall be such that after the bolt has been tightened, the end of the bolt shall project beyond the outer face of the nut, but not by more than two threads. Tie-bolts on restrained/anchoring couplings shall be fitted with “backing nuts” and washers.
- Each flanged joint is to be fitted with an approved and suitably rated gasket and sealed watertight such that there will be no visible sign of leakage under the specified factory and field test pressures and under the in-service working conditions (pressures).

- All bolts are to be tightened in a predetermined pattern with opposing bolts being tightened sequentially. When all bolts are tight, each bolt is to be torqued to the required/recommended torque in a predetermined pattern with opposing bolts being tightened sequentially.
- All bolt threads shall be liberally coated with “Copper slip” or similar approved compound prior to assembly. Upon completion, bolt heads, washers and nuts shall be wrapped with the “Denso Mastic Blanket System” comprising of a priming solution, mastic blanket, petrolatum tape and lay-flat sheeting as described in elsewhere."

PSL 3.8.4 Loose Flanges for Welding

Add to the Sub-Clause :

"Flange jointing material, when installed in the complete pipeline, shall be capable of withstanding transient pressures of up to the specified field test pressure. Under this condition no damage shall be caused or leakage occur through the joint. Bolts and nuts shall be galvanised to SANS 121: 2011 and shall comply with the relevant requirements of SANS 135: 2011 and SANS 136: 2008 where applicable."

PSL 3.9 CORROSION PROTECTION

PSL 3.9.2 Steel Pipes

PSL 3.9.2.1 Holiday Testing (New Sub-Clause)

Add new Sub-Clause:

"All Holiday Testing shall be carried out with an instrument approved by the Employer’s Agent. The sparking detection test shall conform to the standards as set out in SANS 1217:2001. The Contractor shall familiarise himself with the dielectric strength (breakdown strength) of all the coatings and linings he works with for the different pipe sizes. The Contractor shall also have an in depth knowledge of the Holiday Testing equipment he works with, in order to calculate the Corona discharge effect for the typical brush being utilised, with reference to the specific ambient conditions for any specific test.

All Holiday Testing shall be executed at a voltage which is set at 50% of the value of the dielectric strength of the lining or coating being tested. The Contractor shall carefully analyse the loss in test voltage as a result of the Corona Effect, specific to the ambient conditions surrounding the test. The test voltage of the Holiday Testing equipment shall be adjusted such that the voltage drop as a result of the Corona Effect will be taken into account when the actual 50% threshold of the dielectric strength is calculated.

The Holiday Test equipment shall be calibrated by an approved supplier and checked every 30 minutes or every time a test at a different location is started. Each piece of equipment shall have a unique identification number with calibration certificates and detail of equipment utilized shall be submitted to the Employer’s Agent for approval. Method statements for the process of holiday testing shall be submitted to the Employer’s Agent for approval.
The correct equipment for the type of application will be utilized. For example, where pin holes have been repaired and re testing for effectiveness of repair work being done, the Contractor shall utilize the correct equipment to effect same and this shall include the use of a pencil brush which concentrates the efforts of holiday testing at the repair. Where spark tests are performed on Tape Wrap systems, the minimum brush width shall be 300 mm. The brushes utilized shall be brass bristle cone brushes. The typical brush speed shall be 200 to 300 mm/sec when doing spark tests.

The Contractor shall, at his expense, test each and every surface area, that is internal lining as well as external coating, during construction as per this specification. Testing for holidays shall be done after inclusion of materials, manufactured specials and equipment, as well as pipes, into the permanent works. Any defects found shall be repaired and the costs for remedial work shall be deemed to be included in the tendered rates for the construction of the pipeline. These tests and results shall be recorded on the quality control plan as approved by the Employer's Agent."

PSL 3.9.2.1.1 Holiday Testing of Pipe at Pipe Yards (New Sub-Clause)

Add new sub-clause:

The Employer has, at his own cost, had the external pipe coatings checked at the point of delivery, as supplied by the pipe manufacturer. All defects are indicated on the Independent Third Party test reports. Some of the defect repairs were carried out under the pipe supply contract. The Contractor shall be required to repair the remaining defects at the cost of the Employer. Items have been provided for this purpose in the Bill of Quantities.

It shall be the Contractor's responsibility to detect defects in free issue pipes, including their ends, coatings and linings before taking receipt. The Contractor shall execute holiday detection tests on all the pipe coatings in the pipe yard before uplifting and transportation commences and this will be subject to witnessing and sign off by the Employer's Agent or an appointed third party inspection authority. This will determine the baseline to be used when handling and transportation damage, if any, is assessed.

PSL 3.9.2.1.2 Holiday Testing of Pipe at Work Fronts (New Sub-Clause)

Add new sub-clause:

The coating of each pipe shall be inspected and holiday detected by the Contractor immediately prior to being laid and these inspections shall be subject to witnessing and sign off by the Employer's Agent or an appointed third party inspection authority. Two thirds of the circumference will be inspected outside the trench, after the pipe has been transported to the construction site where the pipe will be laid, and the balance of the circumference will be inspected once the pipe has been laid into the trench and rotated 180^{o}. All testing shall be marked on the pipe from start of test point to completion of test point. All remedial work shall be effected immediately upon detection of any holidays. The cost of holiday testing and effecting remedial work to the coating of the pipe at the installation location as a result of construction or transportation damage by the Contractor shall be deemed to be included in the tendered rates for the laying of the pipe.

PSL 3.9.2.1.3 Holiday Testing on Tape Wrap Systems (New Sub-Clause)

Add new sub-clause:

Each and every external coating repair at welded joints, that are repaired with a tape wrap system, shall be holiday tested and subject to approval in terms of the relevant Quality Control Plan. All costs for the holiday detection shall be deemed to be included in the tendered rates for the laying of the pipe.

PSL 3.9.3 Protection against electrolytic corrosion

PSL 3.9.3.1 Preparation of Steel Surfaces for Repairs and/or Reinstatement of Internal Lining and/or External Coating (New Sub-Clause)

Add new Sub-Clause:

"The following method is applicable to the preparation of exposed steel surfaces prior to the carrying out of any repair procedure to internal linings and/or to external coatings. This specification is applicable to all steel surfaces that have been stripped of its corrosion protection layer, internally or externally, as a result of the manufacturing of specials, construction activities or pipe laying, welding and/or damages caused by handling or latent defects in application.

(a) Degreasing:

All bare metal surfaces shall be degreased in order to remove grease and oil from the pipe surface as a first step in the preparation process i.e. before grit blasting and/or power brushing starts. Degreasing shall be carried out using an approved water based solvent degreaser such as that complying with SANS 1216 or, for use in enclosed systems, with SANS 1365. The surface shall then be cleaned with potable water and left to dry completely before the next step is taken.

(b) Grit Blasting – Internal Lining Repair:

Grit blasting of bare metal surfaces shall take place after degreasing of the area. Abrasive material used for blast cleaning shall be free from oil or grease, as shall be the compressed air used in air blast cleaning.

The finished grit blasted surface shall be to Sa 2,5 of ISO 8501-1 with a 75 micron angular profile. Hackles shall be removed with coarse abrasive paper.

Transition areas from internal lining to bare metal which has been grit blasted, shall be smooth without rough edges or flaking appearances.
All grit blasting within the pipe line that is under construction, shall be performed by way of a “vacuum blast“ process in order to limit the generation of dust. Grit blasting shall, under all circumstances, be carried out using equipment suitable for the size of the work to be undertaken.

Damp hessian sacking or other suitable material is to be temporarily fixed around the pipe on both sides of the work areas to prevent damage to the adjoining pipe coating/lining.

All residual dust and debris shall be removed.

The Contractor shall provide the Employer’s Agent with a method statement for approval for each type/location of grit blasting, before work commences.

(c) Power Brush – External Coating Repair:

Power brushing of bare metal surface shall take place after degreasing of the area as specified. The area that has been power brushed shall be free from rust, laitance, dust, oil or other deleterious matter before the application of primer. Any areas in the region where power brushing took place shall be free from signs of disbonding of lining and/or coating, once power brushed. The surface finish, once power brushing has been completed, shall conform to minimum St 2 standard."

PSL 3.9.3.2 Preparation Mixing and Application of Epoxy Compounds (New Sub-Clause)

Add new Sub-Clause:

"When mixing two part epoxies the base and activator shall be mixed in accordance with the manufacturer's instructions. Mixing in the original container will only be permitted by means of methods that ensure full integration of different parts of the compound into a homogeneous compound with the characteristics as intended by the manufacturer. The different parts of the compound shall not be diluted. Mixing shall only be allowed with full batches and reduction of volumes from mixing packs by means of weight or volume measurement, which will result in smaller portions to be mixed, will not be allowed. In the application of the epoxy the following shall be strictly in compliance with the manufacturer's instructions:

- Method of application (Type of brush or roller.)
- Over coating time.
- Temperature range for application.
- Method of mixing base and activator.
- Number of coats to achieve the specified thickness.
- Safety aspects e.g. Eye and hand protection, ventilation, fire precautions, etc.
- Note that roller and brush applicators shall be replaced once the product application expiry time has been reached on any specific applicator tool.

Uncured epoxy must be regarded as being toxic and shall be handled in accordance with the manufacturer's instructions. Adequate lighting and ventilation shall be provided whilst working within the pipeline.

Only solvent free epoxy repair kits shall be utilized to repair the internal linings of the pipe line. This specification refers to "two part epoxy" as an epoxy repair kit which consists of a base and an activator approved by the Employer's Agent and could be products similar to "Denso ST100", "Sigma SF 523", "Nordbak", etc.

Attention is drawn to the fact that "Nordbak 1" or similar approved, is to be used on this Contract. For the repair of cement mortar linings, "Epidermix 338" or similar approved shall be used.

The Contractor's tendered rates for the laying of the pipe shall be deemed to include for all the repairs and make-goods that have to be effected in order to deliver a serviceable and acceptable pipe line. (This excludes such repairs as instructed by the Employer's Agent as a result of manufacturing defects, if any).

Two part epoxy may only be applied on steel surfaces prepared as specified in PSL3.9.3.1."

PSL 3.9.3.3 Making Good of Cement Mortar Lining at Welded Joints (New Sub-Clause)

Add new Sub-clause:

All cement mortar lined pipes shall have their cement mortar lining stopping between 50 mm and 75 mm from each plain end and from each end and it shall be 'chamfered' by 15 degrees to provide a positive dove-tail joint for the epoxy repair plug after field welding to another pipe.

When cement mortar lined straight steel pipes are cut, the cement mortar lining is to be cut back between 50 mm and 75 mm from the cut end of the pipe and "chamfered" by approximately 15 degrees to provide a positive dove-tail joint for the epoxy mortar repair plug after butt welding.

The surfaces are to be prepared as specified in PSL3.9.3.1.

A 50 mm wide by 20 mm thick band of “Epidermix 338” or similar approved epoxy, shall be applied internally on the uncoated steel adjacent to the cement mortar lining. The plain end of the adjoining pipe shall be pushed into the bellmouth (or into the external sleeve when there is no bellmouth) in such a way that the epoxy band is compressed and makes contact with the transverse face of the cement mortar lining of both pipes. The excess material that is squeezed into the bore of the pipes is to be removed by drawing a suitable plug that is 5 mm smaller than the bore of the cement mortar lining across the joint. The plug that is used shall be such as to render an even and smooth finish to the epoxy at the joint. The timing of when the plug is pulled through is critical and shall be carefully controlled."

PSL 3.9.3.4 Repair and Making Good of Solvent Free Epoxy Linings (New Sub-Clause)

Add new Sub-clause:

"All making good of internal solvent free epoxy linings at damaged areas and at welded and flanged joints that is required to ensure continuous internal corrosion protection to steel surfaces shall be carried out strictly in accordance with the solvent free epoxy manufacturer’s specifications. The surfaces are to be prepared as specified in PSL3.9.3.1.

The epoxy material shall be sufficiently thixotropic that 500 micrometres dry film thickness can be achieved in one application without sagging. The material shall be applied to the clean, dry, abraded area so as to fully cover it and extend to no less than 50 mm of the edge of the abraded area. A "halo" of abraded area shall be visible around the repair material.

After curing, the repaired section and at least 250 mm of the surrounding area, shall be tested for electrical insulation defects as specified elsewhere. There shall be no electrical insulation defects.

The Contractor shall ensure that repairs and particularly the making good of linings at welded joints, is carried out progressively as the pipe is being laid and shall not be permitted to lag behind for more than three pipe lengths at each working front."

PSL 3.9.3.5 External Corrosion Protection of Factory Welded Joints and Coating Repairs (New Sub-Clause)

Add new Sub-clause:

"All factory coated steel pipes will supplied with the external coating cut back 100 mm from each pipe end. Where pipes are to be cut, either on site, or for the purpose of fabricating bends, fittings and specials, or in the event of the pipe coating being damaged, the pipe coating shall be cut back 100 mm from the intended cut area before the pipe is cut. Damp hessian sacking or other suitable material is to be temporarily fixed around the pipe to prevent damage to the pipe coating during welding operations. Once welding is complete, and all weld splatter and burnt coating has been removed, the welded pipe joints shall be wrapped in the following manner.

The following specification is based on “Denso” products and systems. Alternative products and procedures may be proposed by the Contractor and, if approved by the Employer’s Agent, they may be used. Irrespective of which products are approved by the Employer’s Agent and used by the Contractor, all procedures shall be carried out strictly in accordance with the Contractor’s method statements which must conform to the manufacturer’s recommendations.

A fundamental outcome is a sound and continuous coating that is free from wrinkles and that does not have any entrapped air pockets or any air bubbles.

a) Surface Preparation:

The bare metal shall be cleaned and wire brushed to minimum St 2 standard and, degreased with white spirit. The adjacent pipe coating shall be cleaned to a minimum of 300 mm either side of the joint and the edges "feathered" to achieve a tapered transition over a distance of 100 mm. The sound, parent coating surface shall be roughened with sandpaper over an area 250 mm either side of the joint.

b) Priming:

The entire pipe and coating surface over a length of 250 mm on either side of the joint shall be primed using "Denso Primer D" (or equivalent approved). Care shall be taken to obtain a thin even film with no runs or sags. The primer shall be allowed to cure until "tack dry" before the application of the tape commences. Priming may only be carried out on those areas that are to be wrapped that same day. If primed areas are to be left overnight, those areas shall be re-primed before wrapping.

c) Profiling Tape:

A 1,5 mm thick x 50 mm wide "Denso Mastic Sealing Tape" (or equivalent approved) shall be applied to the full circumference of the weld bead in accordance with the manufacturer's specifications. Care shall be taken to ensure a smooth profile and to avoid air bubbles being trapped beneath the tape. (Note: The profiling tape may be omitted at the discretion of the Employer's Agent. Tenderers shall nonetheless allow for the profiling tape in their tendered rates).

d) Tape Wrapping:

The joint shall then be wrapped (minimum 55 % overlap) with "Denso CPT 1250/300 Polyethylene/Bitumen" tape starting at the roughened section (250 mm from the welded joint) in accordance with the manufacturer's requirements to create a 500 mm wide wrapping, centred over the welded joint. A 100% overlap is required on the first and last revolutions of the tape wrapping operation. It is important that tension in the tape be released when the wrapping of the last half circumference of the pipe. The Contractor shall ensure that the wrapping overlaps or covers a minimum of 150 mm of the pipe coating. A secondary or outer tape wrap layer is then to be applied over the first layer with a 10% tape overlap.

An alternative tape wrapping system that may be used is the "Densotherm 35 Hot Applied Bitumen Tape" system. The procedures are similar to those for the "Denso" system described above except that the underside of the tape shall be heated as it is applied and the overlaps and seams of the tape are to be sealed by means of a heated tool."

PSL 3.9.3.6 External Corrosion Protection of Shop-Fabricated Pipe Bends and Fittings (New Sub-Clause)

Add new Sub-Clause:

The external coating of shop fabricated bends and fittings shall be carried out as follows:

- Where a substantial part of the external coating on the parent pipe is intact, the coating repairs/make good shall be carried out in accordance with PSL 3.9.3.5 or
- Where black (uncoated pipe has been used), the coating shall be carried out with an approved solvent-free epoxy (SFE) system such as "Nordbak 1" or similar approved system or
- Where only a relatively small proportion of the external coating on the parent pipe remains, all of the remaining coating shall be removed and the entire bend/fitting shall be coated with an approved solvent-free epoxy (SFE) system such as "Nordbak 1" or similar approved system.

All crotch plates and wrappers/collars shall be coated an approved solvent-free epoxy (SFE) system such as "Nordbak 1" or similar approved system.

After application of the SFE coatings to the crotch plates and collars/wrappers, approved mastic (refer PSL3.9.3.8) shall be placed in all crevices that may become moisture traps.

No additional payment will be made for any of this work as the costs are deemed to be included in the scheduled rates for pipelaying.

PSL 3.9.3.7 External Corrosion Protection of Site-Fabricated Pipe Bends and Fittings (New Sub-Clause)

Add new Sub-Clause:

"The coating repairs/make good shall be carried out in accordance with PSL 3.9.3.5."

PSL 3.9.3.8 Corrosion Protection of Flanges and Flexible Adaptor/Anchoring Joints (New Sub-Clause)

Add new Sub-clause:

"All flanges and flexible joints and adaptor/anchoring joints and their associated bolts, nuts and washers, shall, notwithstanding that the flexible and adaptor/anchoring joints will be epoxy coated as specified elsewhere, be protected as described below.

(Note: This specification is based on a “Denso” system. Alternative products may be used, subject to approval by the Employer’s Agent).

a) Surface Preparation:

The entire surface area of the flange/adaptor/anchoring joint, and its bolts, nuts and washers, up to no less than 250 mm either side of the joint, shall be cleaned of all dirt and other deleterious matter. The cleaned area, up to 200 mm either side of the flange/adaptor/anchoring joint, shall then be wire brushed.

b) Priming:

The cleaned flange/adaptor/anchoring joint, bolts, nuts, washers and the adjoining 200 mm length either side shall be primed with “Denso Priming Solution”, or if moisture is present, with “Denso S105 Paste”.

c) Application of Mastic Blankets:

Narrow strips cut from “Denso Mastic Blanket” shall be applied to the flange/ adaptor/anchoring joint to achieve a smooth profile with a 50 mm splayed fillet being formed at the joint/pipe interface. Care shall be taken, particularly at bolts, to avoid the formation of air pockets. Complete “Denso Mastic Blankets” shall then be applied (mastic side down) to the flange/adaptor/anchoring joint until the flange/adaptor/anchoring joint is completely enveloped.

The blanket shall be overlapped at least 50 mm and shall extend at least 150 mm along the pipe barrel on each side of the flange/adaptor/anchoring joint. The ends of the blanket shall be bound to the barrel of the pipe on each end with 100 mm wide “Denso Tape”. The “Denso Tape” overlaps shall be 50 mm and shall extend 100 mm onto the blanket and 150 mm onto the pipe barrel.

d) Application of Protective Sheeting:

The entire flange/adaptor/anchoring joint shall then be wrapped with 350 micron polyethylene sheeting which shall end 400 mm beyond the joint. The protective sheeting shall be secured to the pipe barrel and along the seam with 48 mm wide “Denso Adhesive Tape”".

PSL 3.9.3.9 Coating of Permanently Exposed Pipes/Fittings (New Sub-Clause)

Add new Sub-Clause:

"All pipes which are to be permanently exposed shall, in addition to the specified corrosion protection at flange/adaptor/anchoring joints, be protected with the “Denso Acrylic Pipeline Tape (Steelcoat 500)” system or similar approved UV resistant coating. The pipe surface shall be prepared and the coating applied in strict accordance with the manufacturer’s instructions.

a) Surface Preparation:

The pipe surface to be wrapped shall be cleaned of dirt, grime, grease and other deleterious matter, using white spirit if necessary and then allowed to dry thoroughly.

b) Priming:

“Denso Primer D” shall be applied to the prepared surfaces at a nominal coverage rate of 8 m² per litre. Care shall be taken to obtain an even film with no runs or sags. Only those areas that are to be wrapped the same day shall be primed. If primed areas are to be left overnight, these areas shall be re-primed before wrapping.

c) Tape Wrapping:

The joint shall be spirally wrapped (minimum 55% overlap) with “Denso Acrylic Tape” (or approved equivalent) in accordance with the manufacturer’s requirements such that the start and end points are located at buried sections of the pipe, before it daylights. A 100% overlap is required on the first and last revolutions of the tape wrapping operation. It is important that tension in the tape be released when the wrapping of the last half circumference of the pipe.

d) Final Coating:

One coat of “Densoflex Fire Retardant” shall be applied to the exposed pipe at a nominal application rate of 3 m² per litre."

PSL 3.9.3.10 Repair of Cement Mortar Lining (New Sub-Clause)

Add new Sub-Clause:

Pipes with linings damaged prior to acceptance by the Contractor shall be marked and recorded by both the Contractor and the Employer’s Agent’s Representative and then repaired by the Contractor. The payment rate for repair shall be made at the scheduled rate. Once the Contractor has accepted pipes with undamaged linings from the Employer, any subsequent damage to the lining in the pipes shall be repaired by the Contractor at his expense.

All repair procedures shall be subject to the prior approval of the Employer’s Agent. Generally, a crack is to be ground out using a mechanical grinder down to the steel wall to form a “dove-tail” groove with a minimum width of 8 mm. Care must be taken not to grind any of the steel pipe wall. The groove shall be rendered free of laitance, dust, oil, grease, fractured aggregate and other deleterious matter. The steel pipe wall internal surface shall be rendered free of rust and other deleterious matter by wire brushing (apply white spirit if necessary). The groove shall be filled with “Epidermix 338” (or equivalent approved), mixed and applied in accordance with the procedure set out in PSL 3.9.3.3.

PSL 3.9.3.11 Repair of FBMDPE Coating (Large Areas) (New Sub-Clause)

Add new Sub-Clause:

"A large area repair is defined as an area larger than 650 mm^2.

Pipes with external coatings damaged prior to acceptance by the Contractor shall be marked and recorded by both the Contractor and the Employer's Agent's Representative and then repaired by the Contractor. The payment rate for repair shall be made at the scheduled rate.

All damaged and blistered FBMDPE coating caused by welding or other mechanical means shall be removed back to sound coating by mechanical grinding or other approved means.

The exposed steel surface shall be power wire brushed to remove dirt, scale, rust and other foreign matter to a surface profile equivalent to a Class St 2 finish. Weld spatter shall be removed by chipping or grinding to a smooth surface flush with the surrounding steel. Welds shall have a smooth contour free from sharp edges, protrusions and undercut. Sharp edges and protrusions shall be removed by grinding to a smooth radius of curvature of not less than 3 mm.

Degreasing of the exposed steel surface shall be done in terms of Clause PSL 3.9.3.1.

The surrounding sound FBMDPE surface shall be feathered from steel surface to maximum thickness and then abraded to a distance of 100 mm beyond the defective area. The abrasion shall be carried out with clean emery paper of 80 to 100 mesh so as to produce a suitably rough surface profile without causing the removal of excessive amounts of protective material. Virgin Sintakote powder is to be melted into the defect to ensure proper mechanical bonding with the steel surface and chemical bonding with the existing Sintakote. The melting of the virgin material shall be such that melting is not effected with an open flame. The melted powder shall be shaped with a hot spatula to form a smooth surface over the repair area.

Under no circumstances will patching of damaged areas by means of pieces of tape wrap, be allowed."

PSL 3.9.3.12 Repair of FBMDPE Coating (Small Areas) (New Sub-Clause)

Add new Sub-Clause:

"A small area repair is defined as an area less than 650 mm^2.

A small area repair is effected by means of the application of a hot spatula to repair the defect, provided that there is a residual layer of polyethylene adhering strongly to the steel surface. Alternatively, virgin Sintakote powder material may be melted with heated spatula over the damaged area, to fill the mechanical damages in the coating and fuse with the surrounding coating material, all as per the manufacturer's recommendations.

At each pinhole detected by the Holiday test, the surrounding area shall be abraded to 25mm beyond the defective area. The abrasion shall be carried out with clean emery paper of 80 to 100 mesh so as to provide a suitably rough surface profile without causing the removal of excessive amounts of coating material. A hot spatula shall be utilized to work Sintakote into the pinhole defects. It is noted that any cluster of pinholes within a radius of 25mm shall be regarded as one defect."

PSL 3.9.3.13 Repair of Three Layer Polyethylene Coatings (New Sub-Clause)

Add new Sub-Clause:

Pipes with linings damaged prior to acceptance by the Contractor shall be marked and recorded by both the Contractor and the Employer's Agent's Representative and then repaired by the Contractor. The payment rate for repair shall be made at the scheduled rate. All making good of the exterior coatings at damaged areas that is required to ensure continuous corrosion protection to steel surfaces shall be carried out strictly in accordance with an approved method statement that is to be prepared by the Contractor.

The basic requirements are the careful cut back of the outer sleeve and removal of the residual adhesive layer. The exposed surfaces are to be prepared as specified in PSL3.9.3.1 and this is to be followed by the application of an approved epoxy material followed by the application of a shrink sleeve covering the whole of the affected area with an overlap of no less than 50 mm.

The epoxy material shall be sufficiently thixotropic that 500 micrometres dry film thickness can be achieved in one application without sagging.

After curing, the repaired section and at least 250 mm of the surrounding area, shall be tested for electrical insulation defects as specified elsewhere. There shall be no electrical insulation defects.

PSL 3.9.3.14 External Coating Repair on Continuity Bonds (New Sub-Clause)

Add new Sub-Clause:

"Electrical continuity bonding shall be carried out by a cathodic protection sub-contractor.

After successful testing of each weld in the presence of the Employer's Agent's Representative the pipe coating shall be repaired in accordance with PSL 3.9.3.4.

The cable ends shall be covered with "Denso" mastic prior to tape wrapping."

PSL 3.9.3.15 Corrosion Protection of Valves and & Flexible and Flanged Joints (New Sub-Clause)

Add new Sub-Clause:

"Every buried cast iron/steel coupling, joint, flange, and valve, where scheduled, shall be protected by the following "Denso" or equal approved anti-corrosion system:

After the pipework has been satisfactorily tested (and bonded at the couplings for electrical continuity if applicable) the exposed portion of the coupling, joint or flange and the unsheathed portions of the pipes at the joint and the bodies of all buried valves are to be covered with an approved petroleum based mastic/cloth system applied strictly in accordance with the manufacturer's instructions and then covered with two layers of approved adhesive PVC tape. The external sheathing system, which shall be to the approval of the Employer's Agent, shall be carried out as follows:

All loose dirt, rust, mill scale and flaking paint shall be removed by wire brushing all exposed metal surfaces. An approved priming solution shall be applied by brush with care being taken to ensure all exposed metal surfaces are coated.

"Denso", "Corromastic" or equal approved mastic is to be packed around the joint and/or valve body to form an even contour for the application of tape. A fillet is to be formed between the flange and the pipe barrel/valve body and, in the case of flexible couplings, mastic is to be packed around the bolts to a height of 3 mm above the bolts. Care must be taken to ensure that no air is entrapped.

A layer of impregnated tape/cloth is to be spirally applied with a minimum overlap of 50 mm. All air pockets are to be removed.

A 10 mm thick layer of mastic is then to be packed on top of the tape and a second layer of impregnated tape/cloth is to be spirally applied with a minimum overlap of 25 mm. The tape layer is to commence and terminate at least 100 mm over the pipe sheathing on either side of the joint. The surface is then to be smoothed off and all air pockets are to be removed.

An overwrap consisting of two separate layers of approved, 300 micron thick adhesive PVC tape is to be spirally applied with a minimum of 25 mm overlap and with at least two laps over the untreated sheathing on either side of the joint.

The whole sheathed area of the joint is to be subjected to holiday detection and, if proved sound and approved by the Employer's Agent, may be covered with "padding" sand."

PSL 3.9.3.16 Payment for Inspection and Testing

Repairs by the Contractor will be subject to inspection by the Employer's Agent and the Employer's Third Party inspection agent. Should additional expenditure be incurred by the Employer's inspector, due to any failure of the prescribed tests, then such additional expenditure shall be reimbursed to the Employer by the Contractor and shall be deductible from the Payment Certificates.

PSL 3.10 Valves

Delete the Sub-Clause and substitute:

"Valves supplied under this Contract shall comply with the requirements of Particular Specification PA: Valves which covers Gate Valves, Resilient Seal Valves, Butterfly Valves, Reflux valves and Air Valves."

PSL 3.11 Manholes and Surface Boxes

PSL 3.11.1 Bricks

Delete the first sentence and substitute:

"Bricks for manholes and surface boxes shall be engineering bricks type FBXE45 or better, with a water absorption not exceeding 7% and complying with the applicable requirements of SANS 227."

PSL 3.11.5.1 Manhole Covers and Frames

Delete the Sub-Clause and substitute:

"Manhole covers shall comply with SANS 558 for the types shown on the drawings and/or scheduled in the Bills of Quantities."

PSL 3.11.6 Sand

Add new Sub-Clause:

"Sand used for mortar (general purpose) and for plaster (external) shall comply with the applicable requirements of SANS 1090."

PSL 3.11.7 Cement

Add new Sub-Clause:

The cement used on the Works shall be Portland cement complying with the requirements of SANS 50197-1 and -2: Common Cements.

PSL 4 PLANT

PSL 4.4 Packing (New Sub-Clause)

Add new Sub-Clause:

"Goods should be suitably packed in such manner as will ensure safe and efficient transport by road or rail, and the Contractor shall include in his prices for whatever packing may be necessary in this respect. Small items particularly liable to damage or loss in transit should be crated. All crates and packing material shall, after use, become the property of the Employer, unless distinctly specified otherwise, or if returnable, shall be so at the Contractor's expense."

PSL 4.5 Protection of Linings during Transportation (New Sub-Clause)

Add new Sub-Clause:

"The ends of every pipe, fitting and special shall be fitted with suitable end closures as a precautionary measure against damage being caused to the lining material. The end closures shall be capable of preventing the ingress of dirt and at the same time allowing air to ventilate through the pipework which they protect but without drying the linings out (in the case of cement mortar lined pipes) so as to cause them to crack. They shall be secured in such a manner that they cannot be dislodged or damaged by normal pipe handling operations."

PSL 4.6 Marking (New Sub-Clause)

Add new Sub-Clause:

"Every bend shall be marked as stated in PSL 3.4.1 above and, in addition, shall have its deflection angle in degrees and minutes painted on the outer surface.

Packaged items such as nuts and bolts, insertion rings etc shall be marked with a metal label bearing the Contract No and the Schedule Item No. with which they are to be used."

PSL 4.7 Advice Notes and Invoices (New Sub-Clause)

Add new Sub-Clause:

"The Contractor shall submit one copy of every advice note in respect of each individual consignment, quoting the Contract Number, the truck or vehicle number, item numbers and a brief description of the articles so consigned. The advice note shall be lodged with the Employer's Agent 's Representative on Site at least two days before the arrival of the goods."

PSL 4.8 Delivery and Acceptance (New Sub-Clause)

Add new Sub-Clause:

"The material to be supplied under this Contract shall be consigned and delivered to approved areas adjacent to the pipeline route, or to an approved storage area if not required for immediate use."

PSL 5 CONSTRUCTION

PSL 5.1 LAYING

PSL 5.1.1 General

Add to the Sub-Clause:

"The Contractor will be responsible for clearing the areas required for pipe storage that shall include the removal of rock, stones and all combustible material. He/she shall also be responsible for maintaining the area in a clean and tidy condition for the duration of the Contract.

Upon delivery of the pipes, fittings, specials and valves, these will be inspected jointly by the Employer's Agent 's Representative and the Contractor. Any items found to be damaged shall be returned to the factory for repair or replacement, in which case the costs of additional transport, repair or replacement shall be borne by the Contractor if the pies were supplied by the Contractor and not by the Employer.

The Contractor will be held fully responsible for the care and safety of all pipes and fittings, etc, on site, and shall bear the cost of all renewals, which may be necessary to make good losses, damages or breakages. Furthermore, he shall be fully responsible for handling and re-loading material at the storage areas and for transporting and offloading of all such materials to the Site of the Works.

Before commencing pipelaying, the Contractor shall properly distribute pipes, fittings and specials, along the trenches. Valves and couplings shall not be distributed until they are actually required for laying in their designed position."

PSL 5.1.1.1 Inspection, Detection and Repair of Holidays (New Sub-Clause)

Add new Sub-Clause:

"Complete sets of transistorised portable holiday detection equipment with adjustable output voltage with interchangeable 200 mm brush and full circle electrodes, adaptable for use on damp or dry surfaces of coatings of pipes, buried valve bodies, fittings and couplings of any diameter in the range DN 200 to DN 700 are to be provided, tested, maintained and recharged when necessary by the Contractor at the rates quoted in the appropriate items in the Bills of Quantities, for use by the Employer's Agent Representative in inspecting coatings, wrappings and external protection of pipes, valves, fittings and couplings at the site of the Works and/or the point of delivery in accordance with the following:

When laying of pipes or fittings or covering of pipes, buried valve bodies, fittings or couplings with padding or concrete is proceeding in more than one 250 metre long section of the working strip on any day, the Contractor shall provide a sufficient number of complete sets of holiday detection equipment in addition to the holiday detection equipment required by his own staff to permit the person appointed by the Employer's Agent to carry out holiday inspections simultaneously at each such section of the working strip.

The Contractor shall include in his tendered price for the appropriate item in the Bills of Quantities an allowance to cover the provision by him of all extra labour and equipment necessary for all special handling of pipes, valves and fittings which is required in order to facilitate the following standard holiday detection operations which will be carried out by the Employer's Agent or his Representative.

During laying operations the full circle electrode of the holiday detector will be passed over all the external surface of each pipe, except such area as may be covered by a belt sling or other approved handling tackle not exceeding 600 millimetres in total width used for supporting the pipe in the course of the laying operation immediately prior to lowering the pipe into its trench. Only if a holiday is detected in the course of the inspection described above, will the entire external surface of the pipe have to be inspected by passing the full circle electrode of the holiday detector over the full length of the pipe. At the laying site the holiday detection equipment will also be used to check the external coating of fittings before laying and to check completion of external coatings over welded joints or couplings after hydraulic pressure testing of the pipeline.

The Contractor shall so carry out his laying work as to provide reasonable time and access to the Employer's Agent for the purpose of the inspections described above. The tendered rates for pipework shall be deemed to include for all holiday detection described in this Specification.

All work ordered by the Employer's Agent in writing to be carried out by the Contractor in assisting in any holiday detection inspection which the Employer's Agent may carry out in addition to the standard operations described above and proving of repairs mentioned below shall be carried out by the Contractor at agreed rates.

All holidays, voids, pinholes or other flaws in the coatings or wrapping or completed external covering to welds, couplings or buried valve bodies are to be made good by the Contractor at his expense.

Protective coating or wrapping to pipes and fittings or completed external covering to joints and buried valve bodies which are inadequately bonded, damaged by abrasion, below the minimum thickness, do not comply with the materials specifications and are in any other manner defective must be removed and replaced at the expense of the Contractor. All pinholes and other defects located by means of the holiday detector shall be repaired to the satisfaction of the Employer's Agent and proved sound by the holiday detector.

The coating of each pipe shall be inspected and holiday detected by the Contractor, immediately prior to being laid and these inspections will be witnessed and signed off by the Employer's Agent or an appointed third party inspection authority. Two thirds of the circumference of each pipe and fitting will be inspected outside the trench, after the pipe/fitting has been transported to the construction site where it is to be laid. This inspection is to be carried out shortly before each pipe is hoisted for laying in the trench. The balance of the circumference of each pipe/fitting will be inspected once the pipe/fitting has been laid in the trench. This will require the pie/fitting to be rotated to facilitate inspections.

All remedial work that is required shall be effected immediately upon detection of any holidays. The cost of holiday testing and effecting remedial work to the coating of the pipe at the installation location, as a result of construction or transportation or storage damage, shall be deemed to be included in the tendered rates for the laying of the pipe/fitting.

Each and every external coating make good at welded joints, shall be holiday tested around the full circumference and be subject to approval of in terms of the relevant Quality Control Procedure. All costs associated with holiday detection and any costs of effecting remedial work, shall be deemed to be included in the tendered rates i.e. no special or "extra over" payments will be made for external repairs or make goods at joints.

All pipe specials being corrosion protected with an external epoxy coating, shall be holiday tested before being incorporated into the works as well as holiday tested after inclusion into the works. All the costs of holiday detection and any costs for effecting remedial work shall be deemed to be included in the rates for the laying of the pipe/fitting.

The corrosion protection systems on all fittings and manufactured specials shall be holiday tested once included into the permanent works. All the costs of holiday detection and any costs of effecting remedial work shall be deemed to be included in the tendered rates for the laying of the pipeline.

The appropriate wet sponge tests shall be conducted on the internal surfaces of all epoxy linings, and particularly on reinstated areas and make good at joints, and on manufactured specials and repairs to linings. This will be carried out from time to time and again before final cleaning of sections of the pipeline that are completed. All the costs associated with wet sponge holiday detection and any costs for effecting remedial work shall be deemed to be included in the rates for the laying of the pipeline.

Should the Contractor feel that some of the holidays detected in the lining, are as a result of the original manufacturing process, this should be brought to the Employer's Agent's attention for evaluation. The Employer's Agent's decision in this regard will be final and, should it be decided that the holidays are in fact as a result of the manufacturing process, the Contractor will be required to repair the same at his own cost.

PSL 5.1.2 Damage

Add to the Sub-Clause:

"The Contractor shall be responsible for protecting pipes fittings and valves from grass fires at all times and shall keep grass cut short in the vicinity of all unlaid pipework items.

Should trenches be inundated by water, there is a risk of movement of the pipes by flotation. The Contractor shall ensure that trenches are not flooded by stormwater and that pipes laid in the trench are backfilled as soon as possible after laying, except at joints made with couplings or flanges which must be kept visible until the pipeline has been satisfactorily tested.

Steel pipes with welded joints may, after all specified testing and corrosion protection has been satisfactorily completed and with prior approval from the Employer's Agent, be backfilled at the same time as backfilling the pipeline.

Should movement of the pipes occur, the Contractor shall remove the pipes from the trench and thoroughly clean and relay the pipes. This work shall be carried out at the Contractor's expense."

PSL 5.1.3 Keeping Pipelines Clean

Add to the sub-clause:

"The Contractor shall take all of the steps necessary to prevent flooding of the Works and hence ensure that all work is carried out in the dry, and that the ingress of dirt and or dirty water into the pipes is prevented. The ends of all laid pipes must be closed at all time when work is not being carried out."

PSL 5.1.3.1 Cleaning Pipe Internals (New Sub-Clause)

Add new Sub-Clause:

"The Contractor shall ensure that all pipe work is installed internally free of any contaminants. All traces of dirty water, slag, splatter, swarf, cuttings, coupons, welding rod ends, grinding dust, dirt and other debris are to be removed from the inside of the pipe as it is installed.

The Contractor's attention is drawn to the need to take great care to protect internal epoxy linings. To this end, a rubber mat is to be provided for walking on inside the pipe. On steep slopes, the mat is to be restrained from sliding down the pipe. Care must also be taken on steep slopes to restrain equipment and hand tools from sliding down the pipe during construction.

The relevant safety procedures are to be followed when entering pipes.

The Contractor shall ensure that all dust, grit and powder that accumulates in the pipe as a result of grit blasting for the repair of internal linings, be removed from the pipe in an acceptable manner before the internal lining repairs are carried out.

Once the lining repair has been completed, cleaned off and inspected, that specific section of the pipe shall be blocked off to prevent any further access by workers.

The Contractor shall take note that flushing of the completed pipeline may not be allowed after construction has been completed and therefore clean house keeping practices will be required under all circumstances during construction. The tendered rates for pipe laying shall include for the clean house keeping practices required.

Each section of the pipeline is to be internally inspected and passed by the Employer's Agent once construction has been completed. If the pipework is not satisfactory, the Contractor shall re clean the pipe at his own expense until the pipe is passed clean. The Employer's Agent reserves the right to utilize cameras or any other means to inspect inaccessible areas."

PSL 5.1.3.2 Cleaning of Valves and Fittings (New Sub-Clause)

Add new Sub-Clause:

"All flanges, valves, fittings and equipment may only be installed in pipe work after they have been thoroughly cleaned. Flange faces shall be checked for damage before being incorporated into the permanent works and any damage shall be reported to the Employer's Agent."

PSL 5.1.4 Depths and Cover

Delete Sub-Clause 5.1.4.1 and substitute the following:

"Unless otherwise shown on the drawings or scheduled in the Bills of Quantities or ordered, the depth of excavation for trenches for medium-pressure pipelines shall be such that the cover to finished ground level over the laid pipe shall not exceed 1,0 m."

Delete from the third and fourth lines of Sub-Clause 5.1.4.2:

"e.g. the deflection shall not exceed 1,5° per joint in the case of AC pipes"

PSL 5.1.5 Working Inside Pipes and Protection of Internal Linings (New Sub-Clause)

Add new Sub-Clause:

"All possible care shall be exercised during construction in order to avoid damage being inflicted to the pipe lining as a result of the installation and welding activities, and the following procedures shall be adopted at all times:

- Placing of rubber protection mats in the pipeline to ensure that no damage occurs as a result of foot traffic, falling tools and equipment, weld splatter and or grinding spray.
- Labourers working inside the pipe are to wear soft soled shoes.
- Wet sacking or rubber matting shall be placed on the pipe invert in the areas where welding or flame cutting operations are in progress to minimise the extent of damage to the lining from weld splatter or molten metal from flame cutting. This requirement shall be strictly enforced.
- Tools shall be placed on rubber foam or resilient rubber matting to protect the epoxy pipe lining against mechanical damages.
- Particular care is to be taken inside the pipe when tie ins into the pipe is done for the purpose of fitting air valves, scour valves, by passes and other tie ins.
- Once internal work in a specific pipe sections has been completed and the pipe has been successfully cleaned, holiday detected and approved as being constructed to the satisfaction of the Employer's Agent, the Contractor shall block off that section of pipe to prevent any further man entry into same.
- The rates tendered in the Bills of Quantities shall include for all the measures required under this clause.

Detection of holidays in the internal epoxy lining will only commence once all internal activities in the pipe line have been completed. That is welding of joints, preparation of joints for epoxy reinstatement, as well as epoxy reinstatement in terms of the requirements of this specification. This excludes repair of epoxy lining as a result of damage incurred before the pipe is transported to the construction site as these defects will be repaired in the pipe yard.

Once all work is complete in a particular length of pipe, the Contractor shall arrange for the pipe to be thoroughly swept of all dust and debris. The pipe lining and joint repair will then be tested with a "wet sponge" detector set at 90 Volts in order to detect any electrical insulation defects."

PSL 5.1.6 Equipment for Inspecting Internal Surfaces of Pipes (New Sub-Clause)

Add new Sub-Clause:

"The Contractor shall make the following equipment available for use by the Employer's Agent for the inspection of the internal surfaces of the pipes DN 700 and larger:

- One pair of boots having leather uppers and rubber soles
- One one-piece overall with at least one breast pocket
- One adjustable safety harness
- Two screw drivers, 5 cm and 10 cm long
- One small peen hammer
- A two-cell torch with a 10W light bulb with two sets of rechargeable batteries and a battery charger and spare bulbs
- A sufficient length of 16 mm diameter rope to suit the conditions on site.
- One trolley suitable for inspecting pipes of the appropriate diameter(s).

The equipment shall be kept in good condition and operating order throughout the duration of the Contract. No separate payment will be made for this equipment and the costs therefore will be deemed to be included in the tendered rates."

PSL 5.1.7 Pipe Support (New Sub-Clause)

Add new Sub-Clause:

"Temporary pipe supports may be used to assist setting up and assembly. However, it is preferred that permanent pipe supports are installed as soon as possible to minimize double handling and/or omission during construction.

Permanent pipe supports shall be constructed as indicated on the drawings or as directed on site.

Before testing, all permanent supports shall be complete and all temporary supports removed, unless otherwise agreed by the Employer's Agent."

PSL 5.1.8 End Caps (New Sub-Clause)

Add new Sub-Clause:

"The Contractor shall, at the end of each day's work, fit end caps to the open ends of the pipeline under construction. The end caps shall be manufactured in such a manner that it can be fitted to seal off the pipeline to the extent that it is totally dust and water proof. The end cap shall be able to withstand a pressure of 5 m head of water externally when fitted.

End caps shall be maintained during non-working periods.

The tendered rates for the laying of pipe shall be deemed to include for the supply, fitment, and maintenance of the end caps."

PSL 5.1.9 Marker Posts (New sub-Clause)

Add new Sub-Clause:

"Pre-cast concrete marker posts as shown on the drawings and painted white in colour shall be set at all horizontal direction changes and where otherwise indicated by the Employer's Agent.

The standard marker post rate shall include the supply and erection of painted, inscribed posts. The rate shall be inclusive of erection and shall include for all necessary excavation, mass concrete footing and formwork."

PSL 5.2 JOINTING METHODS

PSL 5.2.2 Flanges (Steel Pipelines)

In the heading delete **"(Steel Pipelines)"**

Add to the Sub-Clause:

"Before being brought together, the ends of the pipes, fittings, couplings and flanges are to be inspected and cleaned to ensure that all parts forming the joint are undamaged and clean.

When jointing flanges, the faces shall be cleaned thoroughly and approved jointing material (compressed asbestos cement fibre or other approved gaskets on flanged joints), cut properly to size, is to be inserted immediately before bringing the two flanges together. Before closing the joints, the flanges must be parallel to each other, with all bolts inserted in the bolt holes. After the fittings have thus been aligned and well supported, the joint shall be bolted up to a uniform tightness using torque wrenches to achieve the required compression force on the gasket.

If and where full face gaskets are used, the jointing material shall be flush with, or protrude beyond, the outer circumference of the flange (this in not applicable to raised face flanges). On completion of the joint, the flanges and bolts shall be protected as described in Clause PSL 3.9.3.8."

PSL 5.2.3 Welding (Steel Pipelines DN 200 or Greater)

Delete the title and replace with **"Welding (Steel Pipelines)"**.

Delete the 1st sentence and replace with:

"Field and shop welding of steel pipes, bends and fittings shall be carried out in accordance with the relevant requirements of the latest version of API 1104. Prior to commencement of welding, the Contractor shall produce a qualified welding procedure in accordance with the latest version of API 1104, for the intended sizes, processes, positions, and consumables to be used on the project.
Welding shall be carried out by welders who are competent in terms of the procedure approval test given in API 1104. Prior to commencement of welding, the current qualification of each welder must be produced in accordance with the welding procedure. Should constant repairs be required on welds carried out by one particular welder, the Employer's Agent may require that the welder be re-tested or removed from the project."

Add to the Sub-clause:

PSL 5.2.3.1 Radiographic Examination of Shop Welds: (New Sub-Clause)

The Contractor shall include in his prices for the manufacture of bends, fittings and specials for the cost of carrying out, under the supervision of an inspector appointed by the Employer's Agent or Employer, examination of shop welds on the following basis:

a) Field Welds:

Radiographic testing will be performed on butt welds and dye penetrant testing on fillet welds. All welds will be tested and adjudicated in accordance with API 1104. Radiographic testing of butt welds is to be carried out on 100% of the welds.

Repairs of welds will be permitted in accordance with approved repair procedures. Repairs shall be re-examined using the relevant non-destructive testing method. All costs associated with the repair of defective welds will be borne by the Contractor.

b) Fabrication of Bends, Fittings and Specials

i) ONE HUNDRED percent radiographic examination of all weld deposited manually or semi-automatically in bends, fittings and specials which cannot be hydraulically tested because they have a plain end.

ii) TEN percent radiographic examination of all welds deposited manually or semi automatically in all flanged bends, fittings, and specials which are to be tested hydraulically.

All radiographs and records thereof shall be made available to the Employer's Agent to enable him to determine whether the welds are acceptable or not and no lining or wrapping of pipes, bends or fittings shall be permitted until the welds have been accepted by the Employer's Agent.

The Contractor must submit a Quality Control plan indicating the inspection point. The Contractor is allowed one inspection once a week for items not manufactured on site.

When a section of the weld is shown by radiography to be unacceptable and, if the limits of the deficient weld are not defined by the radiograph, additional radiography shall be carried out at the Contractor's expense until the limits of the deficiency are determined.
Repairs shall be made to defective welds at the Contractor's expense. All repair welds shall be identified with a stamp marking, indicating which welder conducted the repair. Repaired welds shall be radiographed at the Contractor's expense but, after any repair welder has had ten consecutive repairs approved, the extent of the radiography of the repairs conducted by the welder may be decreased by agreement between the Employer's Agent and the Contractor."

PSL 5.2.3.2 Welding Procedure (New Sub-Clause)

Add new Sub-Clause:

"Welding shall, unless otherwise prescribed in the approved welding procedure, commence at the top of the joint and proceed downwards. In addition to the root weld, at least two further passes shall be made, none of which is to exceed 3 mm in depth but this is subject to the approved welding procedure."

PSL 5.2.3.3 Aligning (New Sub-Clause)

Add new Sub-Clause:

"The alignment of abutting ends shall be such that the offset does not exceed 1,5 mm. Line-up clamps ("dogs") shall not be used for the "fit-ups". The use of "bridges and wedges" or any other method that may reduce the pipe wall thickness when removed or in any way introduce unnecessary stresses into the pipe is forbidden."

PSL 5.2.3.4 Weather Conditions (New Sub-Clause)

Add new Sub-Clause:

"Welding shall not be performed under conditions that could affect the quality of the welded joint (e.g. high moisture or windy conditions). Windshields may be used where practical."

PSL 5.2.3.5 Clearance (New Sub-Clause)

Add new Sub-Clause:

"The minimum clearance around the pipe during welding shall be 500 mm or such other minimum distance that may be required to facilitate compliance with the approved welding procedure. When welding in the trench, adequately sized "fox holes" shall be excavated/formed so as to provide adequate access for the welders."

PSL 5.2.3.6 Visual Inspection (New Sub-Clause)

Add new Sub-Clause:

"100% of each joint will be examined and the following criteria shall be met:

All welds shall be substantially uniform in appearance with the inner and outer weld beads not exceeding 1 mm and 3 mm in height respectively unless otherwise required in terms of the approved welding procedure.

Undercut will not be permitted under any circumstances.

The weld, heat affected zone, and surrounding parent metal shall be free from cracks, porosity and trapped slag.

All weld splatter must be removed prior to corrosion protection application."

PSL 5.2.3.6 Non-Destructive Testing After Construction (New Sub-Clause)

Add new Sub-Clause:

"The Employer's Cathodic Protection Professional Services Provider will carry out coating integrity surveys along the full length of the pipeline as prescribed in the Employer's Cathodic Protection Specification.

Any defect(s) found in the pipeline coating, as a result of the PCM or DCVG testing shall be located and repaired by the Contractor at his expense.

In the case of PCM testing, all coating defects identified with an area greater than 0,5 square centimetre per 12 metre length of pipeline shall be located and repaired.

In the case of DCVG surveys, all coating defects identified with a value greater than 3% IR (or such other value as may be determined and agreed following analyses of the results of the first section which undergoes DCVG testing) shall be located and repaired. The agreement between the Contractor and the Employer's Agent on this baseline, will be set as the criteria for the coating repair requirements by the Contractor on the whole pipeline.

Depending on the extent of the defects identified during PCM or DCVG testing, the Employer's Agent may call for a further survey after the initial defects have been repaired by the Contractor, the cost of which testing shall then be borne by the Contractor.

PSL 5.2.3.7 Quality Control (New Sub-Clause)

Add new Sub-Clause:

"Records of which welds were carried out by each individual welder as well as non-destructive testing results shall be submitted to the Employer's Agent monthly. Should there be repetitive or serious defects, this information shall be forwarded to the Employer's Agent immediately."

PSL 5.2.4 Cut Pipes (New Sub-Clause)

Add new Sub-clause:

"Cut pipes shall be used where required as closure lengths. The cut ends shall be dressed square and to a smooth even finish and prepared for butt welding preparation which shall not be inferior to that of the ends of uncut pipes. The finished dimensions of ends cut on site must be within the tolerances applicable to the ends of the particular types of pipe to be laid. The cost of cutting and trimming of pipes shall be included in the rates tendered for laying and jointing pipes."

PSL 5.3 Setting Valves, Specials and Fittings

Add to the Sub-Clause:

"Valves are to be set correctly in the positions indicated and supported on concrete stools, except where not so required by the Employer's Agent. Valve spindle guide brackets and stays where provided shall be secured into position against concrete work and set and carefully adjusted in order to give true vertical alignment of the spindle."

PSL 5.4 Concrete Casing

In the first and second lines delete "a strength 15 MPa/37,5 mm or such other strength as scheduled" and substitute:

"concrete grade 20/19".

PSL 5.5 ANCHOR/THRUST BLOCKS AND PEDESTALS

In the fourth line delete " 15 MPa/37,5 mm " and replace with “20/19”.

Add to the sub-clause:

"Steel pipelines that are to be continuously welded or flanged, do not require anchor/thrust blocks at tees, bends, terminal valves and end caps."

PSL 5.5 VALVE AND HYDRANT CHAMBERS

PSL 5.6.1 General

Delete the references to drawings L1, L2 and L3 and substitute "drawings issued by the Employer’s Agent ".

PSL 5.6.2 Construction of Chambers

Delete the references to drawings L1, L2 and L3 and substitute "drawings issued by the Employer’s Agent ".

PSL 5.10 DISINFECTION OF POTABLE WATER PIPELINES

Delete the clause and replace with:

"The entire pipeline disinfection will be monitored by the Employer’s Agent Representative and/or the Employer’s personnel. The disinfection criteria are stringent and the Contractor shall keep the pipeline clean throughout the Contract.

The Contractor will be required to submit a detailed method statement for approval by the Employer’s Agent. A minimum requirement will be that the method statement deals with the method of dosing and how the dosing rate will be controlled to ensure a uniform distribution throughout the pipeline being disinfected, the chemicals to be used, the anticipated range of dosing rates and equipment to be used, and the name and qualification the Contractor's person supervising the disinfection.

Once a successful hydraulic test of the entire pipeline has been achieved and the connections have been completed, the pipeline shall be drained. The pipeline shall then be re-charged in accordance with PSL 7.3.4 – “Initial Filling of the Pipeline”. Whilst being charged, a sodium hypochlorite solution shall be dosed at a temporary connection(s) made at an air valve(s), which will be confirmed by the Employer’s Agent in order to achieve a theoretical total chlorine concentration of 25 ppm (mg/l).

Once the entire pipeline has been filled in this manner, it shall be left for a 24-hour period. Thereafter, total chlorine concentrations shall be measured at each scour point. A concentration of 20ppm total chlorine will be considered acceptable. Should this concentration not be achieved at all scours, the Contractor shall take all steps considered necessary by the Employer’s Agent to achieve satisfactory disinfection, at his/her own cost.

Once satisfactory disinfection has been achieved, the pipeline shall be drained via the scour valves (or by other means approved by the Employer's Agent) and sufficient sodium thiosulphate (typically 1 part of total chlorine) shall be dosed into the scour-wet wells to fully neutralise the chlorine before discharging to watercourse.

The pipeline shall then be re-charged in accordance with the stated procedure and, after 24 hours, samples shall be taken and sent to an approved laboratory for analysis (at no cost to the Employer). Should the following limits not be achieved, the Contractor shall carry out at his/her own cost, all steps deemed necessary by the Employer's Agent to achieve satisfactory disinfection."

Water Quality Limits:

PARAMETER	COUNT
e. coli	0
Coliforms	0
Faecal Streptococci	0

PSL 6 TOLERANCES

PSL6.3 ALIGNMENT (PLAN AND LEVEL)

Delete the third and fourth line and substitute:
"of the pipeline, shall be + 50 mm + 10% and the permissible deviation per pipe length shall be +/- 20 mm."

Delete the sixth (last) line and substitute:
"+ 25 mm + 5% provided that there shall be no reversal of the pipeline gradient."

PSL 7 TESTING

PSL 7.3 STANDARD HYDRAULIC PIPE TEST

Add the following preamble:

"Water used for one filling of the pipeline for hydraulic testing, one filling for disinfection and one filling after draining the disinfection water will be provided by the Employer free of charge. Additional water used due to dirty water in the pipe and/or due to unsuccessful hydraulic tests will be charged at the Employer's bulk rate per kilolitre that is charged to their bulk consumers. Filling of the pipeline for hydraulic testing shall be carried out slowly to enable air to escape and under the direction of the Employer's Agent.

Items have been provided in the Bills of Quantities to cover the costs of obtaining the water and conveying water from the supply point to the test section of pipeline.

Water can only be supplied to the Contractor at the New Regional Water Treatment Works under construction to the north of the Phongolo River (co-ordinates: 27^{o} 25' south; 22^{o} 05' 30" east). The due commissioning date for the Works has been notified to be March 2016.

PSL 7.3.1 Test Pressure and Time of Test

Add to the Sub-clause:

Pipeline sections shall be subjected to field test pressures as shown on the drawings.

The sections in which the pipeline may be tested will be at the discretion of the Contractor, except that the pipeline shall be tested in sections not exceeding a maximum allowable length of 2 000 m unless otherwise agreed by the Employer's Agent. The Contractor shall make due allowance in the construction programme and in the tendered rates for the entire testing operation including for the provision of temporary end stops (flanges or bullnoses) and any other costs incurred associated with testing the pipeline in intermediate sections. Once all intermediate sections have been successfully tested, the untested sections, if any, between the ends of the tested sections shall be visually inspected under working pressure.

The pipe shall not be tested until the associated structural concrete for anchorage has cured for 28 days or until such concrete has attained the specified design strength. Once filled, the pipe shall be left for 24 hours to permit maximum saturation of cement mortar linings.

The section to be tested shall be pressurised to the specified pressure and left for 24 hours, during which period, the pressure drop (if any) and the quantity of water required to be pumped in to restore the test pressure shall be measured and recorded. In addition, all flexible and flanged joints shall be visually inspected and there shall be no sign of leakage.

The permissible leakage for welded and flanged steel pipelines is zero (0) litres.

At all times when there is water in the pipeline, and particularly during filling, testing and draining of the pipeline, all air valves shall be in operation and their individual isolating valves shall be open."

PSL 7.3.1.2 Delete the Sub-Clauses 7.3.1.2

PSL 7.3.1.3 Delete the Sub-Clauses 7.3.1.3

PSL 7.3.1.4 Delete the Sub-Clauses 7.3.1.4

PSL 7.3.3 Permissible Leakage Rates (Sub-Clause 7.3.3)

Delete the title of Sub-Clause and substitute the following:

Permissible Make-up Water

Add additional paragraph to the Sub-Clause as follows:

"c) Welded steel pipelines ..... Nil"

PSL 7.3.4 Initial Filling of Pipeline (New Sub-Clause)

Add new Sub-Clause:

"The entire process for filling the pipeline at any time during testing or disinfection shall be carried out under the supervision of the Employer's Agent and will also be monitored by the Employer's Agent and/or the Employer's personnel. Under no circumstances will the Contractor be allowed to carry out filling of the pipeline without the supervision of the Employer's Agent, neither shall he/she permit any other persons to carry out such filling without the written permission of the Employer's Agent.

Any damage to the pipeline caused by non-compliance with this Sub-Cause shall be rectified at the Contractor's expense."

PSL 7.3.5 Connections after Testing (New Sub-Clause)

Add new Sub-clause:

"The connections of the new pipework to the existing pipework shall only be carried out after the pipeline testing has been completed and accepted by the Employer's Agent. For this reason, testing must be carried out against a blank flange or bullnose end cap at these locations."

PSL 7.3.6 Remedial Measures (New Sub-Clause)

Add new Sub-clause:

"In the event that a pipe section fails a test, the Contractor shall carry out all remedial measures necessary to obtain a successful test of each individual section and the entire pipeline, at his/her own expense. Such remedial measures shall in no way compromise the original pipeline specifications."

PSL 7.3.7 Draining of the Pipeline (New Sub-Clause)

Add new Sub-clause:

"The pipeline may have to be drained to carry out remedial measures and it must be drained before the disinfection process commences. The pipeline shall be drained via the scour valves in a manner that does not cause erosion of the streambeds or negatively impact on the environment in any way. All such drainage of the pipeline shall be carried out under the supervision of the Employer's Agent's Representative."

PSL 7.6 Commissioning (New Sub-Clause)

Add new Sub-clause:

"The pipeline will be considered to have been commissioned and practically complete once all the associated structures are sufficiently complete to carry out their structural and hydraulic function and the hydraulic test and disinfection of the entire pipeline has been successfully completed."

PSL 7.7 Water Tightness Test for Chambers (New Sub-Clause)

Add new Sub-clause:

"On completion of each concrete valve chamber, and prior to completion of the backfilling around the chamber, a water tightness test shall be undertaken by the Contractor. This shall be carried out by excavating a trench approximately 0,5 m deep around the periphery of the chamber and continuously (for at least 4 hours) maintaining it full of water. Should there be any noticeable leaks into the chamber, the Contractor shall carry out at his/her own expense whatever measures are necessary to waterproof the chamber to the Employer's Agent's satisfaction."

PSL 8 MEASUREMENT AND PAYMENT

PSL 8.2.1 Collect from pipe yard, Lay and Bed Pipes Fittings, Specials and Couplings

Delete the sub-clause and substitute:

"Collect from pipe yard pipes, transport, lay, and bed pipes complete ……Unit: m or No

Collect from pipe yard pipes, transport, fabricate, install pipes, bends, fittings, valves, etc. Unit: Either per metre or 'extra over' the linear metre rate, or by number as scheduled in the Bills of Quantities.

The rates shall cover the cost of the collection of the pipes from pipe yard and for radiographic and/or hydraulic testing of bends, fittings specials, and installing flanges, couplings, valves and other appurtenances as scheduled, making good the coatings and linings, handling, inspecting, marking bends, fittings and specials with item numbers, transporting, holiday detection testing for coatings of steel pipes, forming joint ("fox") holes in all materials, bedding, laying, welding, jointing, cutting, all testing and disinfecting and where relevant all welding, radiographic and other testing as specified, and the completion of the internal and external corrosion protection (make good) and jointing materials (e.g. nuts, bolts, washers, gaskets, welding rods etc)."

The rates for the supply and installing of valves and specials shall cover the cost of any cutting, trimming, and jointing of pipes required for the installation of valves, bend, fittings in the positions shown on the drawings. Unless specific provision is made in the Bills of Quantities, no separate payment will be made for forming of any additional joints and/or for the supply of additional jointing materials which may be required for the connection of cut pipes.

A maximum payment of 80 % of the tendered rates will be made for a completed section of pipeline which has not yet been hydraulically pressure tested and disinfected. A further payment of 20% of the tendered rates will be made upon successful completion of the pressure testing and disinfection for the relevant section of pipeline.

The rates tendered for the laying and bedding of pipes, bends, fittings, and valves, shall be deemed to exclude the costs associated with the field pressure testing and disinfection of the pipeline. Separate items have been included in the Bills of Quantities for the cost associated with the conveyance of water required for testing, pressure testing, and disinfection of the pipeline."

PSL 8.2.15 Special Wrapping in Corrosive Soil

Delete the heading and substitute: **"Corrosion Protection Unit:…"**

Add new Item:

"The costs of making good the internal linings and external coatings on all butt welded and fillet welded joints on the pipeline are to be included in the tendered rates for pipelaying."

PSL 8.2.16 Mitre Cut Joints (New Item)

Add new Item:

"Mitre cuts (two piece bends) up to 10^{o} in steel pipelines may be carried out in the field only if ordered by the Employer's Agent.

Mitre Cut Joints ..... Unit: No

The rate shall cover the cost of cutting, forming, and bevelling the ends of the pipes at the joint, all welding, testing and forming joint holes in all materials and for completion of the internal and external corrosion protection at the joints."

PSL 8.2.17 Cutting Pipes (New Items)

Add new items:

"Extra over for forming scarf joint……Unit: No

Extra over for forming mitre cut joint……Unit: No

Extra over for cutting pipe as closure……Unit: No

Payment will only be made where shown on the drawings or where instructed by the Employer's Agent Representative. No payment will however be made for cutting pipes to suit the installation of bends, fittings, and valves that are shown on the drawings.

The rates shall cover the cost of cutting, forming and bevelling the ends of the pipes at the joint, all welding, testing and forming joint holes in all materials and for completion of the internal and external corrosion protection at the joints."

PSL 8.2.18 Cutting into and Connecting to Existing Pipeline (New Item)

Add new Item:

"Cutting into and connecting to existing pipeline ..... Unit: Sum

The rate for cutting into and connecting to existing pipelines shall cover the cost of exposing the existing pipeline, making arrangements with the Employer's staff to temporarily shut off the existing pipeline whilst effecting the connection, cleaning and preparing the pipe for cutting, cutting, dealing with all water (including that from possible leaking valves), preparing the pipe ends for jointing, welding / jointing and connecting the new pipework, making good internal linings and external coatings, re-commissioning the pipeline, and including all temporary supports, bedding and backfilling."

PSL 8.2.19 Corrosion Protection of Valves & Flexible and Flanged Joints

Add new Item:

"External corrosion protection to valves, flexible & flanged joints complete as specified in 3.9.3 above …..... Unit: No

Separate items will be scheduled for each item by pipe nominal diameter.

In the case of valves, the rate shall include for protection of the whole of the valve body, all flanges integral to the valve, the connecting flanges to the valve i.e. including the two flanges of the pipework connected to either side of the valve, and the packing of mastic (without tape or sheathing) over the gland adjusting bolts and nuts."

PSL 8.2.20 Repair of FBMDPE Coatings Defects (New sub-Clause)

Add new sub-clauses:

PSL 8.2.20.1 Repair defect smaller than 650mm^2

Repair defects in FBMDPE coatings according to PSL 3.9.3.1 & PSL 3.9.3.12 ..... Unit: No

PSL 8.2.20.2 Repair defect larger than 650mm²

Repair defects in FBMDPE coatings of size between 651 mm² and 1000 mm² according to PSL 3.9.3.1 & PSL 3.9.3.11 ..... Unit: No

Repair defects in FBMDPE coatings of size between 1001 mm² and 1500 mm² according to PSL 3.9.3.1 & PSL 3.9.3.11 ..... Unit: No

PSL 8.2.21 Repair of 3 Layer PE Coatings Defects (New sub-Clause)

Add new sub-clauses:

PSL 8.2.21.1 Repair defect smaller than 650mm²

Repair defects in 3LPE coatings according to PSL 3.9.3.1 & PSL 3.9.3.13 ..... Unit: No

PSL 8.2.21.2 Repair defect larger than 650mm²

Repair defects in 3LPE coatings of size between 651 mm² and 1000 mm² according to PSL 3.9.3.1 & PSL 3.9.3.13 ..... Unit: No

Repair defects in 3LPE coatings of size between 1001 mm² and 1500 mm² according to PSL 3.9.3.1 & PSL 3.9.3.13 ..... Unit: No

PSL 8.2.22 Repair of Cement Mortar Lining Defects (New sub-Clause)

Add new sub-clauses:

PSL 8.2.21.1 Repair lining defect smaller than 200mm²

Repair defects in CML lining according to PSL 3.9.3.1 & PSL 3.9.3.10 ..... Unit: No

PSL 8.2.21.2 Repair defect larger than 200mm²

Repair defects in CML lining of size between 201 mm² and 400 mm² according to PSL 3.9.3.1 & PSL 3.9.3.10 ..... Unit: No

Repair defects in CML lining of size between 401 mm² and 800 mm² according to PSL 3.9.3.1 & PSL 3.9.3.10 ..... Unit: No

PSL 8.2.23 Repair of Damage due to Thermic Welding (New sub-Clause)

Repair defects in pipe coating and lining arising from thermic welding for continuity bonding according to PSL 3.9.3.14 ..... Unit: No

C3.7.10 PSLB : BEDDING (PIPES) (Applicable to SABS 1200 LB - 1983)

PSLB 2.3 DEFINITIONS

Main fill:

Delete "150mm" in second line and substitute "300mm".

PSLB 3 MATERIALS

PSLB 3.1 Selected Granular Material

Delete the sub-Clause and substitute:

Selected granular material shall be a granular material with a PI not exceeding 6, grading modulus not less than 1,2, free from lumps or stones retained on a 10 mm sieve and having a compactibility factor (as determined by the test given in Section LB of Part 3 of SANS 0120) not exceeding 0,4.

Add to the sub-clause:

Where scheduled and/or shown on the drawings, bedding material (padding) as specified in PSLB 3.3 shall be used in place of selected granular material.

PSLB 3.2 Selected Fill Material

In the first line delete "PI not exceeding 6" and substitute "PI not exceeding 10".

In the second line delete "30mm" and substitute "20mm".

Add to the sub-clause:

Where scheduled and/or shown on the drawings, bedding material (padding) as specified in PSLB 3.3 shall be used in place of selected fill material.

PSLB 3.3 Bedding

The steel and HDPE pipes to be laid under this contract are to be considered as ‘flexible’ for the purpose of bedding.

Bedding (selected granular and selected fill material) for steel pipes shall be fine sand or fine non-cohesive soil, carefully selected, with maximum particle size of 5 mm and which shall not cake nor form lumps when drying. Material complying with the above requirements will also be referred to in this document as "padding".

Samples of bedding sand (padding) shall be submitted by the Contractor to the Employer’s Agent for approval well in advance of construction. Only after the Contractor has received written approval from the Employer’s Agent, may he/she proceed with placing sand as selected granular material.

No sharp-edged stones shall be allowed to come into contact with the pipes or fittings. Joint holes (pockets) shall be provided in the trench bottom and bedding, at each pipe joint to facilitate welding, and no extra payment will be made for forming or filling the joint holes (pockets) with padding sand.

All “padding” material used for the cradle beneath and surrounding the coated steel pipes shall comply with the following requirements:

GRADING ANALYSIS RANGE	
SIEVE SIZE (mm)	**PERCENTAGE PASSING**
6,7	98 to 100
4,76	85 to 100
2,36	55 to 95
1,18	30 to 75
0,60	20 to 50
0,425	16 to 38
0,30	13 to 27
0,15	5 to 18
0,075	0 to 12

The material shall be free of organic matter and shall have a compatibility factor of not more than 0.4. The material should be classified as silty to fine sand having a stiffness ratio of not less than 5,0 MPa. Furthermore, the origin of the materials should, preferably, be river transported since it is preferable that the larger grains (3,0 to 4,8 mm in size) be rounded and not sharp and angular.

The Contractor will be required to carry out his/her own quality control testing of the material to ensure that it meets the padding sand requirements and complies with this specification at all times. At least one grading analysis shall be carried out for every 100 lineal metres of bedding placed. The results of these tests shall be forwarded to the Employer’s Agent within 24 hours of completion of the test. Should the material not comply with the specification, the Contractor shall remove and replace it with approved material at his/her own cost.

Depending on the actual material supplied by the Contractor, the moisture content may be critical to enable satisfactory placing and compaction and the Contractor will be deemed to have allowed in his tendered rate for any and all adjustments required to the moisture content of the padding material at all times.

Items have been provided in the Bill of Quantities for the provision of approved bedding sand from approved Commercial or other approved off-site sources for padding sand.

No extra payment will be made for forming or filling joint holes (pockets).

PSLB 3.4 Selection

PSLB 3.4.1 Suitable Material available from Trench Excavation

Delete the Sub-Clause and substitute the following:

The excavation of a pipe trench shall comply with the requirements of Sub-Clause 5.4 of SABS 1200 DB and the provisions of Sub-Clause 3.7 of SABS 1200 DB (in terms of which, for the purposes of providing bedding materials, the Contractor is not required to use selective methods of excavating) shall apply. Nevertheless the Contractor shall take every reasonable precaution to avoid burying or contaminating material that is suitable and is required for bedding or covering the pipeline. If, in the opinion of the Employer’s Agent, bedding material can be produced from the excavated material, the Contractor shall, if so ordered by the Employer’s Agent, screen or otherwise treat (as scheduled) the excavated material in order to produce material suitable for bedding (see also Subclause PSLB 8.2.1).

PSLB 5 CONSTRUCTION

PSLB 5.1.2 Details of Bedding

Delete and replace with:

The pipelines are to be laid on the class of bedding indicated in the Bills of Quantities and/or on the drawings.

PSLB 5.1.2.1 Stone Drainage Layer Beneath Bedding (New Sub-Clause)

Add new Sub-Clause:

Where indicated on the drawings, or as otherwise indicated by the Employer's Agent, a 200 mm thick layer of 19 mm stone shall be placed beneath the bedding layer to act as a drainage channel for excessive groundwater. This layer shall be wrapped in approved geofabric and provided with outlet pipes if and where required or indicated by the Employer's Agent Representative.

PSLB 5.1.4 Compacting

Delete the second line and substitute:

top of the pipeline) shall be 93% mod AASHTO.

Add to Sub-Clause PSLB 5.1.4:

No heavy compaction equipment will be permitted for compaction of any pipe bedding, only pneumatic or hand rammers being acceptable. To this end, and to achieve the 100% compaction specified it is recommended that bedding be brought up evenly on either side of the pipe. The use of complete saturation of the material as a method of achieving the specified compaction may, subject to the Employer's Agent's approval, be used. However, in this regard, contractors are advised that the presence of excessive quantities of water in the pipe trench could lead to flotation of the pipe.

Steps will have to be taken by the Contractor to ensure that flexible pipes do not deform excessively in cross-section during and after construction and backfilling operations. The maximum deflection which will be acceptable at any stage during or after construction is 2% of the pipe diameter horizontally or vertically. The Contractor will be required to provide the necessary apparatus and to monitor deflection during construction.

Pipe deformations will only be maintained within the specified tolerances by correct backfilling practice. No heavy compaction equipment will be permitted for compaction of any pipe bedding, only pneumatic or hand rammers being acceptable. To this end, and to achieve the 93% compaction specified it is required that the bedding material be brought up evenly on either side of the pipe. The use of complete saturation of the material as a method of achieving the specified compaction may, subject to the Employer's Agent's approval, be used. However, in this regard, Tenderers are advised that the presence of excessive quantities of water in the pipe trench could lead to flotation of the pipe.

Prior to the commencement of pipelaying the Contractor will be required to submit, to the Employer's Agent, for his approval, a Method Statement detailing his proposed methods of placing, and compacting methods which he proposes to implement in order to ensure compliance with the specification.

PSLB 5.1.5 Testing (New Sub-Clause)

Flexible joints shall be left exposed with a minimum of 200mm clearance around the bottom of the pipe during hydraulic pressure testing of the pipe to facilitate inspection.

PSLB 5.2 Placing and Compacting of Rigid Pipes

PSLB 5.2.2 Class 'C' Bedding

Delete the third, fourth and portion of the fifth lines and substitute the following:

The pipes shall be bedded on a layer of compacted granular bedding material on which a 25mm thick layer of uncompacted granular bedding material has been placed and spread. Loose granular bedding material lying next to the pipe shall be placed into the haunch area and compacted with suitable hand tools, and additional selected granular material shall be added and compacted in layers until levels for the bedding cradle as shown on Dwg LB - 1 (c) are reached. The remainder of the bedding i.e. the selected fill blanket, shall be placed in layers up the sides of the pipe, each layer being compacted until levels are reached as shown on Dwg LB-1 (c).

PSLB 5.2.5 Stone Bedding (New Sub-Clause)

In areas where waterlogged conditions exist or where ordered by the Employer's Agent, special drains consisting of a 150mm thickness (See PSDB 5.5) of single sized stone with a geofabric filter surround ("Bidim" Grade A4 or similar approved) extending the full width of the trench shall be provided below the bedding to the pipes. The excavation for these drains will be measured in cubic metres at the contract rate applying to unsuitable excavation below the bottom of the trench. The stone filling will be paid for per cubic metre and the geofabric filter will be paid for per square metre. All measurements in this connection will be to a width equal to the base widths and depths ordered.

PSLB 5.3 Placing and Compacting Flexible Pipes

PSLB 5.3(a)Bedding Cradle

Delete the sub-clause and substitute the following:

The pipes shall be bedded on a minimum 100 thick layer of compacted granular bedding material on which a 50 mm thick layer of uncompacted granular bedding material has been placed and spread. Loose granular bedding material lying next to the pipe shall be placed into the haunch area and compacted with suitable hand tools (covered with rubber to prevent damage to the pipe coating), and additional selected granular material shall be added and compacted in layers up to the mid-point of the pipe diameter in the vertical plane. The remainder of the bedding i.e. the selected fill blanket, shall be placed in layers up the sides of the pipe, each layer being compacted until a level of 300 mm above the crown of the pipe is reached.

All bell (fox) holes shall be filled with bedding material.

PSLB 5.3(b) Selected Fill Blanket

Delete "200mm" from title.

PSLB5.4 Concrete Casing to Pipes

Add to the Sub-Clause:

Where concrete casing is ordered by the Employer's Agent it is to be of grade 20/19 concrete with a minimum thickness of 150 mm above the top of the pipe.

PSLB 6 TOLERANCES

PSLB 6.1 Moisture Content and Density

Add to the Sub-Clause :

The permissible deviations applicable are to be those for Degree of Accuracy II class of work.

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.1.3 Volume of Bedding Materials

Add to the Sub-Clause :

(c) The volume of bedding material shall be measured net i.e. the volume of the pipe is to be deducted.

(d) No additional payment will be made for bedding material placed in bell (fox) holes.

PSLB 8.1.5 Disposal of Displaced Material

Delete the Sub-Clause and replace with :

"Material displaced by the pipeline and by imported material from sources other than trench excavation, shall be disposed of by the Contractor at an approved site(s). No haulage shall be paid."

PSLB 8.1.6 Freehaul

Delete the Sub-Clause and replace with:

"All haul will be regarded as free haul. No overhaul will be paid for under this Contract".

PSLB 8.2 SCHEDULED ITEMS

PSLB 8.2.1 Provision of Bedding from Trench Excavation

Delete the Sub-Clause and substitute the following :

PSLB 8.2.1.1 Without the need for screening :

(a) Selected granular material ..... Unit : m^3

(b) Selected fill material ..... Unit : m^3

The rates for (a) and (b) shall cover the cost of acquiring, from any point along the trench excavation, bedding that complies with the relevant requirements of the specification, of delivering it to points alongside the trench spaced to suit the Contractor's methods of working, of making good any backfill deficiency from points where backfill has been acquired, and of disposing of displaced material.

PSLB 8.2.1.2 Including for screening :

(a) Selected granular material ..... Unit : m^3

(b) Selected fill material ..... Unit : m^3

The rates for (a) and (b) shall cover the cost of screening or otherwise treating excavated material, at any point along the trench excavation, in order to produce bedding that complies with the relevant specification, delivering it to points alongside the trench, spaced to suit the Contractor's methods of working, of making good any backfill deficiency there may be from points where screened backfill material has been acquired, and of disposing of displaced material.

PSLB 8.2.2 Supply only of Bedding by Importation

Delete Sub-Clause Clause 8.2.2 and substitute:

Including for screening and/or other treatment :

(a) Selected granular material ..... Unit : m^3

(b) Selected fill material ..... Unit : m^3

The rates for (a) and (b) shall cover the cost of acquiring, loading, transporting, offloading, screening or otherwise treating excavated material in order to produce bedding that complies with the relevant specification, delivering it to points alongside the trench spaced to suit the Contractor's methods of working and of disposing of displaced material.

NOTE: The rate for the supply and laying of pipelines covers the cost of handling the bedding material from alongside the trench, placing it under the pipeline, forming joint holes and completing the bedding around and over the pipeline.

PSLB 8.2.3 Concrete Bedding Cradle

Add the following paragraph to the Sub-Clause:

“All concrete bedding to pipes will require formwork. The rate for concrete bedding shall include for the supply, installation and stripping of all formwork.”

PSLB 8.2.4 Encasing of pipes in Concrete

Delete the fifth and sixth lines and substitute the following :

“encasing the pipe in concrete 150mm thick each side of the pipe and to 150mm above the crown of the pipe including the cost of formwork, (if any), etc. and the cost of formwork to form stopends on either side of collars, couplings, joints etc if instructed by the Employer’s Agent and substitute along the length of the pipeline as shown on the drawings or scheduled, or, if instructed by the Employer’s Agent, on either side of collars, couplings, joints, etc."

The rate for concrete encasing shall include for the supply, installation and stripping of all formwork.” Unit : m

PSLB 8.2.5 Overhaul of Material for Bedding Cradle and Selected Fill Blanket

Delete the sub-clause.

Add new sub-item:

“PSLB 8.2.6 Drainage Layer (New Sub-Clause)

(a) Stone filling ..... Unit : m^2

(b) Geofabric filter material (Bidim Grade A4 or similar) ..... Unit : m^2

Supply and place beneath pipe, 150mm crushed stone layer as ground water drainage layer. The excavation for these drains will be measured in cubic metres at the tendered rate applying to unsuitable excavation below the bottom of the trench (SABS 1200 DB 8.3.2 c).

The rate for stone filling shall be per cubic metre of stone fill, measured according to a width equal to the base widths and depths ordered.

Supply and installation of geofabric filter material (BIDIM Grade A4 or similar) around stone. The rate shall be per square metre of geofabric to enclose the stone material, measured net according to a width equal to the base widths and depths ordered”.

C3.7.11 PSM : ROADS (GENERAL) (Applicable to SABS 1200 M - 1981)

PSM 7 TESTING

PSM 7.2 Process Control

Add to the subclause:

Any routine testing required of the Contractor in accordance with Clause 7.3 is to be undertaken by an approved independent testing laboratory approved by the Employer's Agent.

PSM 7.3 Routine Inspection and Testing

Add new subclause:

PSM 7.3.4 Routine Inspection and Testing

Routine testing shall be carried out in accordance with TMH1 and at the frequency specified in the relevant standardised specification.

No claims will be allowed in the event of any delay caused by the Contractor failing to provide the results of testing timeously from whatever cause.

C3.7.12 PSMF : BASE (Applicable to SABS 1200 MF - 1981)

PSMF 3 MATERIALS

PSMF 3.1 Gravel Classification for Excavation Purposes

PSMF 3.1.1 Method of Classifying

Delete the contents of the Subclause and replace with:

"Materials supplied from designated borrow pits shall not be classified."

PSMF 3.3 Physical and Chemical Properties

PSMF 3.3.1 Natural Gravel (Stabilised and Unstabilised)

Delete sub clause (a) and replace with:

(a) " The maximum particle dimension of the gravel shall not exceed 63 mm."

Delete sub clause (e) and replace with:

(e) The UCS after treatment shall be between 1,5 and 3,0 MPa after 7 days at 100% Mod AASHTO density, or between 1,0 and 2,0 MPa after 7 days at 97% Mod AASHTO."

PSMF 5 CONSTRUCTION

PSMF 5.3 Processing

Delete the Subclause and replace with

PSMF 5.3 Chemical Modification

The base material shall be prepared, broken down and spread. Road lime complying with the requirements of SANS 824 shall then be spread over the prepared base material at a rate of 3,0%. The materials shall then be mixed dry using road graders, ploughs and other suitable equipment until the lime is mixed thoroughly and uniformly with the base material. The mixed material shall then be watered, mixed and lightly compacted.

After 24 hours have elapsed the material shall be ripped, worked in the normal manner and compacted to 98% of modified AASHTO density."

PSMF 5.4 Placing and Compacation on a Base Other than a Waterbound Macadam Base

PSMF 5.4.1 Placing

Delete the Subclause and substitute:

"Before construction of the base is commenced, the Contractor shall ensure that:

(a) the underlying layer on which the base is to be constructed complies with the requirements of the Specification for that layer; and

(b) the kerbing and channelling shall have been completed and approved by the Employer's Agent.

All cast in-situ mountable kerbing, channelling, vehicle entrances, transitions, etc, shall have been laid for a period of at least 72 hours before construction of the base course is commenced.

Where a nominal thickness exceeding 150 mm has been specified, the base shall be constructed in approximately equal layers not exceeding 150 mm each".

PSMF 5.4.2 Gravel

Delete Subclause (a) and replace with :

(a) "In the case of natural gravels: 98% of Mod. AASHTO density. In the case of graded crushed stone and graded crushed stone with fines: 84%, 86% or 88% of apparent density as specified or itemised in the Bill of Quantities."."

PSMF 5.4.4 Compaction

PSMF 5.4.4.2 Delete the subclause 5.4.4.2 and replace with:

"In the case of natural gravels compaction shall be to 98% of Modified AASHTO maximum density and in the case of graded crushed stone and graded crushed stone with fines to 86% density, or such other density as may be indicated in the Bill of Quantities."

Add new subclause:

PSMF 5.4.4.3 Thicknesses (New Subclause)

The thicknesses of the layers after compaction shall be the thicknesses shown on the drawings."

PSMF 5.9 TRANSPORT

PSMF 5.9.1 Freehaul

Add to the subclause:

"All haul from the designated borrow pit shall be regarded as freehaul."

PSMF 8 MEASUREMENT AND PAYMENT

PSMF 8.3 SCHEDULED ITEMS

PSMF 8.3.3 Construct Base with Material from Commercial Sources or Designated Borrow Areas

Replace the description of the item with the following:

"PSMF 8.3.3 Construct Base Course with Material from Commercial Sources and Compact to 86% of Apparent Density"

PSMF 8.3.5 Process Base Material by the Following Processes, as Relevant, and Use in Base

Add the following sub-item:

"(e) Process base material by chemical modification (applicable to item 8.3.1)..... Unit: m^3

The tendered rate shall include full compensation for the chemical modification as specified, including all labour, transport, etc. The modifying agent shall be paid for under item PSMF 8.3.8."

PSMF 8.3.8 Stabilizing Agent

Replace the description of the item with the following:

"PSMF 8.3.8 Road lime for modification ..... Unit: t"

PSMF 8.3.9 Overhaul

Delete the subclause as no payment will be made for overhaul.

C3.8 PARTICULAR SPECIFICATIONS

TABLE OF CONTENTS **Page**

C3.8.1 PVH: Gate RS Butterfly Check Air Valves C3.131

C3.8.2 PWA: Elevated Steel Tank C3.152

C3.8.3 PAA: Dayworks Schedule C3.156

C3.8.4 PT: Training C3.160

C3.8.5 PH: Fencing C3.165

C3.8.6 PE: The Employer's Pre-Construction Health and Safety Specification C3.171

C3.8.7 PZ: Employer's Environmental Management Specification for Environmental Management of Construction Projects C3.199

C3.8.8 PVC: Fusion-Bonded Medium Density Polyethylene Coating of Steel Pipes C3.228

C3.8.9 PVA: Cement Mortar Lining of Steel Pipes C3.233

C3.8.1 PARTICULAR SPECIFICATION: PVH – GATE RS BUTTERFLY CHECK AIR VALVES

TABLE OF CONTENTS ..... PAGE

PVH1 Scope C3.132
PVH2 Intepretations C3.132
PVH3 Materials, Workmanship and Construction C3.132
PVH4 Wedge Gate Valves (SANS 664 Part 1 & Part 2) C3.135
PVH5 Cast Steel Gate Valves (SANS 191) C3.136
PVH6 Resilient Seal Valves (RSV's) (SANS 664 Part 1 & Part 3) C3.137
PVH7 Check Valves (Flanged and Wafer Types) - PN Series (SANS 1551 Part 1) C3.140
PVH 8 Check Valves (Flanged and Wafer Types) - Class Series C3.140
PVH 9 Check Valves (Tilting Disc Type) C3.142
PVH 10 Butterfly Valves C3.143
PVH 12 Valve Actuators C3.149
PVH 13 Drawings C3.149
PVH 14 Inspection C3.149
PVH 15 Measurement and Payment C3.149

C3.8.1 PARTICULAR SPECIFICATION: PVH – GATE RS BUTTERFLY CHECK AIR VALVES

PVH 1 SCOPE

This specification covers the materials, manufacturing and testing requirements for wedge gate, resilient seal, check (reflux), butterfly and air valves for use in water and wastewater installations.

The supply, delivery, installation and field testing of valves is dealt with in PSL

PVH 2 INTERPRETATIONS

PVH 2.1 Supporting Specifications

The following form part of this specification:

(a) SANS 664-1: 2011 - Wedge Gate and Resilient Seal Valves for Waterworks: Part 1: General

(b) SANS 664-2: 2011 - Wedge Gate and Resilient Seal Valves for Waterworks: Part 2: Wedge Gate Valves

(c) SANS 664-3: 2011 - Wedge Gate and Resilient Seal Valves for Waterworks: Part 3: Resilient Seal Valves

(d) SANS 191: 2015 - Cast Steel Gate Valves

(e) SANS 1849: 2008 - Butterfly Valves for General Purposes

(f) SANS 1551-1: 2008 - Check Valves (flanged and wafer types): Part 1: PN Series (DN 40 to DN 600 with PN up to 2 500 kPa)

(g) SANS 1551-2: 2007 - Check Valves (flanged and wafer types): Part 2: Class Series (DN 40 to DN 600 with PN up to 4 200 kPa)

Where there is conflict, the requirements contained in this specification shall take precedence over the above-mentioned SANS specifications.

PVH 2.2 Abbreviations

EPDM	Ethylene Propylene Diene Monomer (M-class) rubber
DN	Nominal Diameter
PN	Nominal Pressure - pressure rating
NBR	Nitrile rubber
QCP	Quality Control Plan

PVH 3 Materials, Workmanship and Construction

PVH 3.1 General

The types, sizes, end connections, and pressure ratings of the valves required are as scheduled in the Bills of Quantities.

Unless specifically stated otherwise, all valves are to be suitable for use in terminal positions.

Technical Data Sheets are included in the Returnable Schedules section of the tender document to enable tenderers to provide specific details of the valves offered.

PVH 3.2 Quality Verification

The valve manufacturer shall have in place, and shall fully comply with, a certified SANS 9001 integrated quality system that is applicable to the valve design, manufacturing, testing, and coating and lining processes.

A QCP shall be prepared by the manufacturer well in advance of commencement of manufacture and submitted to the Engineer for his/her consideration and amendment as deemed necessary and shall thereafter be updated and adhered to by the manufacturer.

PVH 3.3 Corrosion Protection

PVH 3.3.1 General

All valves shall be coated externally and lined internally as specified hereunder.

Coating and lining materials shall be suitable for use on potable water systems. The cured materials shall be chemically unaffected by free chlorine or chloramine in water in concentrations up to 10 mg/ℓ and to ozone concentration up to 5 mg/ℓ in water and by fluids with a pH ranging from 4 to 10.

The coating and lining of valves shall be carried out at the factory prior to the dispatch of the valves.

Non-ferrous metal or stainless steel surfaces must not be painted.

PVH 3.3.2 Substrate Condition

All surfaces to be coated shall be free of all weld splatter, slag and loose scale.

PVH 3.3.3 Surface Preparation

All cast iron and steel surfaces of every valve shall be prepared for painting to a thoroughly clean condition, free of all grease and deleterious matter.

Surfaces shall be degreased by the use of a water-free solvent degreaser such as that complies with SANS 1344 or, for use in enclosed systems, with SANS 1365.

After complete removal of oil or grease contamination, the valve shall be thoroughly washed with clean potable water to remove all residues. The surface shall be water break free. The valve shall then be allowed to dry.

PVH 3.3.4 Blast Cleaning

Abrasive materials used for blast cleaning shall be free from oil or grease, as shall be the compressed air used in air blast cleaning.

Surfaces shall be blast cleaned by air blast cleaning methods, then vacuum cleaned or blown off to achieve a standard equal to Sa3 of Swedish Standard SIS 05 5900 when tested in accordance with SANS 5767.

The profile produced by blast cleaning shall be angular and shall have an average peak to valley height of 60 to 100 microns, when tested in accordance with SANS 5772. Hackles shall be removed with coarse abrasive paper.

Residual dust and debris shall not exceed 0,2% when tested in accordance with SANS 5769.

Water soluble salts shall not exceed 100 mg/m2 at any point when tested with the Weber-Reilly Reagent.

Any laminations revealed by blast cleaning shall be ground out and re-blasted. If grinding penetrates the body to a depth greater than 8% of the nominal wall thickness the valve shall be rejected.

PVH 3.3.5 Handling of Cleaned Valve

After cleaning, the surfaces shall not be contaminated in any way. Operators shall wear clean gloves and all surfaces in contact with the valve surface shall be clean and free from oil, grease, grit, dirt and other contamination.

PVH 3.3.6 Coating and Lining Materials

The materials shall comply with SANS 217 - 2015 Type 1A for solvent borne chemically cured epoxies.

A total minimum dry film thickness of 250 µm that is to be pinhole free over the entire painted surface shall be achieved.

Coating and lining repairs shall be carried out using repair systems that comply with the specified performance requirements and shall be compatible with the coating and lining materials. The Contractor shall submit proof to the Engineer from the suppliers of the lining and coating suppliers to this effect.

The mating face of flanges shall be masked and left uncoated. All runs or drips of epoxy shall be removed from the mating faces of the flanges and the flange profiling shall be clearly visible over the entire flange face.

The mating face shall receive one coat of an approved polymer based, waterborne rust inhibitor.

Care shall be exercised to ensure that after application of all coatings there are no runs or drips and that the flange profiling is clearly visible over the entire flange face.

Excessive coating build up in flange bolt holes that could snag bolts will not be permitted.

PVH 3.3.7 Valve Seating Areas

In the case of valves with resilient seals, attention shall be given to the thickness and integrity of the coating in the areas where the gate is to operate.

PVH 3.3.8 Inspection

Low voltage, wet sponge detection of pinholes is to be conducted on all coated surfaces of the valves. There shall be no defects in the coatings and linings when tested in accordance with ASTM D5162. The finished coating to be smooth and glossy, free from pinholes, excessive runs, sags, “orange peel” finish, occlusions and other visible defects.

PVH 3.4 Local Content

The Department of Trade and Industry has, in terms of Regulation 9 (2) of the Procurement Regulations 2011, stipulated the *"minimum threshold for valves products and actuators for local production and content"* the details of which are set out in the National Treasury instruction that became effective from 3 March 2014. These requirements must be complied with.

PVH 4 WEDGE GATE VALVES (SANS 664 Part 1 & Part 2)

With reference to Annex A.1 to SANS 664-1: 2011 - Wedge Gate and Resilient Seal Valves for Waterworks: Part 1: General:

(a) The sizes, pressure ratings end connections, and other specific details of the valves required are as scheduled in the Bills of Quantities.

(b) The method(s) of operation of the valves shall be as stated in Table A below.

(c) The direction of turning the spindle to close the valve shall be as shown in Table A below.

(d) The valves shall be provided with a means for repacking the gland whilst the valve is under pressure.

(e) The flange details are given in Table A below.

(f) Flanges are to be either flat faced or raised face as shown in Table A below. The backs of each flange shall be spot faced over areas large enough to accommodate every washer and nut.

(g) All flanges are to be drilled with the holes off horizontal and vertical centrelines.

(h) Hexagon-head bolts shall comply with the requirements of SANS 1700-5-1.

(i) All valves shall be double flanged unless otherwise scheduled in the Bills of Quantities.

(j) Unless stated in Table A below, no position indicators are required.

(k) Unless stated in Table A below, no identification plates are required.

(l) Test certificates are required and shall be submitted to the Engineer.

(m) The Employer reserves the right to arrange for inspections and/or witnessing of the manufacture and/or testing and/or coating and lining of the valves. Full details shall be prescribed in the QCP - refer PVH 3.2 above.

(n) The body ends of the valves need not be sealed.

(o) Unless otherwise stated in Table A below, the coating system specified in PVH 3.3 above is applicable.

With reference to Annex A.2 to SANS 664-1: 2011 - Wedge Gate and Resilient Seal Valves for Waterworks: Part 1: General:

The requirements shall be agreed and documented in a QCP - refer PVH 3.2 above.

With reference to Annex A to SANS 664-2: 2011 - Wedge Gate and Resilient Seal Valves for Waterworks: Part 2: Wedge Gate Valves:

(a) The type of trim shall be 'Type 3 - Standard' as shown in Table 1 - Trim Materials.

(b) Trim rings shall be pinned into the body. Trim rings secured by pressing are not permitted. Bonding liquids are not acceptable as the primary means of securing trim rings.

(c) Working pressures of valves are not normally given as they may vary significantly.

(d) Shoes and channel guides of non-corrosive material, namely bronze, are required for valves:

- DN 150 or larger with differential pressures of 500 kPa or higher,
- Installed where the valve is at an angle to the vertical,
- Whenever gearing or an actuator is installed.

(e) Seat leakages in accordance with Table 2 are permissible.

PHV 4.1 Testing

Notwithstanding the requirements of SANS 664-1: 2011, the test pressure requirements are as follows:

All wedge gate valves DN 300 and larger shall be subjected to:

(a) An open end gate strength test of 1,5 times the 'Pressure Rating' of the valve on both sides of the gate. Drop tightness (gate leakage) in respect of this gate strength test is not required but shall comply with the requirements of SANS 664.

(b) A body test of 2,0 times the 'Pressure Rating' of the valve.

Table A - Wedge Gate Valves

SANS 664-1		PN 10	PN16	PN25	PN40
Annex A.1 b)	Operation	Valve cap (only in open space) / Valve handwheel in chamber	Valve cap (only in open space) / Valve handwheel in chamber	Valve cap (only in open space) / Valve handwheel in chamber	Valve cap (only in open space) / Valve handwheel in chamber
Annex A.1 c)	Direction of closing	Clockwise	Clockwise	Clockwise	Clockwise
Annex A.1 e)	Flanges	SANS 1123: Table 1000	SANS 1123: Table 1600	SANS 1123: Table 2500	SANS 1123: Table 4000
Annex A.1 f)	Flange faces	Raised face	Raised face	Raised face	Raised face
Annex A.1 j)	Position indicator	Required	Required	Required	Required
Annex A.1 k)	Identification plates	Required	Required	Required	Required

PVH 5 CAST STEEL GATE VALVES (SANS 191)

With reference to Annex A to SANS 191:2015 - Cast Steel Gate Valves:

(a) The sizes, pressure ratings end connections, and other specific details of the valves required are as scheduled in the Bills of Quantities.

(b) The direction of turning the spindle to close the valve shall be as shown in Table B below.

(c) The valves shall be equipped with hand wheels unless stated otherwise in the Table B below.

(d) The sizes of the valves are as scheduled in the Bills of Quantities.

(e) The design of the guides of all valves, irrespective of size, shall be such that the valves can be installed in any position.

(f) The quality and strength of the cast steel shall be suitable for purpose. Spindles shall be of stainless steel. Seats shall be gunmetal.

(g) All valves shall be double flanged. Flanges shall be as shown in Table B below.

(h) The backs of each flange shall be spot faced over areas large enough to accommodate every washer and nut. All flanges are to be drilled with the holes off horizontal and vertical centrelines.

PHV 5.1 Testing

Notwithstanding the requirements of SANS 191:2015, the test pressure requirements are as follows:

All cast steel gate valves DN 300 and larger shall be subjected to:

(a) An open end gate strength test of 1,5 times the 'Pressure Rating' of the valve on both sides of the gate. Drop tightness in respect of this gate strength test is not required but shall comply with the requirements of SANS 191.

(b) A body test of 2, 0 times the 'Pressure Rating' of the valve.

Table B - Cast Steel Gate Valves

SANS 191		PN25	PN40
Annex A b)	Direction of closing	Clockwise	Clockwise
Annex A c)	Operation	Valve cap (only in open space) / Valve handwheel in chamber	Valve cap (only in open space) / Valve handwheel in chamber
Annex A g)	Flanges	SANS 1123: Table 2500	SANS: 1123 Table 4000
Annex A g)	Flange faces	Raised face	Raised face

PVH 6 RESILIENT SEAL VALVES (RSV's) (SANS 664 Part 1 & Part 3)

With reference to Annex A to SANS 664-3:2011 - Resilient Seal Valves:

(a) The medium passing though the valves will be that shown in Table C below.
(b) The gate shall be fully encapsulated with EPDM or NBR rubber.

In addition to the relevant requirements of SANS 664, RSV's shall have the following minimum requirements:

- The valves shall be PN25 with non-rising spindles.
- The body, bonnet and gate shall be manufactured from spheroidal graphite or ductile iron.
- The spindle shall be manufactured from Grade 304 stainless steel or EN57 steel.
- All valves shall be double flanged. Flange details are given in Table C below.
- The backs of each flange shall be spot faced over areas large enough to accommodate every washer and nut. All flanges are to be drilled with the holes off horizontal and vertical centrelines.
- The face to face dimensions of flanged valves shall be in accordance with SANS 664-1: 2011 Table 1, Column 2, and short pattern.
- The direction of turning the spindle to close the valve shall be as shown in Table C below.
- The spindle seal shall comprise multiple O-rings incorporated in the valve bonnet.
- Unless otherwise stated in Table C below, the coating system specified in PVH 3.3 above is applicable.

The use of studs and Allen-type screws to fasten the bonnet will be acceptable subject to the following:

- All bolts shall be of stainless steel or hot dip galvanised, and shall be suitable for operation with a normal hexagonal “Allen Key”.
- The bolting system shall be counter sunk, and the bolt cavities shall be filled and covered with a waterproof wax resin or an approved equivalent in order to prevent the ingress of dirt.
- The bonnet gasket shall prevent leakage or seepage and must withstand the body test pressure of the valve.
- Gates must be capable of being replaced without removing the valve body from the installation.

PHV 6.1 Testing

Notwithstanding the requirements of SANS 664-3:2011, the test pressure requirements are as follows:

All resilient seal gate valves DN 300 and larger shall be subjected to:

(a) Open end gate strength tests of 1, 5 times the 'Pressure Rating' of the valve on both sides of the gate. Drop tightness in respect of this gate strength test is not required but shall comply with the requirements of SANS 664.

(b) A body test of 2,0 times the 'Pressure Rating' of the valve.

Table C - Resilient Seal Valves

SANS 664-3		PN16	Note:
Annex A a)	Medium to pass through the valve	Potable water	The specification states that ALL RSV valves shall be PN 25 - if there is a need to change this additional columns should be added
Direction of closing		Clockwise	
Flanges		SANS 1123: Table 2500	
Flange faces		Raised face	
Operation		Valve cap (only in open space) / Valve handwheel in chamber	

PVH 7 CHECK VALVES (FLANGED AND WAFER TYPES) - PN SERIES (SANS 1551 Part 1)

With reference to Annex A.1 to SANS 1551-1: 2008 - Check Valves (Flanged and Wafer Type):

(a) The rating of the valves shall be as scheduled in the Bills of Quantities.

(b) Door return springs are not permitted.

(c) Unless otherwise stated in Table D below, the coating system specified in PVH 3.3 above is applicable.

(d) The sizes of the valves are as scheduled in the Bills of Quantities.

(e) Valves with a nominal bore greater than 600 mm must be of the double door or multi-door type and, if so shown in Table D below, shall be fitted with an integral valved bypass. In other respects they must be in accordance with the specifications for the single door type. A suitable arrow indicating the flow direction through the valve shall be cast onto the body of the valve.

(f) All valve flanges shall have bolt holes unless otherwise indicated in Table D below.

(g) All valves shall be double flanged. Flange details are given in Table D below. The backs of each flange shall be spot faced over areas large enough to accommodate every washer and nut. All flanges are to be drilled with the holes off horizontal and vertical centrelines.

(h) Unless stated in Table D below, no identification plates are required.

With reference to Annex A.2 to SANS 1551-1: 2008 - Check Valves (Flanged and Wafer Type):

(a) None of the valves will be used at temperatures that exceed 120°C.

(b) The materials shall be suitable for purpose and shall be agreed and documented in a QCP which is to be approved by the Engineer before manufacture commences.

(c) The valve trim materials shall be suitable for purpose and shall be agreed and documented in the QCP - refer PVH 3.2 above.

(d) Door seat rings shall be fixed with non-corrosive fixing screws.

(e) The maximum permissible leakage rate shall be as stated in column 2 of Table 1 and Table 2 for metal seated and resilient seated valves respectively.

(f) No defects are acceptable unless accepted in writing by the Engineer or the Engineer's inspector, who is duly authorised in writing to approve defects and the method of repair.

(g) Unless otherwise stated in Table D below, the coating system specified in PVH 3.3 above is applicable.

(h) The face-to-face dimensions shall be suitable for the proposed installation and shall be agreed and documented in the QCP, which is to be approved by the Engineer before manufacture commences - refer PVH 3.2 above.

(i) The dimensions "A" and “E" are to be agreed and recorded in a QCP prior to commencement of manufacture of the valves.

(j) Unless otherwise stated in Table D below, no additional features are required.

(k) All flanged check valves shall have an access cover.

(l) Unless otherwise stated in Table D below, bolt holes shall be drilled and not tapped.

(m) None of the valves will be used at temperatures exceeding 50 ºC.

(n) Unless stated in Table D below, no identification plates are required.

(o) The symbols shown in 7.2.2 are to be used.

PHV 7.1Testing

Notwithstanding the requirements of SANS 1551-1:2008, the test pressure requirements are as follows:

All PN Series check valves DN 300 and larger shall be subjected to:

(a) An open end gate strength test of 1,5 times the 'Pressure Rating' of the valve on both sides of the gate. Drop tightness in respect of this gate strength test is not required but shall comply with the requirements of SANS 1551.

(b) A body test of 2,0 times the 'Pressure Rating' of the valve.

Table D - Check Valves - PN Series

SANS 1551-1		PN10	PN16	PN25
Annex A.1 e)	Bypass	Integral DN 150 valved bypass	Integral DN 150 valved bypass	Integral DN 150 valved bypass
Annex A.1 e)	Additional features	Extension arm and counterweight	Extension arm and counterweight	Extension arm and counterweight
Annex A.1 f)	Bolt holes	No bolt holes	No bolt holes	No bolt holes
Annex A.1 g)	Flanges	SANS 1123: Table 1000	SANS 1123: Table 1600	SANS 1123: Table 2500
Annex A.1 g)	Flange faces	Raised face	Raised face	Raised face
Annex A.1 h)	Identification plates	Required	Required	Required
Annex A.2 j)	Additional features	Extension arm and counterweight left side when viewed in direction of flow	Extension arm and counterweight left side when viewed in direction of flow	Extension arm and counterweight left side when viewed in direction of flow
Annex A.2 j)	Additional features	Integral DN 150 valved bypass	Integral DN 150 valved bypass	Integral DN 150 valved bypass
Annex A.2 l)	Bolt holes	Drilled	Drilled	Drilled
Annex A.2 n)	Identification plates	Required	Required	Required

PVH 8 CHECK VALVES (FLANGED AND WAFER TYPES) - CLASS SERIES

With reference to Annex A.1 to SANS 1551-2:2007 - Check Valves:

(a) The rating of the valves shall be as scheduled in the Bills of Quantities.

(b) Door return springs are not permitted.

(c) Unless otherwise stated in Table E below, the coating system specified in PVH 3.3 above is applicable.

(d) The sizes of the valves are as scheduled in the Bills of Quantities.

(e) Valves with a nominal bore greater than 600 mm must be of the double door or multi-door type and if so shown in Table E below, shall be fitted with an integral, valved bypass. In other respects they must be in accordance with the specifications for the single door type. A suitable arrow indicating the flow direction through the valve shall be cast onto the body of the valve.

(f) All valve flanges shall have bolt holes unless otherwise indicated in Table E below.

(g) All flanged valves shall be double flanged. Flange details are given in Table E below. The backs of each flange shall be spot faced over areas large enough to accommodate every washer and nut. All flanges are to be drilled with the holes off horizontal and vertical centrelines.

(h) Unless otherwise stated in Table E below, no identification plates are required.

With reference to Annex A.2 to SANS 1551-2: 2007 - Check Valves:

(a) The body and door materials shall be suitable for purpose and shall be agreed and documented in a QCP - refer PVH 3.2 above.

(b) Valve trim materials shall be suitable for purpose and shall be agreed and documented in a QCP - refer PVH 3.2 above.

(c) Door seat rings shall be fixed with non-corrosive fixing screws.

(d) The maximum permissible leakage rate shall be as stated in column 2 of Table 1 and Table 2 for metal seated and resilient seated valves respectively.

(e) No defects are acceptable unless accepted in writing by the Engineer or the Engineer's inspector who is duly authorised in writing to approve defects and the method of repair of those defects.

(f) Flange faces shall be fully machined and, unless otherwise stated in Table E below, "O" ring joint faces are not required

(g) Unless stated in Table E below, the finish of the gasket contact surface shall be as described in 4.4.3.

(h) Unless otherwise stated in the Table E below, the coating system specified in PVH 3.3 above is applicable.

(i) The dimensions "A" and "E" shall be agreed and recorded in a QCP prior to commencement of manufacture of the valves.

(j) Unless otherwise stated in Table E below, no additional features are required

(k) All flanged valves shall have an access cover.

(l)

(m) The finish of the flange face shall be as agreed and recorded in a QCP prior to commencement of manufacture of the valves - refer PVH 3.2 above.

(n) Unless otherwise stated in Table E below, bolt holes shall be drilled and not tapped.

(o) None of the valves will be used at temperatures exceeding 50 ^{0}C.

(p) Unless stated in the Table E below, no identification plates are required.

(q) The symbols shown in 7.2.2 are to be used.

PHV 8.1 Testing

Notwithstanding the requirements of SANS 1551-2:2007, the test pressure requirements are as follows:

All Class Series check valves DN 300 and larger shall be subjected to:

(a) An open end gate strength test of 1,5 times the 'Pressure Rating' of the valve on both sides of the gate. Drop tightness in respect of this gate strength test is not required but shall comply with the requirements of SANS 1551.

(b) A body test of 2,0 times the 'Pressure Rating' of the valve.

Table E - Check Valves - Class Series

SANS 1551-2		Class 600	Class 900	Class 1500	Class 2500
Annex A1 e)	Bypass	Integral DN 150 valved bypass	Integral DN 150 valved bypass	Integral DN 150 valved bypass	Integral DN 150 valved bypass
Annex A.1 f)	Bolt holes	No bolt holes	No bolt holes	No bolt holes	No bolt holes
Annex A.1 g)	Flanges	SANS 1123: Table 1000	SANS 1123: Table 1600	SANS 1123: Table 2500	SANS 1123: Table 4000
Annex A.1 g)	Flange faces	Raised face	Raised face	Raised face	Raised face
Annex A.1 h)	Identification plates	Required	Required	Required	Required
Annex A.2 f)	Joint face	"O" ring required	"O" ring required	"O" ring required	"O" ring required
Annex A.1 j)	Additional features	Extension arm and counterweight. left side when viewed in direction of flow	Extension arm and counterweight. left side when viewed in direction of flow	Extension arm and counterweight. left side when viewed in direction of flow	Extension arm and counterweight. left side when viewed in direction of flow of flow
Annex A.2 m)	Bolt holes	Drilled	Drilled	Drilled	Drilled
Annex A.2 o)	Identification plates	Required	Required	Required	Required

PVH 9 CHECK VALVES (TILTING DISC TYPE)

(a) The sizes and ratings of the valves shall be as scheduled in the Bills of Quantities.

(b) Door return springs are not permitted.

(c) The tilting disc shall be hinged off-centre with the shaft located in a long bush at each end and with a small amount of lateral clearance to enable the disc and body to align and seal on closure.

(d) The valve shall have an external lever arm with an adjustable counterweight - the lever arm shall be on the side of the valve stated in Table F below when viewed in the direction of flow.

(e) The face-to-face dimensions shall be suitable for the proposed installation and shall be agreed and documented in the QCP - refer PVH 3.2 above.

(f) All valves shall be double flanged. Flange details are given in Table F below. The backs of each flange shall be spot faced over areas large enough to accommodate every washer and nut. All flanges are to be drilled with the holes off horizontal and vertical centrelines.

(g) The valve trim materials shall be stainless steel with the seat ring welded in and with a fine machined conical seat face.

(h) The disc shall have an aerofoil shape that is convex toward the pressure side and shall have a fine machined conical seat face.

(i) Notwithstanding the foregoing, all materials shall be suitable for purpose and shall be agreed and documented in a QCP - refer PVH 3.2 above.

(j) Unless otherwise stated in Table F below, the coating system specified in PVH 3.3 above is applicable.

(k) No defects are acceptable unless accepted in writing by the Engineer or the Engineer's inspector, who is duly authorised in writing to approve defects and the method of repair.

(l) Unless otherwise stated in Table F below, no additional features are required.

(m) Unless stated in Table F below, no identification plates are required.

Table F - Check Valves - Tilting Disc Type

		PN10	PN16	PN25	PN40
d)	Position of extension arm and counterweight	Left hand side when viewed in the direction of flow	Left hand side when viewed in the direction of flow	Left hand side when viewed in the direction of flow	Left hand side when viewed in the direction of flow
f)	Flanges	SANS 1123: Table 1000	SANS 1123: Table 1600	SANS 1123: Table 2500	SANS 1123: Table 2500
f)	Flange faces	Raised face	Raised face	Raised face	Raised face
l)	Additional feature	None	None	None	None
m)	Identification plates	Required	Required	Required	Required

PVH 10 BUTTERFLY VALVES

With reference to Annex A.1 to SANS 1849:2008 - Butterfly Valves:

(a) The types of valves required are as scheduled in the Bills of Quantities.

(b) The nominal sizes (DN) of the valves are as shown in the Bill of Quantities and on the Technical Data Sheets.

(c) The nominal pressures (PN) of the valves are as scheduled in the Bills of Quantities.

(d) None of the valves will operate at a temperature above 50 ºC.

(e) Flange details are given in Table G below. The backs of each flange shall be spot faced over areas large enough to accommodate every washer and nut. All flanges are to be drilled with the holes off horizontal and vertical centrelines.

(f) The face to face dimension of the valves shall be in accordance with Table 5 unless as agreed and recorded in a QCP - refer PVH 3.2 above.

(g) The service application shall be "tight shut-off" as per 4.6.1 a).

Wafer lugged valves shall have drilled though holes unless otherwise stated in Table F below.

(a) Tapping connections shall be in the side of the valve opposite to the operator end of the shaft.

(b) Support feet shall be provided for valves greater than DN 400.

(c) The service differential pressure shall be the 'Nominal Pressure PN' of the valve.

(d) The operating devices shall be as stated in the Table G below.

(e) The direction of turning the spindle to close the valve shall be as shown in Table F below.

(f) Details of the actuators required, if any, are given in PVN Valve Actuators.

(g) The locking mechanism is not required to provide for an intermediate position.

(h) The valve body and disc materials shall be ductile iron unless otherwise agreed and recorded in a QCP prior to commencement of manufacture of the valves.

(i) The leakage rate for low leakage valves shall be rate D.

(j) Valves will not be used for regulating purposes.

(k) A test certificate is required for every valve.

(l) Unless otherwise stated in Table G below, the coating system specified in PVH 3.3 above is applicable.

(m) All valves shall have their jointing surfaces protected during transit and storage.

(n) All valves shall have their body ends sealed to exclude foreign matter during transit and storage.

(o) Each valve shall have a manufacturer's certificate.

With reference to Annex A.2 to SANS 1849:2008 - Butterfly Valves:

(a) This specification does not deal with "other types of valves, shouldered, socketed, etc."

(b) The design and function of position indicators shall be as agreed and recorded in a QCP - refer PVH 3.2 above.

(c) The maximum allowable leakage rate shall be agreed and recorded in a QCP prior to commencement of manufacture of the valves.

In addition to the requirements of SANS 1849:2008, all valves shall comply with the following minimum requirements:

(a) Valves shall be double flanged and be suitable for installation in terminal positions.

(b) Valves shall be of the “tight shut off type” and the water seals shall be of the resilient seal type.

(c) All stainless steel components shall be Grade 316 stainless steel unless the design of the valve warrants a higher strength, high chrome steel.

(d) Hubs for shaft bearing housings shall form an integral part of the valve body.

(e) Valves bodies shall have adjustable mechanical stops to prevent over travel of the valve disc in the open or closed position.

(f) Valves shall have the configurations shown in the Table below:

Nominal Pressure	**PN 10 & PN 16**	**PN 25**	**PN 40**	**> PN 40**
Seal	EPDM or Nitrile - see g) below	EPDM or Nitrile - see h) below	EPDM or Nitrile - see h) below	Metal - see i) below
Eccentricity		Double eccentric	Double eccentric	Triple eccentric

(g) For PN 10 and PN 16 valves, the resilient, synthetic rubber EPDM or Nitrile seal shall preferably be easily replaceable (not bonded), and shall entirely cover the inside of the body overlapping over the sides to form the seal between the body and matching pipework. The liner shall be keyed to the body with annular groves in the bore of the valve to minimise distortion of the material. However, a fully bonded seal is acceptable, in which case, the seal should be bonded onto a phenolic backing ring to facilitate replacement of the seal. In the event that the valves that are offered are fully bonded without a backing ring, the valve manufacturer will be required to guarantee that they are able to re-line their valves in RSA.

(h) For PN 25 and PN 40 valves, the resilient, synthetic rubber EPDM or Nitrile seal shall be fixed to the disc with Grade 316 stainless steel retaining rings protected against galvanic corrosion in accordance with PVH 3.3 above. The recess for the retaining ring in the blade or body shall be coated as specified or the seal face shall be assembled with a coat of wet solvent free epoxy having been applied. Seal retaining screws shall not be recessed but have a hexagonal or Allen key bolt head and spring washer underneath to ensure that water seepage does not occur into the screw area. The seal assembly should be done with the use of “Anti-seize” to ensure ease of removal and further prevent water seepage and corrosion.

(i) For valves with a PN > 40, the disc seal and seat shall be stainless steel and, as they need to be carefully matched the manufacturer shall supply a complete spare set including fixings and the costs shall be included in the tendered rate quoted for the valve. Furthermore, the valve manufacturer will be required to confirm that a facility to recondition the valve exists in RSA.

(j) The design shall be such as to allow the disc to seal drop-tight to the liner, so that there is no ingress of fluid to the shaft area.

(k) The seat shall be sufficiently wide to permit at least 10 mm “lead” distance on each side for the resilient seal.

(l) The resilient seal shall be “non-stick” and shall be stable and not deteriorate under conditions of continuous submersion in chlorinated potable water.

(m) The valve seal and seat shall be replaceable without dismantling the valve - not applicable to PN 10 and PN 16 valves that may have bonded seals.

(n) Discs shall be a single casting of a hydrofoil section with a smooth continuous surface. The maximum combined stresses in the disc shall not exceed 20% of the minimum yield stress of the material used when the specified unbalanced pressure is applied on either of the two sides.

(o) Shafts may either be continuous or of a stub-shaft configuration. In the case of stub shafts, they must extend into the disc hub for a distance of at least 1,5 times the diameter of the shaft and they shall not protrude from the hubs i.e. the shaft shall not be exposed.

(p) Shafts may be either round or hexagonal in cross section. The disc shall be attached to the shaft by means of a 'square drive' or spline or key. No allowance shall be made on dowel pins or taper pins to transmit torque. The connection of the disc to the shaft shall be capable of transmitting a shaft torque equivalent to at least 75% of the design torsional strength of the shaft. Dowel and taper pins that may be required to prevent lateral movement shall be mechanically secured.

(q) Shafts shall be fabricated from high strength, high grade, stainless steel and be located in self lubricating sleeve type bearings/bushes. Each valve shall be fitted with at least one adjustable thrust bearing set to hold the disc securely concentric with the body or seat.

(r) Shafts shall be located inside the disc and not be in contact with the water.

(s) Shaft sealing shall be achieved with two replaceable O-rings at each end of the shaft and, where applicable, the rubber lining is to be moulded along the stem.

(t) Each valve shall be equipped with an operating lever, or a gearbox with a handwheel, or an actuator as stated in Table G below.

(u) Each valve shall be so protected as to minimize the possibility of damage during transit and storage. All valves shall be individually crated.

(v) The valves will be installed with their shafts horizontal and the valve operating spindle, vertical. The direction of opening shall be such that the bottom of the disc moves in a downstream direction. The 'handing' of the valves shall be as shown in Table G below.

PHV 10.1 Testing

Notwithstanding the requirements of SANS 1849:2008, the test pressure requirements are as follows:

(a) All valves shall be subjected to an open end gate strength test of 1,5 times the 'Pressure Rating' of the valve on both sides of the gate. Drop tightness in respect of this gate strength test is not required but shall comply with the requirements of SANS 1849.

(b) All valves shall be subject to a body test of 2,0 times the 'Pressure Rating' of the valve.

PVH 10.2 GEARBOXES (For Butterfly Valves)

Where required and/or where specified, all gearboxes on butterfly valves shall comply with the following:

(a) Gearboxes shall be side mounted and of the spur/worm type capable of being manually operated, by one person under the maximum unbalanced working pressure whilst applying a torque of no more than 120 Nm.

(b) Shear pins shall be fitted to gearboxes in order to provide overload protection.

(c) Water must not be able to leak past the main shaft and enter the actuator.

(d) Disc position indicators shall be fitted to the gearbox and shall clearly indicate the fully open and closed positions.

(e) A suitable arrow indicating the preferred flow direction through the valve, where such preference is applicable, shall be cast onto the body of the valve and, where applicable, the inappropriate arrow ground off.

(f) The gearbox shall be fitted to the right hand side or left hand side of the valve when viewed from the upstream side as stated in Table F below.

(g) The handwheel shall be of appropriate size and the direction of rotation of the operating hand wheel to close the valve shall be as stated in Table F below.

(h) Gearboxes shall be coated in accordance with the coating specification for its associated valve.

Table G - Butterfly Valves

SANS 1849		PN10	PN16	PN25	PN40
Annex A.1 e)	Flanges	SANS 1123: Table 1000	SANS 1123: Table 1600	SANS 1123: Table 2500	SANS 1123: Table 4000
Annex A.1 e)	Flange faces	Raised face	Raised face	Raised face	Raised face
Annex A.1 h)	Holes in wafer valves	Drilled	Drilled	Drilled	Drilled
Annex A.1 l)	Operating device	Lever / hand wheel	Lever / hand wheel	Lever / hand wheel	Lever / hand wheel
PVH 9 f)	Location of gearbox	Left hand side when viewed in the direction of flow	Left hand side when viewed in the direction of flow	Left hand side when viewed in the direction of flow	Left hand side when viewed in the direction of flow
PVH 9 g)	Direction of closing	clockwise	clockwise	clockwise	clockwise

PVH 11 AIR VALVES

PVH 11.1 Design and Performance

The design and performance characteristics of the air valves must have been tested and approved by the Council for Scientific and Industrial Research (CSIR) or other similar testing authority.

Valves shall be capable of discharging high volumes of air through the large orifice under positive line pressure filling conditions and shall be capable of letting in high volumes of air under negative pressure conditions. In addition, the valve shall be capable of releasing small quantities of dis-entrained air at all line pressures up to the rated working pressure of the valve.

Air valves shall not exhibit the characteristics of dynamic closure in both the exhaust and vacuum mode. The valves shall be dual acting and suitably sized to enable the following without creating shock or pressure surges in the pipeline:

- Unrestricted intake of air under negative (sub atmospheric) pressure
- Unrestricted discharge of air under pressurised air pressure conditions and,
- Slow discharge of air that may come out of solution when the space beneath the air valve is full of water under pressure

The primary intake/discharge orifice shall be equivalent in cross-sectional area to the nominal diameter of the air valve. The discharge/intake port shall be protected by a non corrosive screen or shield that shall not impair the discharge characteristics of the valve.

Discharge of pressurised air shall be controlled by the seating and unseating of a small orifice nozzle which shall only open in the presence of air and shall not leak under normal operating conditions.

The valve construction shall be proportioned with regard to the inherent material strengths such that excessive deformation or damage of any kind or leaks do not occur when the air valve is subjected to twice its rated pressure.

Valves shall react immediately to negative pipeline pressure in order to prevent the formation of unacceptably high negative pressure conditions.

During air discharge conditions, the large orifice shall close at a differential pressure across the large orifice of between 4 and 6 kPa in order to minimize transient pressure effects. The design shall enable air to continue to be released once the large orifice has closed under such conditions. This may be achieved by means of a secondary orifice or other approved manner. A slow closing characteristic is an important feature so as to sudden rate of change of velocity which will result in a pressure spine and concomitant surges in the pipeline

The valve shall seal drop tight, without the use of a mechanical spring device, at all line pressures from 10 kPa up to 1,5 times the rated working pressure of the valve.

The valve floats and seals shall require minimal maintenance and it shall be possible to carry out such maintenance without removing the valve.

Provision shall be made for the installation of a 6 mm stainless nipple and ball valve for the fitting of pressure gauges for testing purposes. The stainless steel nipple shall extend through the body to cover all the threads.

Unless otherwise stated in Table G below, all ferrous components shall be treated as specified in PVH 3.3 above.

All stainless steel components shall be painted with “Everbond” or similar material applied in accordance with the manufacturer's instructions, the purpose of which is to disguise the stainless steel to minimise the risk of theft.

All air valves shall be supplied with a copy of the relevant factory test certificates that reflect the test pressure and valve serial number. Original factory test certificates together with a copy of the QCP referred to in PVH 3.2 above, shall be issued for each valve.

Flange details are given in Table G below. The backs of each flange shall be spot faced over areas large enough to accommodate every washer and nut. All flanges are to be drilled with the holes off horizontal and vertical centrelines.

PVH 11.2 Testing

Each valve shall be tested at the factory as follows:

(a) Body Test: The valve shall be filled with water and a pressure equivalent to twice the 'Pressure Rating' shall be applied for at least 5 minutes. There shall be no visible signs of leakage during the test.

(b) Low Head Leak Test: The pressure shall be reduced to 50 kPa and maintained for at least 5 minutes. There shall be no loss of water from the valve during the test. Steadily lower the pressure further to ascertain at what pressure seepage begins and record that pressure.

(c) Drop Test: One valve taken at random from each batch of ten small orifice and double orifice air valves (or less) shall be subjected to a “drop test”. The valve shall be filled with water and pressurised to above the working pressure and isolated from the test rig by closure of an isolating valve. A chamber in the test rig immediately prior to the isolating valve must be filled with compressed air at a pressure equal to that being maintained in the air release valve. The isolating valve is then opened so as to allow the air to rise in the air release valve without the pressure dropping lower than 2 - 3 bar above rated working pressure of the air release valve. The “Drop Test” is then carried out by slowly bleeding off the pressure through a suitable cock until the float drops away from the orifice to allow discharge. Failure of the air release valve to function in the manner described will be reason for rejection.

Table G - Air Valves

	PN10	**PN16**	**PN25**	**PN40**
Flanges	SANS 1123: Table 1000	SANS 1123: Table 1600	SANS 1123: Table 2500	SANS 1123: Table 4000
Flange faces	Raised face	Raised face	Raised face	Raised face

PVH 12 VALVE ACTUATORS

Valve actuators, if scheduled, shall comply with the requirements of Particular Specification PVK and shall be manually operated or power operated as scheduled in the Bills of Quantities.

PVH 13 DRAWINGS

The valve manufacturer shall provide fully dimensioned drawings for each type and size of valve and actuator. Drawings must be provided in .pdf and in a CAD format as required by the Engineer.

PVH 14 INSPECTION

An inspector may be appointed by the Employer to witness the hydraulic and other testing of valves and/or to inspect valves prior to their release for delivery to site. Where an independent inspector is appointed, the test and/or inspection certificates must be signed by the supplier and the inspector.

The following procedure shall be employed for the inspection of all valves:

(a) All valves will be subject to inspection at their place of manufacture or assembly or, where not manufactured or assembled locally, at the valve supplier.

(b) Inspection may be carried out by the Engineer or a third party appointed by or on behalf of the Employer.

(c) Where valves are provided with corrosion protective coatings, provision must be made for the prepared surfaces to be inspected by the Engineer or his representative prior to the application of any coatings or linings.

(d) Provision must be made for all valves to be subjected to inspection and testing following application of corrosion protection coatings and prior to release from the factory for delivery to site.

(e) Tests on the coatings and linings may include visual inspection, dry film tests and wet sponge “holiday” detection tests at the Engineer's discretion.

PVH 15 MEASUREMENT AND PAYMENT

The method of measurement and payment for valves is dealt with in PSL.

TECHNICAL DATA SHEET No 1

B of Q Item Number						
Description	**Specified**	**Offered**	**Specified**	**Offered**	**Specified**	**Offered**
Type of Valve						
DN - Nominal Diameter (mm)						
Number Required (No)	Refer B of Q		Refer B of Q		Refer B of Q	
Medium (potable water)						
Pressure Class (PN 10, PN 16, PN 25, PN 40)						
End Connections						
Manufacturer						
Place of manufacture						
Factory Body Test Pressure (kPa)						
Factory Gate Test (kPa)						
Max. Unbalanced Working Pressure (kPa)						
Min. Working Pressure (kPa)						
Max. Field Test Pressure (kPa)						
DN ..... Bypass Required	(yes or no)		(yes or no)		(yes or no)	
Shaft configuration - full length / stubs / cross section 9round or hexagonal) (2)						
PN 10 and PN 16 valves - Seal material & method of fixing to body - replaceable / fully bonded / phenolic backing ring (2)						
PN 25 & PN 40 valves - seal material (2)						
Valves > PN 40 - Name of the facility in RSA that can recondition the valves (2)						
Method of Operation						
Side of Valve that the gearbox is to be located (when view from upstream side of valve) (2)						
Extension arm and counterweight (3)						

B of Q Item Number						
Description	**Specified**	**Offered**	**Specified**	**Offered**	**Specified**	**Offered**
Should any aspect of a valve being offered not comply fully with the specification, details thereof must be stated here. Should there be insufficient space, details may be given on a separate sheet provided that reference to that sheet(s) is given here.						
The information contained in this Technical Data Sheet is for tender evaluation purposes only and does not over-ride any aspects of the specification. Acceptance of the tendered offer(s) does not imply acceptance of "out-of-spec items" offered.						

(1) Lever is applicable only to Butterfly valves
(2) Applicable only to Butterfly valves
(3) Applicable only to Check (non return) valves

C3.8.2 PARTICULAR SPECIFICATION: PWA – STEEL ELEVATED TANK

TABLE OF CONTENTS ..... PAGE

PWA 1 Scope C3.153
PWA 2 Design Requirements C3.153
PWA 3 Tank Stand C3.153
PWA 4 Tank C3.153
PWA 5 Corrosion Protection C3.154
PWA 6 Pipework C3.154
PWA 7 Water-Tightness Testing C3.154
PWA 8 Measurement and Payment C3.155

PARTICULAR SPECIFICATION: PWA

STEEL ELEVATED TANK

PWA 1 SCOPE

This specification covers the particular requirements relating to the proposed steel elevated tank and structural steel tank stand which is to be erected at approximately Latitude 27°26'25"S and Longitude 32°05'34"E near Jozini in KwaZulu-Natal.

PWA 2 DESIGN REQUIREMENTS

The steel tank and stand (including base plates and holding down bolts) and vertical inlet / outlet pipe and overflow pipe are to be designed and detailed by the Contractor under this Contact. The tank and pipework shall be watertight under all operating conditions and the tank and stand shall be structurally stable. All designs shall accord with the National Building Regulations and, where applicable, the Occupational Health and Safety Act. The tank shall be designed in accordance with SANS 10239 and the stand shall be designed in accordance with the latest editions of SANS 10160 for wind loadings, and SANS 10162 for structural steelwork.

On completion of the designs and drawings and prior to the commencement of manufacture, two copies of the drawings are to be submitted to the Employer's Agent for approval. This submission by the Contractor to the Employer's Agent is to be accompanied by a certificate signed by a registered Professional Engineer accepting responsibility for the design of the tank and stand and advising the Employer's Agent of the design loads which must be used by the Employer's Agent to design the reinforced concrete foundation.

The Employer's Agent will then design and detail the reinforced concrete foundation using the design loads provided by the Contractor and then issue drawings of the reinforced concrete foundation to the Contractor for construction purposes.

After erection of the tank and stand, and prior to handing over to the Employer, the registered Professional Eng who designed the tank and stand shall issue a Certificate of Completion of the Structural System (Form 4 in Annex D in SANS 10400-A after satisfying himself that all fabrication, manufacture and erection has been carried out in accordance with his requirements.

PWA 3 TANK STAND

The base plates of the tank stand are to rest on reinforced concrete pedestals (vertical concrete columns rising from the buried concrete base slab) the tops of which will be approximately 400 mm above natural ground level. The tank stand manufacturer is to supply and deliver to site holding down bolts which the Contractor will cast into the concrete pedestals.

The tank floor (inside of the tank) shall be 10 metres above the top of the concrete pedestals.

An external ladder fitted with a safety cage shall be supplied and erected to enable access to be gained from ground level to the tank roof. One landing shall be provided.

PWA 4 TANK

The tank shall have a useable capacity of not less than 100 m³. It is envisaged that standard pressed steel panels will be utilised and that the dimensions of the tank will be 6.1 m x 4.88 m x 3.66 m deep. All panels shall be adequately braced internally. All sealing compounds shall be odourless, tasteless and non-toxic.

The tank shall be roofed and provided with a vented, hinged and lockable manhole cover and an internal access ladder.

The tank shall also be provided with the following:

- A DN 150 flanged inlet pipe 300 mm long supplied and fitted into the tank floor.
- A DN 150 flanged outlet pipe 300 mm long supplied and fitted into the tank floor.
- A DN 150 flanged drain pipe 300 mm long supplied and fitted into the tank floor.
- A DN 200 “morning glory” type vertical overflow pipe fitted inside the tank with the lip of the bellmouth 20 mm above the operating top water level. This pipe is to terminate in a flange approximately 300 mm below the tank floor.
- A float water level indicator.
- A walkway around the tank, 1000 mm below the top of the tank.

PWA 5 CORROSION PROTECTION

All steelwork is to be hot dipped galvanised to the minimum coating thickness requirements in Table 3 of SANS 121. All nuts, bolts, screws, and threaded articles shall have a zinc coating that complies with the minimum coating thickness requirements of Table 4 of SANS 121. Should it be necessary to cut any steelwork on site or should the galvanised coatings be damaged in any way. the affected components shall be either sent off site for re-hot dip galvanising or the damaged areas coated with zinc rich paint as instructed by the Employer’s Agent.

PWA 6 PIPEWORK

All pipework shall be manufactured in accordance with SANS 719 from 4.5 mm mild steel plate and shall be hot dipped galvanised to SANS 121 after fabrication. All inlet pipework is to be flanged with flanges to SANS 1123 Table 2500/3 with bolt holes drilled off-centre. All outlet, drain and overflow pipework is to be flanged with flanges to SANS 1123 Table 1600/3 with bolt holes drilled off-centre.

The pipework to be supplied under this section of the Contract shall comprise:

Inlet, outlet and drain pipe:

- DN 150 double flanged vertical pipes between the flanges 300 mm below tank floor (refer Clause PWA4 above) and flanges at the same elevation as the tank stand base plates.

Overflow pipe:

- DN 200 double flanged vertical pipes between the flange 300 mm below tank floor (refer Clause PWA4 above) and a flange at the same elevation as the tank stand base plates.

The four vertical pipes shall be adequately supported and clamped to the tank stand by means of galvanised mild steel pipe clamps.

The pipework which is to be connected to the four flanges referred to above (and situated at the same elevation as the tank stand base plates) will be measured under Section D of the Bill of Quantities.

PWA 7 WATERTIGHTNESS TESTING

The tank shall be filled to overflow level and left for 48 hours. Should there be any visible signs of leakage or any drop in the water level (other than that caused by evaporation) the Contractor shall search for and remedy the defects. The elevated tank and stand and pipework will only be deemed to have passed the watertightness test if, after 48 hours, there is no evidence of leakage.

PWA 8 MEASUREMENT AND PAYMENT

Items have been included in the Bill of Quantities under Section G to cover the work described in this specification.

PWA 8.1 Design

Detailed design and submission of drawings to the Employer's Agent and obtaining approval thereof. This item is limited to a maximum of 10% of the total (Section G) tank costs.....Unit: Sum

PWA 8.2 Supply

Supply and deliver stand and tank and all appurtenances to site. .....Unit: Sum

PWA 8.3 Erection

Erection of tank and stand and all appurtenances. .....Unit: Sum

PWA 8.4 Disinfection

Disinfection of internal surfaces of tank. This item must be not less than 5% of the total (Section G) tank costs .....Unit: Sum

PWA 8.5 Testing

Testing tank and pipework for watertightness. This item must be not less than 5% of the total (Section G) tank costs. .....Unit: Sum

PWA 8.6 Certificate of Completion

Submission of Certificate of Completion of the Structural System signed by a Registered Professional Engineer all as required in terms of the National Building Regulations. This item must be at least 5% of the total (Section G) tank costs .....Unit: Sum

C3.8.3 PARTICULAR SPECIFICATION: PAA – DAYWORKS SCHEDULE

TABLE OF CONTENTS ..... PAGE

PAA 1 General C3.157
PAA 2 Salaries and Wages of Workmen C3.157
PAA 3 Constructional Plant C3.157
PAA 4 Materials C3.157
PAA 5 Measurement and Payment C3.158

C3.8.3 PARTICULAR SPECIFICATION : PAA - DAYWORKS SCHEDULE

PAA 1 GENERAL

In cases where the Employer's Agent orders any variation in the form, quality or quantity of the work or any extra work to such an extent that the tendered rates for specific items are no longer applicable, or where a combination of tendered rates cannot be applied to compensate for such work, the Employer's Agent may, in terms of the General Conditions of Contract, order that the amended or extra work be carried out as daywork at the cost of labour, plant and materials. For that purpose provision is made for the Contractor to tender his rates for labour and plant in the Daywork Schedule which forms part of this contract.

No work will be measured as daywork unless:

(a) the Employer's Agent agrees that the varied work is not in accordance with the specification or scope of a measured item in the contract;

(b) the Employer's Agent has issued an order in writing for the execution of such varied work; and

(c) statements of plant and labour are submitted daily to the Employer's Agent for his consideration and approval.

All work valued at the tendered rates in the Daywork Schedule will be subject to contract price adjustment as applicable to the Contract.

PAA 2 SALARIES AND WAGES OF WORKMEN

The amount to be paid for labour will be based on the rates tendered in the Daywork Schedule for the workers executing the work. The tendered rates shall be all-inclusive and shall be held to cover all charges for the Contractor's profits, timekeeping, clerical work, insurance, establishment, superintendence, the use of hand tools, etc, and no additional surcharge over and above the tendered rates will be applicable.

PAA 3 CONSTRUCTIONAL PLANT

The rates for constructional plant as tendered in the Daywork Schedule shall cover all costs, overheads and profit for the contractor and no further surcharge will be payable on the tendered rates. The cost of operators shall be included in the tendered rates except where otherwise specified in Clause PSAA 5 (Measurement and Payment) hereafter.

Where plant or equipment for which no rates exist in the Daywork Schedule are employed, the cost thereof shall be determined as agreed with the Employer's Agent in terms of the General Conditions of Contract. In such case contract price adjustment will only be applicable if the agreed cost is based on rental rates at the time of the base month before closing of tenders, or if the ruling rates current at the time of the execution of the work are de-escalated to the base month.

The Contractor will be paid for the transport to and from the site of constructional plant not on site and specially ordered by the Employer's Agent to be brought on site. No payment will be made for transport of equipment listed in the Contractor's Schedule of Constructional Plant in the tender document, or for equipment which has been removed from the site on request of the Contractor, or for equipment already on site, regardless of whether it appears on the Schedule of Constructional plant or not.

PAA 4 MATERIALS

Materials required for daywork items which cannot be compensated under existing rates and have to be purchased, will be paid for at cost, excluding VAT, plus a surcharge of 15%. The cost of materials provided for daywork at current rates at the time when the work is executed, will not be subject to contract price adjustment unless the prices of the materials are de-escalated to the base month for escalation.

PAA 5: MEASUREMENT AND PAYMENT

Item — Unit

PAA 5.1 Labour

(a) Unskilled workers ...../hour (h)

(b) Skilled workers (Artisans) ...../hour (h)

(c) Operators and drivers (where measured separately) ...../hour (h)

(d) Foremen ...../hour (h)

(e) Others (specify) ...../hour (h)

The unit of measurement is the hour or part thereof during which workers were engaged in daywork.

The tendered rate shall include full compensation for all salaries, wages, bonuses, pension, insurance, medical aid and other benefits as well as overheads arising from administrative personnel, site agents, supervisors, tools and profit. No surcharge will be paid on the tendered rates

The cost of operators included in the rates for constructional plant, will not be measured again under Labour.

PAA 5.2 Constructional Plant

Item — Unit

(a) Back-acting excavators

(i) ..... (Specify type, power and mass)...../hour (h)
(ii) ..... etc. (for other back-acting excavators) ...../hour (h)

(b) Tractors and drawn rollers and trailers

(i) Tractor ..... (Specify type, power and mass) ...../hour (h)
(iii) Tractor with trailer, complete (Specify tractor, and type and capacity of trailer) ...../hour (h)

(c) Compactors

(i) ..... (Specify type and mass)...../hour (h)
(ii) ..... etc. (for other types and masses)...../hour (h)

(d) Compressors

(i) (Specify capacity and number of tools)...../hour (h)
(ii) etc. (for other compressors and tools) ...../hour (h)

(e) Trucks

(i) (Specify type, and capacity)...../hour (h)
(ii) etc. (for other trucks)...../hour (h)

(f) Light delivery vehicles

(i) (Specify load capacity)..... /kilometre (km)
(ii) etc. (for other)..... /kilometre (km)

PAA 5.3 Cost of materials delivered to site (specify) …… Provisional sum or as scheduled

The unit of measurement for sub-items 5.2(a) to (e) is the hour or part thereof during which the item of plant had been in active use for the daywork operation, including stopping time of less than five minutes.

Where applicable travel time to and from the normal parking position on site, or the position of the most recent non-daywork activity, as well as stopping time exceeding five minutes shall be multiplied by a factor of 0,6. Time shall be measured by means of a vibrating clock card.

The unit of measurement for sub-item 5.2(f) is the kilometre travelled to collect or transport small quantities of materials. Kilometres travelled in light delivery vehicles by supervisors in the execution of normal supervision duties, shall not be measured for payment.

The tendered rates shall include full compensation for the supply, maintenance, service, repairs, depreciation as well as fuel, lubricants, licensing, insurance, overheads and profit. It shall also include the cost of drivers and operators except in the case of sub-item PAA 5.2(c) and (d) where the operators of tools are paid for under labour.

C3.8.4 PARTICULAR SPECIFICATION: PT - TRAINING

TABLE OF CONTENTS **PAGE**

PT1 Introduction C3.161
PT2 Employers Arrangements C3.161
PT3 Training Arrangements C3.161
PT4 Training Categories and Objectives C3.161
PT5 Measurement and Payment C3.166

C3.8.4 PARTICULAR SPECIFICATION: PT - TRAINING

PT1 INTRODUCTION

PT1.1 Scope

This specification covers Accredited On-Site Skills Training for nominated trainees from the local community in skills relating to specific areas related to construction. It is intended that candidates for training will be people who are undergoing, or who have undergone, training at a University of Technology or FET College. Training is described in section C3.5.10.

PT2 EMPLOYMENT ARRANGEMENTS

The Employer will inform the Contractor of the number and names of candidates to be trained and confirm the categories of training to be provided (see PT4 below) and the required timing (date for start of training and duration). The Contractor shall proceed to timeously employ such candidates for the duration of training and shall claim for salary and other validated costs incurred, including agreed mark-up, according to the Training Schedule. The trainees shall be employed according to the Contractor's full and normal conditions of employment for unskilled labour, including registration for Workmens' Compensation.

The trainees shall fall under the Contactor's Health & Safety Plan for the duration of training. However the trainees will not be available for deployment by the Contractor for the duration of training. Upon completion of training the employment contract with each trainee will cease and the Contractor shall have no obligation towards the trainees in respect of further employment. The Contractor may, however, employ the trainees on permanent, or other basis, on terms to be mutually agreed.

PT3 TRAINING ARRANGEMENTS

The Employer will inform the Contractor of the number and names of candidates to be trained and confirm the categories of training to be provided (see PT4 below). The Contractor shall then obtain three quotations from suitable accredited Skills Training Service Providers on the basis of PT4 below. The quotations and responses shall be submitted for the approval and decision of the Employer.

Upon notice of Employer's approval, the Contractor shall proceed to appoint the selected firm to provide such Accredited Skills Training Facilitator(s) as are required according to the disciplines of training to be provided. The Contractor shall pay the training fees and charges of the accredited trainer according to the agreed fee scales and according to such validated registers of attendance and certificates of performance as are agreed in the training contract to be entered into.

The Contractor shall provide a suitable area for the purpose of training, in proximity to the worksite so as to allow for interaction with the workplace as and when required for training purposes, and shall make available a meeting room, with tables and chairs, for instruction purposes, together with water supply and sanitation facilities for male and female participants.

The Contractor shall be required to provide construction materials for practical training. Any such materials supplied shall be charged as per Dayworks schedule.

PT4 TRAINING CATEGORIES AND OBJECTIVES

PT4.1 Trench Excavation and Supervision

PT4.1.1 Training Objective

At the end of training the trainee will be able to and understand why it is necessary to:-

i) Remove and preserve topsoil;

ii) Excavate straight pipe trenches by machine and manual labour;

iii) Excavate the trench invert evenly;

iv) Excavate vertical trench sides;

v) Deposit excavated material a safe distance away from the trench edge;

vi) Be able to work with boning rods;

vii) Backfill around the pipe;

viii) Compact the backfill to the trench;

ix) Understand and apply the Construction Regulations with regard to trench excavation.

PT4.2 Pipelaying

PT4.2.1 Training Objective

At the end of training the trainee will be able to:-

i) Understand the principles and function of a pipeline;

ii) Measure the depth of a trench to establish the degree of bottoming up required;

iii) Supervise, level and prepare the bedding to receive the pipes;

iv) Set up fishline at the bottom of the trench

v) Excavate a trench to the required depth and width to contain the water main;

vi) Prepare the bedding';

vii) Lay a pipeline using the correct tools, materials and equipment;

viii) Make a connection from the water main to a branch or house connection;

ix) Do initial, intermediate and final backfilling and compaction and ensure correct compaction by testing soil density;

x) Backfill after laying the pipes in such a way that the pipes are protected from movement or damage from external pressure;

xi) Understand and apply the Construction Regulations with regard to pipelaying.

PT4.3 Steel Fixing

PT4.3.1 Training Objective

At the end of training the trainee will be able to:-

i) Understand basic structural drawings;

ii) Recognize the different bar profiles and strengths and their purposes;

iii) Interpret shape codes and bending schedules;

iv) Set up steel bars for bending;

v) Select the correct steel bars for fixing;

vi) Fix in place steel bars;

vii) Carry out dimensional checks according to drawing and adjust where necessary;

viii) Understand and apply the Construction Regulations with regard to steel fixing.

PT4.4 Formwork and Concreting

PT4.4.1 Training Objective

At the end of training the trainee will be able to:-

i) Understand basic structural drawings;

ii) Set out work and determine placing of formwork;

iii) Fix formwork in place;

iv) Recognize the types of support, propping, etc. and determine the level of support requirements for specific formwork;

v) Understand different prescribed mix and strength concretes;

vi) Understand various concrete constituents and their requirements;

vii) Conduct proportioning for a given prescribed mix concrete;

viii) Mix the concrete and transfer and place on site with minimum wastage;

ix) Conduct a concrete slump test and interpret the result;

x) Understand concrete vibration and its function and limitations;

xi) Understand concrete set – false, initial and final;

xii) Carry out dimensional checks according to drawing and adjust where necessary;

xiii) Understand and apply the Construction Regulations with regard to concreting work.

PT4.5 Basic Construction Hand

PT4.5.1 Training Objective

At the end of training the trainee will be able to:-

i) Demonstrate his/her knowledge of tools and equipment needed for excavation and concreting;

ii) Excavate and trim foundations according to specifications;

iii) Mix the concrete to the required proportions and methods, transporting without wasting and place correctly in foundations;

iv) Set up the floor shutter according to specifications;

v) Placing the floor concrete according to specifications and using correct procedures and equipment;

vi) Understand and apply the Construction Regulations with regard to excavation of foundations and concrete work.

PT4.6 Bricklaying & Blocklaying

PT4.6.1 Training Objective

At the end of training the trainee will be able to:-

i) Interpret basic drawings;

ii) Demonstrate his/her knowledge of the tools necessary and set up internal dimensions;

iii) Erect a profile on position and plumb;

iv) Select and mix the correct mortar for the work;

v) Build blockwork/brickwork using the correct methods and according to specifications;

vi) Understand and apply the Construction Regulations with regard to blocklaying/bricklaying.

PT4.7 Finishing Hand

PT4.7.1 Training Objective

At the end of training the trainee will be able to:-

i) Fix timber supports for roofing according to specifications;

ii) Erect concrete beams to superstructure according to specifications;

iii) Measure and cut roof sheets using correct methods and according to specifications;

iv) Fit a door and align it so that it works correctly;

v) Construct a South African roof truss to specifications and within tolerances required;

vi) Erect and align roof trusses in accordance with the specifications;

vii) Align and fix purlins to take roof sheets;

viii) Clad roof with sheeting/tiles accordance with specifications;

ix) Understand and apply the Construction Regulations with regard to construction and finishing of buildings.

PT4.8 Task-based Labour Administration

PT4.8.1 Training Objective

At the end of training the trainee will be able to:-

i) Record tools issued to labourers;

ii) Determine classification of excavation using trial pits;

iii) Set out daily tasks;

iv) Do basic task administration work;

v) Reconcile monthly task sheets to task sheets;

vi) Reconcile monthly task sheets to physical measurements;

vii) Understand and apply the Construction Regulations with regard to labour-intensive construction.

PT4.9 Understanding the Scope of Works and Specifications

PT4.9.1 Training Objective

At the end of training the trainee will be able to:-

i) Read basic plans and maps;

ii) Understand the Contractor's mobilization requirements;

iii) Understand statutory duties and requirements in Contractor's mobilization;

iv) Analyse the scope requirements and produce a construction programme;

v) Plan tasks according to priorities and specifications;

vi) Understand and apply the Construction Regulations with regard to contractor's mobilization and requirement for Commencement of Works.

PT4.10 Labour Recruitment and Management

PT4.10.1 Training Objective

At the end of training the trainee will be able to:-

i) Measure labour requirement using the two factors; time to complete a contract and physical amount of work to be completed;

ii) Learn how to select and employ reliable staff and labour;

iii) Administer labour;

iv) Draw up a simple employment contract for labour;

v) Complete time sheets and maintain records;

vi) Administer payroll functions;

vii) Understand and apply statutory requirements and regulations with regard to employment of staff and labour.

PT4.11 Contractor's Responsibilities and Requirements

PT4.11.1 Training Objective

At the end of training the trainee will be able to:-

i) Understand the role of the Employer, Contractor, Employer's Agent, Local- and statutory authorities;

ii) Read and interpret a construction programme;

iii) Programme and plan to complete tasks on time;

iv) Interpret and adhere to specifications;

v) Manage labour;

vi) Plan tool requirements;

vii) Choose correct tools and equipment;

viii) Have a knowledge of contract management;

ix) Facilitate and manage good relationships with all parties involved;

x) Understand and apply the Construction Regulations with regard to construction in general.

PT4.12 Payroll Management and Implementation

PT4.12.1 Training Objective

At the end of training the trainee will be able to:-

i) Understand and compile payroll data;

ii) Learn coinage submission;

iii) Prepare a payroll for electronic payment;

iv) Implement the pay;

v) Understand and apply statutory requirements and regulations with regard to employment and payment of staff and labour.

PT4.13 Basic Tender and Contract Pricing

PT4.13.1 Training Objective

At the end of training the trainee will be able to:-

i) Recognize and understand Fixed and Time-Related costs and charges;

ii) Read and understand Bills of Quantities;

iii) Apply rates and accurately extend to quantities;

iv) Refer and look up statutory rates and price indices;

v) Accurately Calculate Contract Price Adjustment;

vi) Place orders and negotiate with suppliers;

vii) Understand a Health & Safety Plan and Environmental Management plan and recognize the cost implications of compliance;

viii) Learn contract pricing for future projects;

ix) Understand tender documentation and demonstrate competence in understanding scope and scale of inputs required to complete the contract.

PT4.14 Community Liaison and Facilitation

PT4.14.1 Training Objective

At the end of training the trainee will be able to:-

i) Understand the Basic Conditions of Employment and other relevant legislation and regulations;
ii) Understand the role of the Employer, Contractor, Employer's Agent, Local- and statutory authorities;
iii) Understand the role of the Health & Safety Agent, health & Safety Office and Environmental Control Officer;
iv) Understand protocol in engaging and responding to Local- and statutory authorities;
v) Demonstrate competence in engaging and responding to the general public and the local community;
vi) Demonstrate competence in convening and chairing informal and formal meetings;
vii) Lead discussions to a conclusion and take concise and accurate minutes of meeting;
viii) Complete reporting on labour generation and labour issues to EPWP and National Treasury requirements.

PT5 MEASUREMENT AND PAYMENT

PT5.1 Appointment of Training Agent

The Service Provider for Skills Training will be paid by the Contractor and the cost recovered via the contract as certified by the Employer's Agent. The Contractor shall apply a mark-up of ten percent (10%) to the training fee to cover administration. The cost of obtaining quotations and appointing the successful Service Provider shall be deemed to be included in the Contractor's administration mark-up. Payment shall be on the basis of validated invoices for approved orders.

Payment item: A provisional sum, plus accompanying item for Contractor's 10% markup, is provided under BoQ Section A: Preliminary & General.

PT5.2 Provision of Training Area and Facilities

The preparation of a suitably sized area for conducting training and including a training room with furniture and water supply and sanitation facilities for trainees is described in PSA.
Payment item: An item for provision and maintenance of training area and training room is provided under BoQ Section A: Preliminary & General.

PT5.3 Employment of Trainees

Trainees shall be employed by the Contractor on the same basis as unskilled labour. Separate payroll records shall be kept for trainees. Payments in respect of salary and other validated costs for trainees will be recovered via validated payroll records.

PT5.4 Materials for Training

The Service Provider shall be responsible for requisitioning via the Contractor at least one week in advance, the materials required for practical training purposes. The Contractor shall be responsible to obtain these materials and to transport them to the training location at least one day prior to the scheduled training date. Materials for training shall be deemed to be addressed by PAA4.
Payment shall be claimed under the respective item in BoQ Section A: Preliminary & General.

PT5.5 Construction Plant used in course of Training

Should any item of constructional plant or tools be required for the sole purpose of practical Skills Training, the Contactor shall keep separate records of the use of this plant for training purposes. The Service Provider shall be responsible for requisitioning the use of constructional plant and tools via the Contractor at least one week in advance. The Contractor shall take reasonable steps to provide the plant or tools on site at the training location at least one day prior to the scheduled training date. Use of constructional plant for training shall be deemed to be addressed by PAA3 and payment shall be claimed under the Dayworks schedule (refer PAA5.2).

C3.8.5 PARTICULAR SPECIFICATION: PH FENCING

TABLE OF CONTENTS **PAGE**

PH1 Scope C3.168
PH2 Materials, Strength and Dimensions..... C3.168
PH3 Welding..... C3.169
PH4 Erection C3.169

C3.8.5 PARTICULAR SPECIFICATION: PH FENCING

PH1 SCOPE

This specification covers the supply and erection of an Anti-Intruder Fence and is to be read in conjunction with the typical details shown on the drawings.

PH2 MATERIALS, STRENGTHS AND DIMENSIONS

PH2.1 Anti-Intruder Fences

Anti-Intruder Fences are to be constructed of Razor Mesh fencing and pre-stressed concrete posts. The fence shall conform to the following details:

Min. overall height above ground level (mm)		2200
Straining and Intermediate Posts:		
1.	Min. ht. (mm)	2900
2.	Cross-section [square]	
(a)	Straining posts (mm)	100 x 100
(b)	Intermediate posts (mm)	75 x 75
3.	Design bending moments	
(a)	Straining posts (Nm)	1500
(b)	Intermediate posts (Nm)	700

Stays		
1.	Min. length (mm)	2650
2.	Cross-section [square] (mm)	75 x 75
3.	Design bending moment (Nm)	450

Razor Mesh (150 mm x 300 mm)		
1.	High tensile core (mm)	2,15
2.	Min. width (mm)	2400
3.	Buried depth (mm)	200
4.	Blade thickness	0,5 mm

PH2.1.1 Posts and Stays

All posts and stays shall be capable of withstanding, without signs of cracking, a uniform load imposed over their length (but excluding extension arms) and acting in either main axial plane so as to produce a bending moment at the base of the post of at least that shown above.

All pre-stressing wires shall have a concrete cover of 18 mm (± 3 mm).

Any out-of-straightness of posts, stays and extension arms shall not exceed 3 mm per metre length of the member.

PH2.1.2 Wire

Straining and tie wire shall be made from mild steel and shall be galvanised to Class "A" (heavy) standards in accordance with SABS 675. The diameter of the straining wire shall be 4,0 mm and of the tie wire 2,0 mm.

PH2.1.3 Gates

Gates shall be made from mild steel tubing which has continuously welded seams. The height of the gate(s) shall be the same as that of the fence and shall coincide approximately with the corresponding sections of fence. The frame shall consist of tubing of bore 50 mm and wall thickness 2,5 mm in the case of main frame members and of bore 25 mm and wall thickness 2,0 mm in the case of bracing members.

PH3 WELDING

The welding shall be such that the profiles of the welds merge smoothly into the adjacent surface of the parent material without excessive overlap. The weld faces shall be reasonably uniform and shall be free from excessive porosity, cavities, and trapped slag. The weld metal, the heat-affected zone, and the adjacent parent metal shall be free from cracks.

PH4 ERECTION

PH4.1 Foundations

Straining and intermediate posts and associated stays are to be buried to the depths detailed on the drawings. Holes dug in the ground are to be a minimum of 450 mm square for straining posts and intermediate posts.
The material below the concrete shall be well rammed and consolidated and while it is being poured the concrete shall also be well rammed and consolidated.

PH4.2 Posts

Straining posts shall be provided at all corners and other changes in direction, at acute variations in the level of the fence and as supports for gates. On straight lengths of fence straining posts shall be spaced not more than 60 m apart. Intermediate posts and standards shall be spaced not more than 3 m apart.

PH4.3 Stays

Two stays shall be bolted or otherwise attached to each straining post, other than a straining post supporting a gate which shall have one stay. When a stay is bolted to a post a washer shall be placed underneath the nut of the bolt.

The stay(s) shall be positioned behind the mesh and on the line of the fence.

PH4.4 Wires

All straining wires shall be parallel between posts. Each wire shall have one end taken at least twice around a straining post and the other end passed at least twice through the eye of a strain eye bolt attached to the next straining post. The free ends of the wire shall be twisted at least three times around the wire.
The straining wires shall be secured to each intermediate post, standard or dropper by a tie wire and the tie wire shall be secured to the straining wire by at least three complete turns on either side of the post.

PH4.5 Razor Mesh

The razor mesh is to be fixed to the straining wires with tie wires at not more than 375 mm centres.
Separate sheets of Razor Mesh are to be overlapped such that the apertures interlock. The mesh is to be joined by binding each aperture in two places with 2 mm diameter galvanised wire.
Any cut edges of the Razor Mesh are to be protected by painting with a zinc chromate or a zinc rich primer.
The Razor Mesh is to be buried to a minimum depth of 200 mm below ground level. The trench is then to be filled with earth or other approved material, well rammed and consolidated.

PH4.6 Gates

Gates shall be so erected that:

(a) there is a gap of not less than 25 mm and not more than 50 mm between the hinge stile(s) and the straining posts;

(b) there is a clearance of not less than 50 mm and not more than 75 mm between the bottom horizontal frame member(s) and the ground; and

(c) when closed there is a space of not more than 15 mm between the closing stile and the straining post in the case of single-leaf gates, and between the closing stiles in the case of double-leaf gates.

Gates shall have no noticeable twist or sag and when closed shall hang parallel to the adjacent posts. Gates shall move freely on their hinges and shall be provided with drop bolts and ground recesses to enable them to be held in open or closed positions.

C3.8.6 PARTICULAR SPECIFICATION: PE – THE EMPLOYERS PRE-CONSTRUCTION HEALTH AND SAFETY SPECIFICATION

TABLE OF CONTENTS ..... PAGE

PE1 Introduction C3.172
PE2 Purpose C3.172
PE3 Application C3.172
PE4 Definitions C3.172
PE5 Compliance C3.174
PE6 Site rules for contractors C3.175
PE7 Responsibilities of Contractors for construction work C3.175
PE8 Documentation and procedures C3.178
PE9 Compensation for Occupational Injuries and Diseases Act C3.178
PE10 Application of the Construction Regulations, 2014 ..... C3.185
PE11 Site-Specific and Deisn Risks C3.188
PE12 Scope of works C3.188

PE1 Introduction

This Health and Safety Specification has been prepared in terms of the Client's responsibility [Construction Regulation 5 (1) (b)] to provide the Principal Contractor and Contractors with a documented Specification of all Health and Safety requirements pertaining to the associated works on the proposed construction site/s, so as to ensure the Health and Safety of all persons affected by the construction activities. This Health and Safety Specification highlights, but in no way replaces, the legal requirements that the Principal Contractor and Contractors are bound to comply with in terms of the contract.

- The client has made provisions in the tender for the Principal Contractor to price for the cost of Health and Safety Measures before and during the construction process [Construction Regulation 5 (1)(g)]. The Principal Contractor, in turn, needs to make the same provision when Contractors (Sub-contractors) tender or quote on work [Construction Regulation 7 (1) (c) (ii)].

- The Principal Contractor and Contractors are required to prepare a Health and Safety Plan based on the Client's Health and Safety Specification including other legal requirements applicable to their business, which shall be applicable from the date of commencement of and for the duration of the work [Construction Regulation 7 (1)(a)]. This documented plan must be based on a Hazard Identification and Risk Assessment (HIRA) which will serve to identify the hazards, and their associated risks, anticipated for the scope of works [Construction Regulation 9].

Principal Contractors tendering must provide the Client with an appropriate Preliminary Health and Safety Plan (including a Preliminary Hazard Identification and Risk Assessment) as in Construction Regulation 7 and 9. This Plan must be submitted with the tender.

PE2 Purpose

The purpose of the Health & Safety Specification is to provide the Principal Contractor and Contractor's tendering for the proposed construction work, and/or appointed for the above mentioned construction work with the necessary detail of all the health and safety requirements pertaining to the associated scope of works, so as to enable the Principal Contractor and Contractors to develop their Health and Safety Plans to be implemented on site with a purpose of ensuring the health and safety of all persons, property, equipment and other persons that may be affected by construction activities.

PE3 Application

The H&S Specification contains clauses that are applicable to occupational health and safety in construction and the document is intended to impose pro-active controls associated with the activities, plant & machinery and other aspects of the proposed construction work that impact on health and safety of persons, by means of a documented H&S Plan prepared by the Principal Contractor and Contractors.

Compliance to the requirements of the OHSAct and relevant legislation is in addition to the requirements of the H&S Specification and forms part of the Principal Contractor's and Contractor's responsibility. The Client and Client's Agent will monitor the Principal Contractor to ensure that the Principal Contractor and Contractors comply with the requirements of the OHSAct & other legal requirements and will not prescribe to the Principal Contractor how such compliance is to be achieved.

PE4 Definitions

The following definitions apply.

For the purpose of the General Health and Safety Specification, the abbreviations or definitions given hereunder shall apply:

"CR" refers to the Construction Regulations, 2014

"GHSS" refers to this document (the General Health & Safety Specification) including any project - specific annexures that the engineers and designers could attach.

"OHSA" refers to the Occupational Health &Safety Act of 1993

"S" refers to a Section in the Occupational Health & Safety Act of 1993

"H&S" refers to Health and Safety

"Client"

Incident: means any unplanned event that causes, or has the potential to cause, an injury or illness and/or damage to equipment, buildings, plant or the natural environment. Incidents range from near-miss incidents to serious incidents and emergencies.

"Near Miss" means an incident which has the potential to cause an injury or illness or damage to company property.

"Regulations" means, specifically, the Construction Regulations, 2014 as issued on 7 February 2014, under the Occupational Health & Safety Act of 1993, but not excluding the other applicable regulations existing under the Act.

"Site" means the lands and other places, made available by the Municipality or the Client for the purposes of the Contract, on under over in or through which the construction work is to be executed or carried out.

"Principal Contractor" and "Contractor" shall be as defined in the Regulations.

Construction Work [CR 1]: Means any work in connection with –

- The erection, maintenance, alteration, renovation, repair, demolition or dismantling of or an addition to a building or any similar structure;
- The installation, erection, dismantling or maintenance of a fixed plant where such work includes the risk of a person falling;
- The construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or
- The moving of earth, clearing of land or making of an excavation or work on any similar type of work.

Hazard Identification, Risk Assessment and Risk Control (HIRA)
Means a documented plan, which identifies hazards, assesses the risks and detailing the control measures and safe working procedures, which are to be used to mitigate and control the occurrence of hazards and risks during construction or operation phases.

Site
Means the area in the possession of the Contractor for the construction of the works. Where there is no demarcated boundary it will include all adjacent areas, which are reasonably required for the activities for the Contractor, and approved for such use by the client.

Hazard
Means a source of or exposure to danger (source which may cause injury or damage to persons or property)

Risk
Means the probability or likelihood that a hazard can result in injury or damage.

Construction Manager [CR 8(1)]
Means a full time, competent employee appointed in writing by the Contractor to supervise construction work. The appointment, as required by the OHSA, shall stipulate health and safety responsibilities, area of responsibility and the proposed duration of the project.

Hazardous Chemical Substance (HCS)
Means any toxic, harmful, corrosive, irritant or asphyxiant substance, or a mixture or substances for which an occupational exposure limit is prescribed, or an occupational exposure limit is not prescribed, but which creates a hazard to health.

Construction Plant
Encompasses all types of plant including but not limiting to, cranes, piling frames, boring machines, excavators, dewatering equipment and road vehicles with or without lifting equipment.

Contractor [CR 1]
Means an employer [OHSA 1] who performs construction work and includes principal contractors and sub-contractors.

Health and Safety Plan (HSP) [CR 1]
Means a documented plan, which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified.
The plan shall be applied from the date of commencement of and for the duration of construction work [CR 5(1)]

Health and Safety File (HSF) [CR 1]
The file holding all documentation and records on health and safety for the project, which shall be available at all, times for evaluation, and a copy of which will be forwarded to the client upon completion of the project.

Disabling Injury Frequency Rate (DIFR)
The number of disabling injuries (DI's) multiplied by a constant (man hours relative to period worked) divided by total man hours worked over a rolling period (usually 12 months, but can be less)

Disabling Injury Severity Rate (DISR)
The number of days lost due to DI's multiplied by a constant (man hours relative to period worked) divided by total man hours worked over a rolling period (usually 12 months, but can be less)

Confined Space
An enclosed, restricted or limited space in which, because of its construction, location or contents, or any work carried on therein, a hazardous substance may accumulate or an oxygen deficient atmosphere may occur, and includes any chamber, tunnel, pipe, pit, sewer, container, valve, machinery or object in which a dangerous liquid or dangerous concentration of gas, vapour, dust or fumes may be present.

PE5 Compliance

- The Principal Contractor and other contractors must establish, implement and maintain a system for identifying and accessing the legal and other health and safety requirements that are applicable to their organisation.
- The Principal Contractor and other contractors shall ensure that these applicable legal and other requirements to which their organisation subscribes are complied with when establishing, implementing and maintaining their system, and when doing their construction activities. legal requirements referred to are legal requirements such as
    a. Occupational Health and Safety Act, number 85 of 1993 and its regulations as amended,
    b. Compensation for Occupational Diseases Act, number 61 of 1997
    c. Including all legal and other requirements to which the organisation subscribes.
- All information regarding legal and other requirements must be kept up to date all the time.
- The Principal Contractor and other contractors must communicate relevant information on legal and other requirements to all stakeholders.

PE6 Site Rules for Contractors

The site rule for contractors is the minimum standard with regard to specifications for construction work on this site. Contractors may have existing standards for each specific trade, but where conflict may arise between the contractor's standards and these Site Rules for contractors, the more stringent shall apply.

PE6.1 Rules of Conduct

Contractors and all employees under their control, including any visitors brought onto site must adhere to the following Rules of Conduct on Site:

Conduct Not Permitted:-

- No persons shall partake of, possess or sell drugs or alcoholic beverages on Site. Any employee or visitor whose actions and demeanour show symptoms of possible narcosis or drunkenness shall be removed from site.
- Indulge in practical jokes, horseplay, fighting or gambling.
- Make use of water from fire hydrants
- Destroy or tamper with safety devices, symbolic signs or wilfully and unnecessarily discharge fire extinguishers.
- Bring onto site or have in your possession of a firearm, lethal weapon, camera, or any other recording device, unless authorised to do so.
- Assault, intimidate or abuse any other person.
- Operate construction equipment (vehicles or plant) without the necessary training/competency and authorisation.
- Display insubordination toward any supervisor, foreman or manager in respect to carrying out of properly issued instructions or orders for health and safety reasons.
- Enter into any areas where you have no business unless authorised to do so by the person in charge
- Negligently, carelessly or wilfully cause damage to property.
- Refuse to give evidence or deliberately make false statements during investigations
- Bring animals onto site.

Insubordination towards any foreman, supervisor or manager could lead to removal from site and/or dismissal and/or prosecution. Except insofar as the principles of common law, or conditions as determined by any relevant statutes are concerned, the decision of the Client or his Agent shall be final and binding in respect of any disputes that may arise from the interpretation of these rules.

PE7 Responsibilities of Contractors for Construction Work

PE7.1 Notification of Construction Work [CR 4]

Before construction work commences, the contractor shall notify the Provincial Director of the Department of Labour in writing if the construction work shall:-

- Include excavation work
- Include working at height
- Include demolition of a structure
- Include the use of explosives to perform construction work

PE7.2 Duties of Principal Contractor's [CR 7]

The contractor must:-

8.2.1. Compile a suitable, sufficient, and coherent site specific health and safety plan [CR 7(1a)

8.2.2. Keep on site a Health and Safety File with all required documents (CR 7 1b).

8.2.3. Ensure sub-contractors are appointed in writing, registered with COIDA and have necessary competences and resources to perform construction work safely.

8.2.4. Ensure all employees have valid medical certificate of fitness specific to the construction work performed and issued by an occupational health practitioner in a form of Annexure 3.

8.2.5. Ensure co-operation between all contractors [CR 7(4)] to comply with the Act.

8.2.6. Ensure compliance with the Act in terms of [CR 5(3)]

a. Provide relevant sections of these specifications to contractors as required

b. Appoint each contractor in writing and only appoint contractors who have the necessary competencies and resources may be appointed [CR 7(1) (v)]

c. Ensure each contractor's HSP is implemented and maintained throughout the duration of the project on site

d. Stop any contractor from work which is not in accordance with HSP / law or which pose a threat to health and safety of persons.

e. Sufficient information is provided to contractors where there are changes to design and construction.

f. Ensure every contractor is registered and in good standing with the Compensation Commissioner

g. Ensure potential contractors have made provision for the cost of health and safety measures

8.2.7. Negotiate and approve the HSP of each contractor [CR 7(1) (vi)

8.2.8. All HSP's including the principal contractor's to be available on site [CR 7(1)]

8.2.9. All HSF's including the principal contractor's to be available on site [CR (7)]

8.2.10. A consolidated HSF to be handed over to the client on completion of construction including records of drawings, designs etc. [CR 7(1) (e)]

8.2.11. HSF to include updated list of all contractors, the agreements and their type of work [CR 7(1) (f)]

PE7.3 Contractor's Responsibilities [CR 7(2)] (including sub-contractors)

8.3.1. Provide their HSP to the principal contractor [CR 7(2)(a)]

8.3.2. Where a contractor appoints another contractor (sub-contractor) it is the responsibility of that contractor to apply sub regulation 1(b) to(g) of CR 7 as if he were the principal contractor [CR 7(3)]

8.3.3. No contractor to appoint another contractor (sub-contractor) unless the latter has the necessary competency and resources to perform the required work

8.3.4. To provide any information which affects the health and safety of any persons at work to the principal contractor [CR 7 (2) (e)]

PE7.4 Legal Appointments

The principal contractor shall ensure copies of the appointment letters of all responsible persons appointed on site will be kept in the HSF. All legal appointments shall be conducted in accordance with the requirements set out in the OHSA and as per this specification. The tables below set out the appointment protocols for CR and OHSA. It should be noted that these represent complete lists and not all these appointments may be required:

PE7.4.1 Construction Regulation Appointments

Reg.	Appointment	Appointee	Appointed by
CR 5 (1)(k)	Principal Contractor	16(2) for the company	Client
CR 7 (1)(v)	Contractor	Competent person	Principal Contractor
CR 8 (1)	Construction manager	Competent person	Principal Contractor
CR 8 (2)	Assistant Construction manager	Competent person	Principal Contractor
CR 8 (5)	Safety Officer **SACPCMP registered**	Competent person	Principal Contractor
CR 8 (7)	Construction Supervisor	Competent person	Principal Contractor
CR 8 (8)	Assistant Construction Supervisor	Competent person	Principal Contractor
CR 9(1)	Risk Assessor	Competent person	Principal Contractor
CR 11 (2a)	Structure Inspector	Competent person	Principal Contractor
CR 13 (1)	Excavation Work Inspector	Competent person	Principal Contractor
CR 21 (1k)	Construction Vehicle Inspector/ Mobile plant Operator	Competent person	Principal Contractor
CR 28 (a)	Stacking and Storage Supervisor	Competent person	Principal Contractor
CR 29 (h)	Fire Equipment Inspector	Competent person	Principal Contractor
CR 29 (i)	Fire Team Members	Competent person	Principal Contractor

OHS Act Appointments and other relevant Regulations

Reg.	Appointment	Appointee	Appointed by
OHSA 16 (2)	16 (2)	Contract Manager	16(1)
OHSA 17 (1)	Health & Safety Rep	Elected / Nominated	16(1)
GAR 9 (2)	Incident Investigator	Competent person	Principal Contractor
GSR 3 (4)	First Aider	Competent person	Principal Contractor

The responsibilities of each appointment are detailed in the relevant form, which are signed by both the authorised person and the appointee and kept in the Health and Safety file.

PE8 Documentation and Procedures

All required HSE documentation for the construction work, shall be kept in the HSF, which shall be available on site. The Construction Supervisor shall be responsible for the file on site and the Project Manager shall ensure that documentation is valid and up to date. The procedures to be used for the project are to be in accordance with contractor policy and as per the outcome of the HIRA exercise. It is required that the documentation is filed in an orderly fashion for easy access. The following sections are suggested:

- Policies, permits, notifications etc.
- Health & Safety plans, specifications
- Appointments
- Incident management
- Inspection checklists
- Risk assessments
- Training
- Safe Work Procedures
- Hazardous Chemical Substances
- Medicals
- Audit reports

PE9 Application of COIDA and OHSA to Construction Work
[Items 8.11 to 8.15 only may not be applicable]

PE9.1 Compensation of Occupational Injuries and Diseases Act, Act No. 130 of 1993 (COIDA)

Every contractor shall provide proof of registration and a valid letter of good standing with the Compensation Commissioner.

PE9.2 Occupational Health and Safety Policy [OHSA 7]

The contractors must develop a Health and Safety Policy that:-

- Is appropriate to nature & scale of risks,
- Includes commitment to prevent injuries & ill health, and continual improvement of health and safety performance,
- Includes the commitment to comply with applicable legal and other requirements,
- Includes the setting of health and safety objectives and targets,
- Is documented, implemented and maintained,
- Is communicated to all stakeholders,
- Is reviewed periodically to ensure its relevant and appropriate to the construction company.

PE9.3 Health and Safety Training and Competency

A training needs analysis must be developed and training provided for all persons requiring training. Proof of training / competency must be made available on file.

PE9.3.1 Induction Training

The principal contractor shall be responsible for the induction of all personnel entering the site including visitors, inspectors etc. Contractors doing specific construction work shall be responsible for the induction of their employees with respect to that specific work. Records to be kept on file for all personnel that undergo induction training.

PE9.3.2 Awareness Training

In addition, the client would favour awareness training to be carried out such as weekly Toolbox Talks on relevant topics e.g. manual lifting, wearing PPE, safe use of portable electric tools etc.

PE9.3.3 Competency and CV's

Where applicable, valid copies of certificates of competency of appointed personnel to be provided and kept in the HSF. Other training requirements such as those identified through the HRA process, to be completed and proof of that training also kept in the HSF. Where competency is achieved through experience, a brief CV will be required.

PE9.3.4 Specific OH&S Training

Valid certificates of training from registered service providers preferably accredited by the appropriate SETA are required for First Aiders, H&S reps, Fire Marshals (CR21 Fire Equipment Inspectors) etc.

PE9.3.5 Medical Fitness

All employees doing construction work on site must have a valid medical certificate of fitness specific to construction work to be performed and this must be issued by an occupational health practitioner in the form of Annexure 3.

PE9.4 Hazards and Potentially Hazardous Situations [OHSA 13]

The principal contractor is responsible to ensure that all contractors and any visitors are warned of any hazardous or potentially hazardous situations, which may affect them on site and shall put any additional measures in place to assist in mitigating the risk of these hazards.

PE9.5 Health and Safety Reps [OHSA 17 and 18]

The principal contractor shall be responsible to ensure compliance to this section of the OHSA as required and to ensure similar compliance of all contractors.

If a rep is not required, the appointed Safety Officer will be responsible for these functions

PE9.6 Health and Safety Committee [OHSA 19 and 20]

The principal contractor shall be responsible to ensure compliance to this section of the OHSA as required. If a committee is not convened, health and safety matters will need to be tabled and discussed at site meetings.

PE9.7 General Documents / Record Keeping

The principal contractor shall ensure that all Health and Safety documents and records, required by OHSA and Regulations are kept on site for reference purposes and auditing.

PE9.7.1 Inspections

The principal contractor shall keep all records of inspections undertaken during the contract. An assessment will need to be made of what inspections are required and their frequency. The principal contractor is also responsible to ensure compliance to this requirement by all contractors

PE9.7.2 Audits [CR 5 (0) and 7 (1c)(vii)]

The client's agent shall carry out regular audits on the principal contractor at least once per month. Similarly, principal contractors shall be responsible for carrying out regular audits on their contractors at least once per month. The results shall be tabled for action and discussed at the Health and Safety Committee meetings or the site meetings, as appropriate.

PE9.8 Incident management and emergency plans

The principal contractor shall create an Emergency Plan for the construction site. The plan shall be clearly laid out for all types of emergencies including responsibilities, evacuation routes, siren, emergency no.'s etc. The plan shall be fully explained to all personnel during the induction training. All contractors will become completely familiar with the requirements of the plan and will participate in any evacuation drills that may take place.

PE9.8.1 First Aid [GSR 3]

The principal contractor shall be responsible to ensure compliance to this regulation as required. In particular, a first aid box with the minimum stock as specified in the regulation will be located at the site office and there will be signage to indicate the location of the box. Attention is drawn to GSR 3(4) for the requirement of trained first aiders. It is also suggested that a trained first aider be made responsible for the box in terms of the following:

- Security – the box should not be left open but it must be accessible in case of emergency (spare key availability)
- Injuries - a record of first aid box injuries treated and the stock issued
- Stock – a regular inspection to maintain stock levels and check expiry dates

In addition, the first aid requirements should be noted for high risk substances or hazardous chemical substances and if these are to be used, then it should be addressed in the HIRA and the need for eye wash facilities assessed.

PE9.8.2 Incidents and Injuries – Investigation and Reporting

The Principal Contractor will ensure there is a management system to report and investigate all incidents. All incidents including ALL near misses, first aid box treatment, and all other serious incidents involving any form of disabling injury or fatality are to be reported to the Client and the Clients H&S Agent telephonically immediately. This shall be confirmed in writing as soon as possible after the incident. Failure to comply with these provisions will be considered a serious offence. "Recording and Investigation of Near Misses".

Incidents

The principal contractor shall provide evidence by means of a procedure or chart that he is fully aware of the "hierarchy" of incidents that can occur e.g. unsafe situations, near misses, first aid box injuries, medical cases, disabling injuries etc. He shall keep an incident register of all such incidents, investigate and implement corrective action where required. The client also reserves the right to request incident statistics from the principal contractor such as DI's, DIFR and DISR and it is advised that these are maintained.

Injuries

First aid box injuries have been addressed under 8.8.1 above. More serious injuries requiring transport of the injured person to the nearest hospital or doctor or the calling of ambulance and paramedic personnel will be the responsibility of the principal contractor's appointed personnel such as the Construction Supervisor, First Aider and Safety Officer. It is advised that all required emergency numbers be on hand and prominently displayed.

As all contractors are registered and in Good Standing with the Compensation Commissioner, it will be the responsibility of the contractor whose employee has been injured, to make the necessary report and claims to the Commissioner.

PE9.8.3 Accident and Incident Reporting and Investigation [OHSA 24, GAR 8, 9 (1) & (2)]

Should an incident or accident investigation need to be conducted, a competent person shall be appointed to conduct the said investigation. The procedure to be followed will be in accordance with Annexure 1 of GAR 9 – "Recording and Investigation of incidents".

Particular attention is also drawn to OHSA 24, the reporting of certain incidents to an inspector of the department of labour.

The principal contractor shall ensure that the investigations are kept for record purposes and he shall ensure that the outcome of the investigation is communicated to all affected parties as required i.e. the Client, Clients H&S Agent and contractors.

The Client reserves the right to participate in all investigations into accidents or incidents and to conduct their own investigation if required.

PE9.9 Contractors and Suppliers [OHSA 37(2)]

The client shall enter into an “Agreement with Mandatory” in terms of Section 37(2) of the Occupational Health and Safety Act, 85 of 1993, with all appointed principal contractors. Likewise all principal contractors shall enter into a similar agreement with all contractors, sub-contracted to them for any period of the contract. Please note that if contractors hire any construction vehicles or mobile plant, the companies from which the equipment is hired must provide any maintenance and test certification as required. In addition, if operators are hired with the equipment, proof of competence and medical certification must be provided.

The principal contractor shall ensure that all contractors are issued with this safety specification where reasonable. The principal contractor shall assist and ensure that contractors engaged comply with all of these requirements and adhere to the requirements set out in the OHSA. Contractors will be stopped from working in the event of unsafe conditions and activities being observed.

All contractors shall be subject to the requirements specified in the HSP and will be issued with a copy of the plan. If the contractor is not able to comply with the requirements set out in the plan, he shall not be appointed as contractor.

PE9.10 Personal Protective Equipment, Intoxication, Signage and Access Control

PE9.10.1 Personal Protective Equipment (PPE) [GSR 2]

The principal contractor shall through the Risk Assessment process identify the specific PPE needs per activity. Contractors, as employers, will be responsible for the issue of the required PPE. Should PPE be lost or stolen, then the employee will be issued with new PPE. Should PPE be worn out or damaged, the user shall return the worn or damaged PPE and will be issued with a replacement. Training in the use of this shall be provided. Visitors shall be informed of PPE requirements prior to their visit so that they may enter the site.

PE9.10.2 Intoxication [GSR 2A]

The principal contractor shall ensure that no persons may enter or remain at the construction site if under or apparently under the influence of intoxicating liquor or drugs.

PE9.10.3 Display of signs [GSR 2B]

The principal contractor shall make use of signage to assist in enforcing compliance to any requirement specified in this document or as required by law. Standard symbolic signs are acceptable for conveying these requirements where applicable. Approved signs as per SABS standard approved colours must be used.

PE9.10.4 Access control [GSR 2C]

The principal contractor shall be responsible to ensure control of access to all persons entering the construction site. The reasons for this are as follows:

- The principal contractor is the 'employer' on the site and is responsible for section 8 of OHSA for employees and contractors and section 9 for any other person on site such as visitors and inspectors
- All persons entering the site must undergo induction training to inform them of the hazards present on the site. This includes contractors, visitors, inspectors etc.
- The construction supervisor will be aware of who is on site and their function
- The construction supervisor will be able to control tasks that may impact on other work being carried out on the site by a permit to work system
- The number of people and their purpose on the site must be known in case of emergency and evacuation
- Security reasons

The principal contractor shall post notices at the site informing all those entering the site of these requirements.

PE9.10.5 Pressure Equipment Regulations, 2009 (Gas Bottles) [PER 2009]

If gas bottle sets (Oxy-Acetylene for heating, cutting, welding) are used, these regulations, as required, shall be adhered to. Regular inspection of the sets shall be carried out. In particular:

- Only trained personnel shall operate such equipment.
- The Construction Supervisor shall ensure operation of the equipment is in accordance with the HIRA requirements and Safe Working Procedure (SWP) and/ or method statement.
- All users shall undergo regular awareness training (toolbox talk) to ensure compliance.
- The Construction Supervisor shall ensure the required PPE is provided and properly used.

PE9.10.6 Portable Electrical Tools [EMR 9]

This regulation shall be complied with as a minimum requirement. Regular inspections of all Portable Electrical Tools such as drills, angle grinders etc., and shall be carried out. In particular:

- Only trained personnel shall operate such equipment.
- The Construction Supervisor shall ensure operation of the equipment is in accordance with the HRA requirements and Safe Working Procedure (SWP).
- All users shall undergo regular awareness training (toolbox talk) to ensure compliance.
- The Construction Supervisor shall ensure the required PPE is provided and properly used.

PE9.11 Permit to work (including hot work)

The principal contractor shall ensure that:

- All work being carried out on the site has been approved through the necessary project control system.
- Permits required from third parties such as town councils for utility and sewage services are in place.
- A permit system is operational so that work consisting of many tasks related to the construction on site, can be carried out without endangering the health and safety of personnel on site, neighbours and the public surrounding the site and/or causing damage to property.
- In particular, attention is drawn to GSR 9, which details the requirements for welding, flame cutting, soldering and similar operations (hot work) especially since there is dry grass which can catch fire resulting to veld fires.

PE9.12. Work in confined spaces [GSR 5]

The principal contractor shall ensure that no work is carried out in a confined space unless it is safe to do so. All the requirements of this regulation shall be met. Attention is drawn to the fact that further precautions are required if hot work is to be carried out in a confined space a per GSR 5(5) and GSR 9(2).

In addition, CR 13(2j) specifies that excavations are regarded as confined spaces and these precautions need to be applied.

PE9.13 Environmental Rules

The Contractor shall give effect to and maintain all safeguards and standards and take such measures as may be necessary for the protection of the environment. Prevention of any type of pollution must be taken into consideration when performing all construction activities on site.

PE9.13.1 Clearing

The Contractor shall comply with the following conditions and requirements for clearing:

- Follow the Occupational Health and Safety Act, the Environmental Regulations for workplaces and Project EMP.
- Areas to be cleared will have boundaries clearly marked by tape, pegs or other means and will conform to limits on design drawings.
- Clearing will not commence until drainage control works are in place.
- Cleared vegetation should be windrowed along the contour to assist with erosion control.
- Any area which is not to be disturbed under requirements of the Cultural Heritage Management Plan will be clearly identified.
- Vegetation clearance will be restricted to that necessary for the works.
- The Engineer is to be notified immediately if contaminated soil is discovered.
- Traffic shall be confined to maintained tracks and roads.
- Particular care shall be taken to minimise disturbance to the bed and banks of watercourses.

PE9.13.2 Noise and Vibration

The Contractor shall ensure that the exposure of persons to noise is prevented by all means and where it is not possible to prevent it, to adequately control the noise. The noise-induced hearing loss regulations must be complied with.

Each of its mobile and fixed plant and that of its subcontractors' are fitted with appropriate noise suppression equipment to ensure that noise levels from such plant are contained within the relevant limits prescribed by relevant industrial safety and environmental legislation, regulations and site standards. If there is a noise problem with electric power generating equipment, compressors, or other facilities under the control of the Contractor, additional noise suppression shall be erected by the Contractor at the Contractor's cost around the offending unit(s).

Any deviation from the above listed practices is to be rectified at the Contractor's cost.

PE9.13.3 Transport, Storage and Handling of Hazardous Substances and Dangerous Goods

The Contractor shall comply with the following conditions and requirements for storing and handling hazardous and dangerous goods:

- Comply with Hazardous Chemical Substance Regulations.
- Provide a list of hazardous substances and corresponding MSDS prior to bringing substances on Site.
- Substance register to be held at each storage facility.
- Corrosive materials to be stored and handled in accordance with HCS Regulations 14.
- Fuel, oils and substances in containers of 210 litres or more shall be stored in a bunded area with capacity of at least 110% of the total quantity of HCS.
- Fuel, oils and substances in less than 200 litre drums shall be stored as above or in a fenced and roofed compound.
- All fuel, oils and substances must be clearly labelled.
- Transfer of bulk fuel and handling of hazardous substances shall be conducted only by appropriately trained personnel.
- Spill clean-up kits including absorbent materials shall be kept at each storage facility.

PE9.13.4 Dust Prevention

The Contractor shall comply with the following conditions and requirements for air quality and dust:

- Dust generated by construction activities will be suppressed by water spraying, to levels that are safe for Site personnel.
- Speed limits on unsealed roads will be limited to a maximum speed consistent with the minimisation of dust generation.
- Earthworks Supervisors must pay particular attention to the management of topsoil stripping such that dust does not become a safety hazard or severe nuisance.
- All dust complaints will be investigated promptly and appropriate action initiated to reduce nuisance.

PE9.13.5 Waste Management

- The Contractor shall provide suitable rubbish receptacles at the Site and shall ensure that all litter is collected in them and properly disposed of off Site in accordance with the requirements of the relevant statutory requirements.
- The Contractor shall ensure proper collection and off-site disposal of all industrial wastes in accordance with relevant statutory requirements.
- The Contractor shall apply the principles of Waste Minimisation by reducing the amount of waste generated on Site by their operations and activities as much as possible. The Contractor shall provide for recycling of glass, metals, plastics and paper.

PE9.14 Monitoring, Audit and Review

The Client's Agent shall have the right to conduct audits / inspections of the Contractor's operations, equipment and procedures at any time, and the Contractor shall fully co-operate with the Client's Agent during such audits / inspections.

The Client's Agent rights under this clause shall not relieve the Contractor of its obligations to conduct audits and reviews of its own safety and health performance.

Where such Client's Agent audits reveal deficiencies in the Contractor's procedures, equipment, training, drills, etc., the Contractor shall rectify such deficiencies as soon as practicable and provide to the Client's Agent a status report on all outstanding corrective actions. Where such deficiencies include an unsafe practice or a breach of the Statutory or the Contract's requirements, the Client's Agent may in accordance with the General Conditions of Contract suspend the work associated with the unsafe practice or breach until the deficiency is rectified.

PE10 Application of the Construction Regulations, 2014

[Please note: this is the complete list. Item 10.1 is compulsory and the rest are applicable if relevant to the work being carried out]

PE10.1 Hazard Identification, Risk Assessment and Risk Control (HIRA) [CR 9]

The contractor shall prior to the commencement of any construction work perform a HIRA exercise, which will form part of the HSP and file for the project.

A copy of the HIRA shall be made available for viewing to the client's OHS agent and shall be kept in the Health and Safety File.

NB: The contractor shall ensure that the outcome of all HIRA exercises will be conveyed to all relevant employees with respect to the hazards and the related control measures before any work commences.

Below is a list of activities, which may be considered for HIRA if the activity is to be carried out on site. The list is not exhaustive but gives examples of activities for a construction site:

- Traffic Management– restrictions etc.
- Site security and access
- Existing services, overhead and underground
- Ground conditions
- Excavations
- Activities that affect adjacent sites
- Excavations in particular those adjacent to roads or sidewalks
- Stacking, storage of equipment and materials, and good housekeeping
- Use of hand tools

- Use and storage of flammable and hazardous chemicals such as petrol, diesel, etc.
- Waste management including removal of hazardous waste
- Environmental restraints such as effluents, boundary noise and dust
- Temporary site accommodation
- General hazards to site personnel such as noise and dust.

The control of several of these risks may be specified in the OHSA or the CR but this does not mean that the HIRA exercise does not have to be carried out.

PE10.2 Fall Protection [CR 10]

Regulation 10(1)(a) of this regulation states that a contractor shall designate a competent person, to be responsible for the preparation of a fall protection plan. The fall protection should include the prevention of person falling into trenches due to ground preparations.

PE10.3 Structures [CR 11]

The appointed contractor shall meet the requirements of this regulation. Attention is drawn to CR 11(2)(a) which requires the designer to inspect the structure at appropriate times when mandated by the Client and the record of these inspections to be available on site.

PE10.4 Excavations [CR13]

Section 1 of this regulation states that this work must be carried out under the supervision of a competent person, who has been appointed in writing. All the requirements of CR 13 shall be met. For inspection of excavations, attention is drawn to sub regulation 2(h), the records of which must be available on site.

All the requirements as far as GMR 18 is concerned, compliance to these requirements will be the responsibility of contractors using any lifting equipment and lifting tackle.

The principal contractor must comply with the requirement of the Construction Regulations 22 and the requirements of the Driven Machinery Regulations 1988.

PE10.5 Construction vehicles and mobile plant [CR 23]

It will be the responsibility of each contractor on site to ensure compliance of their construction vehicles and mobile plant to these regulations.

This includes vehicles to be used for transporting personnel to and from site, which will be subject to relevant requirements such as licensing and roadworthiness checks. In addition the following will apply:

- Safe transport for personnel working on the project to and from the workplace, which shall include proper seating, side restraints and cover.
- Road safety principles shall be adhered to on and off site.

If a mobile crane or other mobile plant is hired, only approved hire companies shall be contracted to provide such equipment. The Construction Supervisor shall ensure compliance of the provider to these regulations. In particular attention is drawn to the competence and fitness of the operator [section 1(d)] and the inspection of the equipment [section 1(j)]

PE10.6 Use and storage of flammable liquids [CR 25], and hazardous chemical substances [HCSR]

All the requirements of CR 25 shall be met

In terms of HCSR, contractors shall ensure that all hazardous chemicals brought to site have a Material Safety Data Sheet (MSDS) and the users are made aware of the important sections of the MSDS such as:

- Hazards
- First aid measures
- Firefighting measures
- Accidental release measures
- Handling and storage
- Exposure control especially PPE
- Disposal

First Aiders shall be made aware of the MSDS and how to treat HCS incidents appropriately. Copies of MSDS's will be available on site and in the HSF.

PE10.7 Water Environments [CR 26]

The requirements of this regulation shall be met. i.e

- A contractor must ensure that where construction work is done over or in close proximity to water, provision is made for –
  - Preventing persons from falling into water
  - The rescuing of persons in danger of drowning.
- A contractor must ensure that where a person is exposed to risk of drowning by falling into the water the person is provided with and wears a lifejacket

PE10.8 Housekeeping [CR 27] including [ERW(6)]

All contractors shall ensure that housekeeping standards as per these regulations shall be maintained at all times.

PE10.9 Stacking of Materials [CR 26] including [GSR(8)]

All contractors shall ensure that materials are only stored in defined and allocated storage areas and that materials being stored are stacked in accordance with sound stacking principles as per these regulations.

PE10.10 Fire precautions [CR 29]

All contractors on site will comply fully with the requirements of this regulation. In particular, the principal contractor will be responsible for the evacuation plan (section (l)) the details of which will be imparted to contractors, visitors etc. through the site induction.

PE10.11 Construction welfare facilities [CR 30]

The principal contractor shall be responsible for implementing this regulation and shall ensure that adequate facilities are provided for the personnel on site in terms of the following:

- Change room facilities
- Adequate toilets.
- Hand wash facility.
- Potable water.

No food preparation shall be conducted on site. Eating and drinking will only be permitted in the designated eating areas, which must be provided with adequate seating.

Waste bins shall be strategically placed and cleared regularly.

PE11 Site Specific and Design Risks

[Please note: this is not a complete or exhaustive list. The principal contractor is expected to assess all risks to which his employees may be exposed during the construction process, as well as the hazards identified and listed below.]

PE11.1 Hazard Identification and Risk Assessment Methodology

PE11.1.1. Baseline Risk Assessment

A Baseline Hazard Identification and Risk Assessment must be carried out during the preliminary stages of the construction/demolition project for the purposes of attempting to reduce the possibility of accidents or ill health occurring.

Taking into account the constraints of time and resources, every effort must be made to identify the hazards and recommend possible solutions. It is not reasonably practicable to expect the baseline risk assessment to identify all hazards, which is why task risk assessments are carried out on site.

PE11.1.2. Task Risk Assessment

Once on site, every contractor shall perform task risk assessments, using the baseline risk assessment as a guide.

The Risk Assessment should be reviewed once on site and thereafter after any incident, change in design or every one-year period, whichever occurs first. Additional hazards highlighted or a change in the risk factor should have a separate risk assessment carried out and filed.

The Risk Assessment is based on the combination of the CONSEQUENCE and PROBABILITY associated with each hazard.

PE12 Scope of Works

This specification covers the health and safety requirements to be fulfilled 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 No 85 of 1993, and the corresponding Construction Regulations 2014, and all other safety codes and specifications referred to in the said Construction Regulations.

In terms of the OHS Act Agreement in **Annexure 3**, 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 OHS Act 1993 and the Construction Regulations 2014.

This Health and Safety Specification and the Contractor's own Safety Plan as well as the Construction Regulations 2014, shall be kept on site and made available for inspection by all employees, inspectors, Client Safety Practitioner and any other persons entering the site of works.

ANNEXURE A – Notification of Construction

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993
(ACT NO 85 OF 1993)
REGULATION 4 OF THE CONSTRUCTION REGULATIONS, 2014
NOTIFICATION OF CONSTRUCTION WORK

1.(a) Name and postal address of Principal Contractor:

……

(b) Name and tel. no of Principal Contractor's contact person:

……

2. Principal Contractor's compensation registration number: ……

3.(a) Name and postal address of client:

……

(b) Name and tel. no of client's contact person or agent:

……

4.(a) Name and postal address of designer(s) for the project:

……

(b) Name and tel. no of designer(s) contact person:

……

5. Name and telephone number of Principal Contractor's construction supervisor on site appointed in terms of regulation 8.(1)……

6. Name/s of principal contractor's sub-ordinate supervisors on site appointed in terms of regulation 8.(2).

……

7. Exact physical address of the construction site or site office:

……

8. Nature of the construction work

……

……

……

9. Expected commencement date: ……

10. Expected completion date: ……

11. Estimated maximum number of persons on the construction site: Total: …..... Male: …..... Female: …....

12. Planned number of contractors on the construction site accountable to principal contractor: ..……

13. Name(s) of contractors already chosen.

……

……

……

……..	……
Principal Contractor	Date
……..	……
Client's Agent (where applicable)	Date
……..	……
Client	Date

- THIS DOCUMENT IS TO BE FORWARDED TO THE OFFICE OF THE DEPARTMENT OF LABOUR **PRIOR TO COMMENCEMENT** OF WORK ON SITE.

- **ALL PRINCIPAL CONTRACTORS** THAT QUALIFY TO NOTIFY MUST DO SO EVEN IF ANOTHER PRINCIPAL CONTRACTOR ON THE SAME SITE HAD DONE SO PRIOR TO THE COMMENCEMENT OF WORK.

ANNEXURE B – CEO Appointment

CEO ASSIGNMENT IN TERMS OF SECTION 16(2) OF THE OHSA (ACT 85 of 1993)

Section 16 of the Act states:

(1) Every chief executive officer shall, as far as is reasonably practicable, ensure that the duties of his employer as contemplated in this Act; are properly discharged.

(2) Without derogating from his responsibility or liability in terms of sub-section (1), a chief executive officer may assign any duty contemplated in the said sub-section, to any person under his control, which person shall act subject to the control and directions of the chief executive officer.

(3) The provisions of sub-section (1) shall not, subject to the provisions of section 37, relieve an employer of any responsibility of liability under this Act.

(4) For the purpose of sub-section (1) the head of department of any department of State shall be deemed to be the chief executive of that department.

I, (full name of CEO)……do hereby assign my duties in respect of the overall management and control of to (full name of Appointee)

in his/her capacity as to ensure that the duties of the employer are carried out as contemplated in the Act and the Regulations as amended for (division/area/region/premises/project(s)).

SIGNATURE: …… **DATE:** ……

Designation: Chief Executive Officer

Kindly confirm your acceptance of this appointment by completing the following:

ACCEPTANCE OF ASSIGNATION

I,…… hereby accept this assignation and confirm that I am conversant with the requirements of the OHS Act and regulations as amended and agree to carry out the duties as set out for the employer.

NOTE : Your Attention is Drawn to regulation General Administrative Regulation 5 and Sections 8, 9, 13, 17, 18, 19, 20 and 37 of the Occupational Health and Safety Act No. 85 of 1993.

SIGNATURE: …….. **DATE:**……

Designation :……

ANNEXURE C – Appointment of H&S Representatives

APPOINTMENT OF HEALTH AND SAFETY REPRESENTATIVE IN TERMS OF SECTION 17 OF THE OHSA (ACT 85 of 1993)

(APPOINTEE'S NAME*) …*……..

I, (Appointer's full name) …… being an employee of (name of Contractor's organization) ……..... and, having been appointed as (area of responsibility e.g. Responsible Person for the construction of X on site Y) ……..…….., hereby appoint you (Appointee's full name) ……..…….. in terms of Section 17 of the OHSA as the Health and Safety Representative for (area of responsibility) ……..……..……..

In terms of this appointment your functions are as follows:

- To represent your employee electorate's interests in terms of occupational health and safety.
- To carry out health and safety inspections of your workplace as designated above prior to each appropriate health and safety committee meeting.
- To serve on the appropriate health and safety committee.
- To bring to the attention of your supervisor any deviations from the safe work procedures any other matters regarding health and safety that come to your attention at any time.

The dates and times of the health and safety committee meetings will be determined by the committee(s). You should attend all meetings of the health and safety committee on which you serve.

You will be required to undergo Health and Safety Representative training in order to ensure that you can complete your tasks successfully.

Your appointment is valid from (start date) …….. to (end date) ……..

Appointer's Signature…… Date…….

Kindly confirm your acceptance of this appointment by completing the following:

ACCEPTANCE

I, (Appointee's full name) …… understand the implications of the appointment as detailed above and confirm my acceptance.

Appointee's Signature…… **Date**……..

ANEXURE D – Recording Of Incidents

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993
(ACT NO 85 OF 1993)
REGULATION 9 OF THE GENERAL ADMINISTRATIVE REGULATIONS
RECORDING AND INVESTIGATION OF INCIDENTS

A. RECORDING OF INCIDENT

1. Name of employer ……

2. Name of affected person……

3. Identity number of affected person……

4. Date of incident .....5. Time of incident…….....

6. Part of body affected

Head or Neck	Eye	Trunk	Finger	Hand
Arm	Foot	Leg	Internal	Multiple

7. Effect on person

Sprains or strains	Contusion or wounds	Fractures	Burns	Amputation
Electric shock	Asphyxiation	Unconsciousness	Poisoning	Occupational Disease

8. Expected period of disablement

0-13 days	2-4 weeks	4-16 weeks	16-52 weeks	52 weeks or permanent disablement	Killed

9. Description of occupational disease……

10. Machine/process involved/type of work performed/exposure** ……

11. Was the incident reported to the Compensation Commissioner and Provincial Director?

Yes	No

12. Was the incident reported to the police?*

Yes	No

13. SAPS office and reference ……

* to be completed in case of a fatal incident.

** in case of a hazardous chemical substance, indicate substance exposed to:

B. INVESTIGATION OF THE ABOVE INCIDENT BY A PERSON DESIGNATED THERETO

1. Name of investigator .....
2. Date of investigation .....
3. Designation of lestigator .....
4. Short description of incident

   .....

   .....

   .....
5. Suspected cause of incident

   .....

   .....

   .....
6. Recommended steps to prevent a recurrence

   .....

   .....

   .....

Signature of Investigator: ..... **Date:** .....

C. ACTION TAKEN BY EMPLOYER TO PREVENT THE RECURRENCE OF A SIMILAR INCIDENT

.....

.....

.....

Signature of Employer: ..... **Date:** .....

D. REMARKS BY HEALTH AND SAFETY COMMITTEE

Remarks:

.....

.....

.....

Signature of Chairperson of Health & Safety Committee: ..... **Date:** .....

ANNEXURE E – Index of Project Health & Safety File

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993
(ACT NO 85 OF 1993)
REGULATION 5(1)(b) OF THE CONSTRUCTION REGULATIONS, 2014
PROJECT HEALTH & SAFETY FILE

1. LEGAL APPOINTMNENTS

- Updated Legal Appointments Register.
- Updated OH&S Organogram.
- Legal Appointments.
- Client Legal Appointment
- 37(2) Agreement with Client

2. COMPANY DOCUMENTATION

- Company Health & Safety Policy and other Policies
- Current Company Letter of Good Standing (WCA)
- Company & Site OH&S Rules
- Client Health & Safety Specifications
- Health & Safety Plan
- Notification of Construction Work (with proof of transmittal)
- Employee Medical Examination Certificates
- Certificates of Competence (CoC)

3. RISK ASSESSMENTS & SAFE WORK PROCEDURES

- Risk Assessments & SOP's Register
- Risk Assessments & SOP's
- List of Site Mandatory PPE.
- Method Statements

4. TRAINING

- Induction Training Manual.
- Induction Training Register
- Tool Box Talks
- First Aiders
- Health & Safety Representatives
- Scaffold Erectors & Inspectors
- Risk Assessor(s)
- Fire Teams
- Operators Of Machinery
- Etc…

5. SUB-CONTRACTOR MANAGEMENT

- Approved Sub-Contractor List.
- Sub-Contractor Legal Appointment
- Sub-contractor Letter of Good Standing
- Sub-Contractor Health & Safety Plan
- Mandatory Agreements with Principal Contractor
- Sub-Contractor Audit Reports
- Sub-Contractor Medicals
- Sub-Contractor Organogram & Legal Appointments

6. INCIDENT MANAGEMENT

- Incident Management/Reporting Procedure
- Emergency Procedure
- Simulation Drills
- Monthly Incident Statistics/Reports
- Incident/Accident Investigation Reports

7. OH&S AUDITS & INSPECTIONS

- Client's Audit Reports.
- Principal Contractor's Audit Reports
- Principal Contractor's Health & Safety Inspections.
- Health & Safety Representatives' Reports (Signed by Committee Chairperson).

8. OH&S MEETINGS

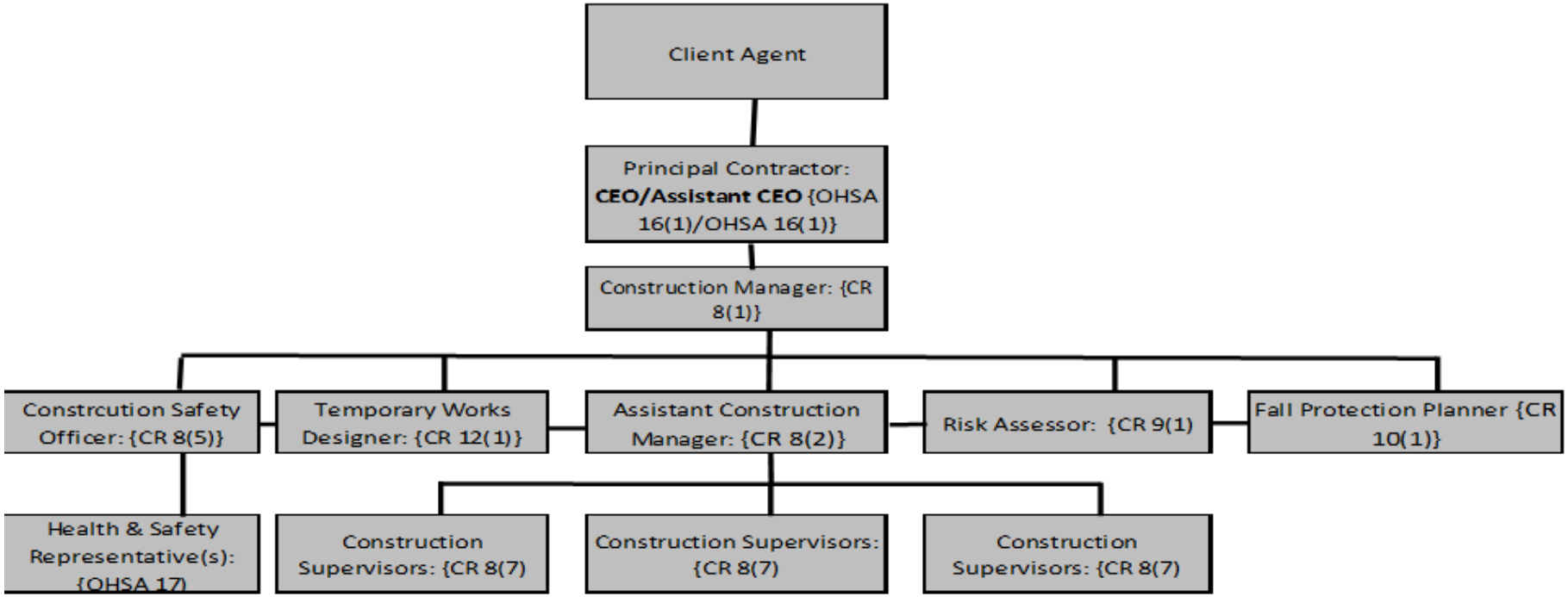
- Project OH&S Coordination Meetings (where applicable)
- Principal Contractor's Health & Safety Committee Members List
- Principal Contractor's Health & Safety Committee Meetings minutes (with agenda & attendance registers)

9. INSPECTION REGISTERS

(As per site requirements)

ANNEXURE F – Legal Appointment Register

Name	Designation	Appointment name	Appointment clause	Date appointed	On site	Off-site
	Site manager	Manager	16(2)	11-Jul-10	X	
	General Foreman	Supervisor of Construction work	CR 6(1)	12-Jul-10	X	
	truck driver	Construction vehicle operator	CR21	11-Jul-10	X	
	Foreman	Assistant to Sup. Of construction work	CR 6(2)	11-Jul-10		X
	Mechanic	Safety Representative	OHSAct 17(1)	12-Jul-10	X	
	Foreman	Excavation Supervisor	CR 11(1)	13-Jul-10		X



Approved: .....

Date: ...../...../.....

C3.8.7 PARTICULAR SPECIFICATION: PZ - EMPLOYER'S ENVIRONMENTAL MANAGEMENT SPECIFICATION FOR ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION PROJECTS

TABLE OF CONTENTS **PAGE**

PZ1 Introduction C3.200
PZ2 Site Establishment and Housekeeping C3.205
PZ3 Construction C3.207
PZ4 Reinstatement and Rehabilitation C3.217
PZ8 Measurement and Payment C3.223

C3.8.7 PARTICULAR SPECIFICATION: PZ - EMPLOYER'S ENVIRONMENTAL MANAGEMENT SPECIFICATION FOR ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION PROJECTS

PZ1 INTRODUCTION

PZ1.1 SCOPE

This specification is additional to the South African Bureau of Standards Standardised Specification for Civil Engineering Contracts and must be read in conjunction with the said specification.

This specification covers the principles, responsibilities and requirements generally applicable to implement effective environmental management during the execution of any construction contract. is so doing this Specification represents minimum standards of conduct applicable to the contract with respect to environmental management. In addition the specification references specific requirements of the Environmental Authorisation and Environmental Management Programme (EMPr) for Phase 1 of the project.

For more detailed requirements the Contractor is directed to the EMPr which forms part of this contract. The requirements of the EMPr rule and supersede those of this Specification.

The aim of this specification is to ensure that construction activities are conducted in an environmentally and socially responsible manner and that the requirements of the Environmental Authorisation and Environmental Management Programme are kept in mind at all times.

PZ1.2 INTERPRETATIONS

This specification contains clauses that are generally applicable to the implementation of effective environmental management on construction contracts. Interpretations of, and variations to, this specification are set out in the project specification.

PZ1.2.1 Supporting specifications:

Reference is made to the SABS 1200 standards which are to be read in conjunction with this specification. All aspects of these SABS requirements which are relevant to environmental management during construction contracts will apply.

PZ1.2.2 Principles

The following principles should be considered at all times during construction phase activities:

- The Environment is considered to be composed of both biophysical and social components.
- Construction is a disruptive activity and all due consideration must be given to the environment, particularly the social environment, during the execution of a project to minimise the impact on affected parties.
- Minimisation of areas disturbed by construction activities will minimise many of the construction related environmental impacts of the project and reduce rehabilitation requirements and costs.
- As minimum requirements, all relevant standards relating to international, national, provincial and local legislation, as applicable, shall be adhered to. This includes requirements relating to waste emissions (e.g. hazardous, airborne, liquid and solid), waste disposal practices, noise regulations, road traffic ordinance etc.
- All effort should be made to minimise, reclaim or recycle ‘waste’ material. The disposal of waste material is subject to strict conditions and sanctions apply to unauthorised disposal.

PZ1.3 DEFINITIONS

For the purpose of this specification, the definitions given in SABS 1200 shall apply.

Additional definitions which shall apply to this specification are as follows:

Environmental Control Officer: Either an Employer's staff member or an Environmental Consultant assigned to the project on a part or full-time basis. The Environmental Control Officer will be part of the Project staff and will advise the Employer's Agent on all environmental matters relating to the works, in terms of this specification and the project specification, if applicable.

Environmental Officer: Either an Employer's employee (e.g. Quality Assurance Inspector) or Consultant designated to monitor the implementation and compliance with the environmental specifications and environmental management plan on a daily basis.

Cleared surface: "surface vegetation" as referred to in SABS 1200 C 2.3 will be deemed to be any woody or herbaceous vegetation but exclude grasses, sedges, rushes and reeds. Clearing and grubbing shall for the purpose of this specification mean the removal of all woody and herbaceous vegetation including stumps, but excluding grass and groundcover vegetation.

Employer's Agent: As defined in GCC2015

Interested and Affected Parties (IAP): All persons who may be affected by the project either directly or indirectly, or who have an interest or stake in the area to be affected by the project. IAPs include landowners, tribal or local authorities, public interest groups etc.

Liquid Waste Stream: Any reagent solutions, fuels, oils, greases, contaminated run-off, sewerage and wash water, etc.

Open Trench: Open trench will, for the purpose of this specification, be deemed to include: clearing and grubbing; stripping of topsoil; trenching; placing of bedding; pipe-laying; placing of selected fill; backfilling to ground level; removing excess material; construction of cross berms to channel water (if required); and replacement of topsoil to final finished level (refer to Figure 1: Appendix A).

Progressive Reinstatement: Reinstatement of disturbed areas to topsoil profile on an ongoing basis, immediately after selected construction activities (e.g. backfilling of a trench) are completed. This allows for passive rehabilitation (i.e. natural recolonisation by vegetation) to commence. See also 'Open Trench' and 'Rehabilitation'.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement revegetation of a disturbed area and the ensurance of a stable land surface. Revegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

Riparian vegetation: Vegetation occurring on the banks of a river or stream (i.e. vegetation fringing a water body). In this specification, riparian vegetation in terms of removal, storage and replacement (see PZ3 17.1 and PZ3 17.2), is only applied to sedge, grass, ground-cover, reed, bulrush, or herbaceous component of riparian vegetation and excludes the woody component.

Sedges: Grass-like plants growing in wetland/ marshy areas or adjacent to water.

Subsoil: Subsoil is the soil horizons between the topsoil horizon and the underlying parent rock. Subsoil often has more clay-like material than the topsoil. Subsoil is of less value to plants, in terms of nutrient (food) and oxygen supply, than topsoil. When subsoil is exposed it tends to erode fairly easily.

Timeous: At least 5 working days prior to an activity.

Topsoil: This is defined as the A horizon of the soil profile. Topsoil is the upper layer of soil from which plants obtain their nutrients for growth. It is often darker in colour, due to the organic (humic) fraction. Topsoil is deemed for the purposes of this specification as the layer of soil from the surface to the specified depth required for excavation (see PZ3 5.3, relevant SABS 1200 clause and project specification). Where topsoil is referred to, it is deemed to be both the soil and grass / ground cover fraction. (see 'Cleared Surface')

Veld: This is defined for the purpose of this specification as unimproved natural vegetation areas (e.g. grasslands).

Water body: Any open body of water including streams, dams, rivers, lakes, and the sea.

Wetland: A seasonally, temporally, or permanently wet area which also may exhibit a specific vegetation community. It is often marshy in character.
Wetland Vegetation: Vegetation which is indicative of a wetland environment - for example, sedges, rushes, reeds, hydrophilic grasses and ground-covers, but for the purposes of this specification excludes woody species.

Xeriscaping: Landscaping with vegetation which has a low water usage. The objective is to conserve as much water as possible, whilst still beautifying an area (i.e. conservation and aesthetics). Concept embraces utilising indigenous as opposed to exotic plants.

PZ1.4 ABBREVIATIONS

DWS	:	Department of Water & Sanitation (previously Dept of Water Affairs)
ECO	:	Environmental Control Officer
EMP	:	Environmental Management Plan (in this contract the EMPr)
EMPR	:	Environmental Management Programme Report (in this contract the EMPr)
EO	:	Environmental Officer
IAPs	:	Interested and Affected Parties
IEM	:	Integrated Environmental Management
MSDS	:	Material Safety Data Sheet

PZ1.5 DRAWINGS

Drawings referred to in this specification are included in Volume 2: Drawings.

PZ1.6 FORMS

Forms referred to in this specification are included in Part T2 or attached to this environmental specification.

PZ1.7 CONDITIONS OF CONTRACT

PZ1.7.1 Duties and Powers of the Employer's ISD Representative

The Employer's ISD Officer:

- arranges information meetings for or consults with IAPs about the impending construction activities;
- may on the recommendation of the Employer's Agent and /or Environmental Officer order the Contractor to suspend any or all works on site if the Contractor or his Subcontractor/ supplier fails to comply with the said specifications;
- maintains a register of complaints and queries by members of the public at the site office as per attached pro-forma. This register is forwarded to the Environmental Control Officer on a monthly basis.

PZ1.7.2 Duties and Powers of the Employer's Agent

The Employer's Agent is responsible for:

- enforcing the environmental specification on site;
- monitoring compliance with the requirements of the specification;
- assessing the Contractor's environmental performance in consultation with the Environmental Officer from which a brief monthly statement of environmental performance is drawn up for record purposes;
- documenting, in conjunction with the Contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video record.

PZ1.7.3 Duties and Powers of the Environmental Control Officer

The Environmental Control Officer:

- briefs the Contractor about the requirements of the Environmental Specification and/ or Environmental Management Plan, as applicable;
- advises the Employer's Agent about the interpretation, implementation and enforcement of the Environmental Specification and other related environmental matters;
- attends site meetings, as necessary;
- monitors the Constructor's compliance with this specification and the project environmental specification as applicable;
- undertakes periodic audits of the effectiveness of the environmental specifications on the site;
- communicates environmental policy issues to the Employer's Agent;
- provides technical advice relating to environmental issues to the Employer's Agent;
- reports on the performance of the project, in terms of environmental compliance.

PZ1.7.4 Duties and Powers of the Environmental Officer

The Environmental Officer:

- attends site meetings;
- monitors the site for compliance with the Environmental Specification and EMP;
- reports on the performance of the project in terms of environmental compliance to the ECO and Employer's Agent as per the pro-forma attached;
- liaises with the ECO on matters of policy and those requiring clarity and advice.

PZ1.7.5 Extent of the Contractor's Obligations

The Contractor is required to:

- provide information on previous environmental management experience and company environmental policy;
- supply method statements for all activities requiring special attention as specified and/or requested by the Environmental (Control) Officer and/or Employer's Agent during the duration of the Contract;
- be conversant with the requirements of this environmental specification and the project specification as applicable;
- brief his staff about the requirements of the environmental specification;
- comply with requirements of the Environmental (Control) Officer in terms of this specification and the project specification, as applicable, within the time period specified;

- ensure any sub-contractors/ suppliers who are utilised within the context of the contract comply with the environmental requirements of the Employer, in terms of the specifications. The Contractor will be held responsible for non-compliance on their behalf;
- bear the cost of any delays, with no extension of time granted, should he or his Sub-Contractors/ Suppliers contravene the said specifications such that the Employer's Agent orders a suspension of work. The suspension will be enforced until such time as the offending party(ies), procedure, or equipment is corrected;
- bear the costs of any damages/ compensation resulting from non-adherence to the said specifications or written site instructions;
- comply with all applicable legislation in terms of 7.6 below;
- ensure that he informs the Employer's Agent timeously of any foreseeable activities which will require input from the Environmental (Control) Officer.

The Contractor will conduct all activities in a manner that minimises disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment.

PZ1.7.6 Compliance with Applicable Laws

The supreme law of the land is "The Constitution of the Republic of South Africa", which states:

"Every person shall have the right to an environment which is not detrimental to his or her health or well being"

Laws applicable to protection of the environment in terms of Environmental Management (and relating to construction activities) include but are not restricted to:

Animals Protection Act, Act No 71 of 1962
Atmospheric Pollution Prevention Act, No 45 of 1965
Conservation of Agricultural Resources Act, No 43 of 1983
Environmental Conservation Act, No 73 of 1989
Environmental Planning Act, Act No 88 of 1967
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, No 36 of 1947
Forest Act, No 122 of 1984
Forest and Veld Conservation Act, Act No 13 of 1941
Hazardous Substances Act, No 15 of 1973
Lake Areas Development Act No 34 of 1975
Land Survey Act, No 9 of 1921
Minerals Act, No 50 of 1991
Mountain Catchment Act, No 63 of 1970
National Monuments Act, No 28 of 1969
National Parks Act, No 57 of 1976
National Resources Development Act, Act no 51 of 1947
National Water Act, No 36 of 1998
Occupational Health and Safety Act, No 85 of 1993
Provincial and Local Government Ordinances and Bylaws
Soil Conservation Act, Act No 76 of 1969
Water Services Act No 108 of 1997

and all regulations framed thereunder and amendments there to.

PZ1.7.7 Compliance with the Environmental Specification

The Contractor is deemed not to have complied with the Environmental Specification if:

- within the boundaries of the site, site extensions and haul/ access roads there is evidence of contravention of clauses;
- if environmental damage ensues due to negligence;
- the Contractor fails to comply with corrective or other instructions issued by the Employer's Agent within a specified time,
- the Contractor fails to respond adequately to complaints from the public.

Application of a penalty clause will apply for incidents of non-compliance. The penalty imposed will be per incident. Unless stated otherwise in the project specification, the penalties imposed per incident or violation will be:

Failure to demarcate working servitudes	R1000
Working outside of the demarcated servitude	R2000
Failure to strip topsoil with intact vegetation	R1000
Failure to stockpile topsoil correctly	R500
Failure to stockpile materials in designated areas	R500
Pollution of water bodies (including increased suspended solid loads)	R1000
Failure to control stormwater runoff	R1000
Failure to provide adequate sanitation	R500
Unauthorised removal of woody vegetation	R2000
Failure to erect temporary fences	R500
Failure to provide adequate waste disposal facilities and services	R500
Failure to reinstate disturbed areas within the specified time-frame	R3000
Failure to rehabilitate disturbed areas within the specified time-frame	R3000
Any other contravention of the project specific specification	R400
Any other contravention of the particular (general) environmental specification	R300

PZ2 SITE ESTABLISHMENT AND HOUSEKEEPING

PZ2.1 LAYOUT

The Contractor will take into account any of the limitations identified in the project specification with regard to establishment of site, in particular the location of access routes, and establishment layout.

Notwithstanding the provision of a project specification, the Contractor will provide the Environmental Control Officer with a layout design of the site indicating the position of all of the following, as applicable: offices, ablution facilities, storage areas, workshops, laboratories, batching plant, particulate matter stockpile area (i.e. soil/ granular chemicals/ cement fines etc), waste disposal facilities, hazardous substances storage area, access routes, etc. This layout plan is to be submitted prior to site establishment for acceptance. Any changes to this plan require review by the Employer's Agent in conjunction with the ECO.

The Contractor will take into account prevailing wind directions when designing the site layout to minimise impacts due to dust, unpleasant odours etc.

The Contractor will take into account the positions of residences when designing the site layout in order to minimise noise impacts on the residents.

Site security lighting is to be positioned such that the direct beam is focused away from residential properties and does not pose a nuisance or danger to road users.

No site establishment will be allowed within 100 m of a water body or drainage channel or on a flood plain unless approved by the Environmental (Control) Officer or specified in the project specification.

PZ2.2 SITE CLEARANCE

No trees or shrubs may be removed without the prior permission of the Environmental Officer, unless in keeping with the final site reinstatement and rehabilitation plan.

Topsoil is to be stripped from all areas where permanent or temporary structures and access roads are to be constructed. Topsoil conservation is to be in terms of clause PZ3 5.3 of this document.

PZ2.3 SERVICES

PZ2.3.1 Sanitation

Portable chemical toilets are to be utilised at site unless a connection to sewer is possible or a proper septic tank system is installed. In the case of the septic tank, the installation will require the relevant approvals from the local authority and will require removal upon completion of the contract, unless otherwise directed.

Sanitation facilities will be located within 100 m from any point of work, but not closer than 50 m to a water body.

PZ2.3.2 Solid Waste Facilities

Facilities for solid waste collection are to be provided. These are to be at least a 200 l drum and clearly identified as the point for waste disposal.

Waste is to be separated into paper, glass and metal with separate collection points for each. The Contractor will ensure that the appropriate recycling contractors receive this waste.

The Contractor is to institute a daily litter collection programme. The collected waste is to be disposed of regularly and proportionately to its generation at a site designated for waste disposal.

No burning will be permitted on any site unless by approved incineration methods and in a low risk fire area. In the case of incineration, ash is to be co-disposed with spoil in a designated spoil dump.

No burying of waste will be allowed on any site.

PZ2.3.3 Cooking and Heating Facilities

No open fires will be allowed anywhere on site.

Contained fires (i.e. in a fire drum) will be allowed for heating and cooking only in designated areas, in other cases cooking is restricted to gas or electrical equipment.

PZ2.4 FUELS, HAZARDOUS SUBSTANCES AND OTHER LIQUID POLLUTANTS

PZ2.4.1 Storage and handling

All potentially hazardous raw and waste materials are to be handled by trained staff and stored on site in accordance with manufacturer's instructions and relevant legal requirements. Hazardous waste shall only be disposed of at an appropriately licenced and registered solid waste disposal facility. The product MSDS is to be lodged with the Employer's Agent.

Storage and handling areas for fuels, lubricants, chemicals and other hazardous substances are to be paved with concrete to prevent accidental contamination of the soil. Alternatively, an impermeable liner may be placed beneath above-ground storage tanks. The integrity of the liner is to remain intact for the duration of the contract, until removal.

Open storage vessels, for example shutter lubricant drums, are to be stored under cover to prevent 'splash' contamination.

All storage areas are to be bunded (with at least sandbags) and have a peripheral collection drain, with oil interceptors (if required).

The bunded area is to be sufficiently large to contain a spillage equivalent to the volume of one container of the substances stored.

All products to be dispensed from 200 litre drums will be done so with appropriate equipment, and not dispensed by tipping of the drum.

Daily checks are to be conducted on the dispensing mechanism of above-ground storage tanks to ensure the timeous identification of faults.

Collection containers (e.g. drip trays) are to be placed under all dispensing mechanisms of hydrocarbon or hazardous liquid substances to ensure contamination from leaks and dispensing is contained.

The dispensing mechanism of diesel and petrol storage tanks is to be stored in a container when not in use.

PZ2.4.2 Control of pollutants

A drainage diversion system is to be installed to divert runoff from areas of potential pollution, e.g. batching area, vehicle maintenance area, workshops, chemical and fuel stores, etc if applicable.

Contaminated runoff and waste water is to be directed into a collection system (e.g. sump, attenuation dam, PVC porta-ponds etc.) for treatment or collection and disposal. The final collection point (e.g. sump) is to be PVC lined.

Collected contaminated runoff/ wastewater is to be pumped out of the final collection point and disposed of at an appropriate landfill site. Sump liners are to be treated in the same manner.

The treated waste water, effluent and contaminated runoff may require analysis prior to discharge as detailed in the project specification or instructed by the Environmental Officer.

Details regarding proposed methods for treatment of pollutants are to be submitted to the Environmental (Control) Officer for acceptance upon award of the Contract.

Any spillages, irrespective of their size, are to be contained and cleaned up immediately. The Pollution Control section may provide technical assistance for cleanup, if required. No spills may be hosed down into a stormwater drain or sewer.

Use of specialised cleanup techniques and/ or products may be required depending on the spill. This will be instructed by the Environmental Control Officer. These will be to the Contractor's cost.

PZ2.5 GENERAL

Site staff are not permitted to use any open water body or other natural water source (e.g. springs) for purposes of bathing, or the washing of clothes, machinery or vehicles. Nor draw water from a spring without the permission of the community utilising that spring.

PZ3 CONSTRUCTION

PZ3.1 CONSTRUCTION METHODS AND PROGRAMME

PZ3.1.1 Construction Method

The Contractor will provide method statements for construction activities (14 working days prior to the activity commencing) relating to the following environments and those listed in the project environmental specification, unless methods have been prescribed in this or the project environmental specification:

- rivers, streams, or any other open water body;
- wetlands;
- access roads (see PZ3.13 below);

- steep slopes (i.e. steeper than 1:4) or less if friable material is present;
- indigenous bush/ forest;
- close proximity (i.e. 50 m or less) to a residential dwelling;
- drilling and/or blasting of rock.

If a construction method employed by the Contractor is not environmentally acceptable to the Employer, the Contractor may be instructed to cease the utilisation of that method in favour of a more environmentally acceptable one, proposed either by himself or the Employer.

PZ3.1.2 Construction Programme

The Contractor will programme construction so as to minimise the impact on the environment and provide this programme to the Environmental Control Officer for perusal and acceptance at the onset of the contract period. The Environmental Control Officer is to made aware of any amendments to the construction programme or alterations to the scope of work in order that their impacts on the environment can be assessed.

The Contractor shall ensure that all affected landowners/ authorities are advised of the proposed programme at the beginning of the contract period.

PZ3.2 AREAS OCCUPIED / DEMARCATION OF SITE

Routes for temporary access and haul roads are to be located within the approved demarcated areas and vehicle movement is to be confined to these roads. Movement of vehicles outside the designated working areas is not permitted without authorisation from the Employer's Agent.

All construction activities are restricted to working areas designated on the drawings and/or demarcated and approved by the Employer's Agent. Materials including spoil are stockpiled at designated areas.

Any areas disturbed outside of the demarcated areas or without permission of the Environmental (Control) Officer or Employer's Agent will be subject to reinstatement and rehabilitation (as per PZ4 below) to the Contractor's cost.

For the pipeline construction, unless otherwise indicated in the project specification or drawings, a general maximum working servitude width of 20 m will apply for machine excavation for the DN700 pipelines and a maximum working servitude width of 10 m will apply for machine excavation for the DN200 pipelines. A maximum width of 6 m will apply for manual excavation. These maximum working servitude widths may vary depending on the sensitivity of the environment, as detailed in the project specification.

In sensitive biophysical environments, for example wetlands, indigenous forest / bush, pristine natural grasslands, and sensitive social environments, as defined in the project specification or by the Environmental Control Officer, the working servitude is reduced as indicated in the project specification.

The working servitude shall contain all construction related activities, including, stockpiling of materials, placing of toilets, vehicle movement areas, etc.

Demarcation of linear projects shall be clearly marked, on either side of the linear feature, in all areas where works are occurring. Progressive movement of fencing is required as linear projects progress.

In the case of a fenced site, the boundary fences will be denoted as the outermost limit of the site, but internal areas may be demarcated with stakes as above. The site boundaries of non-fenced, but 'contained' projects are to be delineated using stakes or temporary fencing, depending on the hazard which that site poses.

PZ3.3 SUPPLY OF WORKS FACILITIES

No water may be abstracted from water bodies for the purposes of construction, without approval of the Employer's Agent in consultation with the Environmental Control Officer.

PZ3.5 SITE CLEARANCE

PZ3.5.1 Clearance

Spoil sites will require clearing in addition to those areas in terms of SABS 1200 C 5.1.

The site shall only be cleared immediately prior to construction activities commencing i.e. at the last practicable stage.

No trees or indigenous shrubs may be removed without the prior permission of the Environmental (Control) Officer, unless in keeping with the final site reinstatement and rehabilitation plan.

PZ3.5.2 Disposal of materials

Material obtained from clearing operations shall be disposed of at appropriate municipal disposal facilities. They are not to be disposed of as per Paragraph 1 of Sub-clause 3.1 of SABS 1200 C.

Wood obtained from clearing and grubbing operation remains the property of the landowner/ community and must be stacked at sites designated by relevant person. The Contractor will be required to remove and dispose of any wood from site at a designated site for vegetation disposal, should the landowner/ community not require it.

All tree trunks and branches of diameter greater than 50 mm are to be cut into lengths not exceeding 2400 mm.

Brush wood (i.e. < 50 mm diameter) is to be disposed of, or utilised as specified in the project specification or upon instruction of the Employer's Agent.

PZ3.5.3 Conservation of topsoil

The Contractor is required to strip topsoil (as defined in this specification) together with grass, groundcover and sedges from all areas where permanent or temporary structures are located, construction related activities occur, and access roads are to be constructed, etc. The depth to which topsoil will be stripped shall be 200 mm unless stated otherwise in the project specification.

Topsoil is to be handled twice only - once to strip and stockpile, and secondly to replace, level, shape and scarify.

Topsoil is to be replaced along the contour.

Topsoil is to be replaced by direct return (i.e. replaced immediately on the area where construction is complete), rather than stockpiling it for extended periods. This is feasible for progressive construction (e.g. pipelines), but not necessarily so for reservoirs, site establishments, dams, etc.

Topsoil stockpiles are not to exceed 2 m in height.

Topsoil stockpiles are to be maintained in a weed free condition (i.e. no 'broad-leafed' plants regarded as weeds in terms of the Conservation of Agricultural Resources Act No 43 of 1989, or those plants regarded as a 'general nuisance in the area' are to be growing on the stockpiles). The Environmental Control Officer will provide guidance as to which plants are weeds and require removal.

The stockpiles are not to be contaminated with sub-soil, or any other waste material.

Topsoil may not be compacted in any way, nor may any object be placed or stockpiled on it.

Topsoil may not be compacted in any way, nor may any object be placed or stockpiled on it.

Topsoil which is to be stockpiled for periods exceeding 4 months is to be vegetated. In summer a mixture of Eragrotis tef (Teff) and Eragrostis curvula (Weeping Lovegrass) (ratio 1:2) is to be applied at an application rate of 6 kg/ha, unless otherwise instructed in the project specification.

In winter, a mixture of Lolium multiflorum (Annual/Italian Rye grass) and Eragrostis curvula (Weeping Lovegrass) (ratio 1:1) is to applied at an application rate of 6kg/ha (see PZ4 5.3 for sowing times), unless otherwise instructed in the project specification. Fertiliser is to be applied as per PZ4 5.2.

PZ3.5.4 Cutting of trees

Any tree branches which require removal are to be properly pruned and sealant applied to the cut surface, if required.

The Contractor's attention is drawn to Sub-clause 5.2.3.3 of SABS 1200 C with respect to work in indigenous forests.

Any indigenous trees or bush which require removal in terms of the project, and which have not been identified in the project specification or EMP, are to be timeously indicated to the Environmental Officer prior to work affecting them.

PZ3.5.5 Landscape Preservation and Conservation of Flora

Notwithstanding Clause 5.7 of SABS 1200 C, the Contractor will be required to transplant designated plants to alternative locations as specified in the project specification or identified by the Environmental Control Officer, upon the instruction of the Employer's Agent.

Transplanting shall be undertaken by employing the following method:

Removal

- Mark the orientation of the tree/shrub (for example, the north-facing side of the trunk indicated by a small arrow made with indelible ink) trunk. Do not scratch a mark on the surface of the trunk;
- Delineate a circle from the trunk with a radius equivalent to the drip-line of the tree, or as indicated by the Environmental Control Officer on site;
- Excavate the tree with an intact rootball.

Replanting

- A hole 500 mm larger in diameter than the anticipated rootball must be prepared in advance of the tree removal in order that the tree can be replanted immediately;
- The tree must be positioned as per its original orientation;
- A planting method known as 'puddling' must be employed. This method involves the addition of soil and water simultaneously to expels air from the planting hole. Place the tree in its new hole, making sure the top surface of the rootball is level with the ground level. Place a hose pipe in the hole and leave it running whilst extra soil is added around the rootball;
- 'Compact' the tree in the hole and attach tree stays for stabilisation.

Compensatory planting of species may be required should transplantation not be feasible, as indicated in the project specification or upon instruction of the Employer's Agent.

PZ3.6 EARTHWORKS

PSZ3.6.1 Backfill material

With reference to SABS 1200 DB sub-clause 3.5, no material stripped or excavated which is classed, in terms of this specification, as topsoil, may be used as backfill in any excavation.

PZ3.6.2 Excavation and backfilling

During excavation 'conservation of topsoil', as specified in PZ3 5.3 above will apply.

Excavated material is to be stockpiled along a pipeline trench within the working servitude, unless otherwise authorised.
Surplus excavated soft, intermediate and hard rock material shall not be disposed of along the pipeline trench as indicated in SABS 1200 DB sub-clause 5.6.3 and 5.6.4, but shall be removed to a spoil site (see PZ3.15 below) designated during the project if applicable, or agreed by the Employer's Agent in conjunction with the Environmental Control Officer.

In certain cases, for example to help stabilise the disturbed area or to reinstate the natural aesthetics of an area, excess excavated intermediate and hard material may be disposed of in a designated manner along a pipeline trench, as indicated by the Environmental Control Officer, or in the project specification. In this case, rock material shall not exceed 250 mm in maximum dimension (see PZ4 2.1).

In terms of SABS 1200 DB 5.6.5 and SABS 1200 LB 3.4.2, deficiency of backfill material shall not be made up by excavation within the free haul distance of 0.5 km of site, without the prior approval of the Employer's Agent of the source of the material. Where backfill material is deficient, it should ideally be made up by importation from an approved borrow pit (i.e. one which operates within the ambient of an EMPR.) (See also PZ3 14 below).

The Contractor will backfill in accordance with the requirements of progressive reinstatement.

The maximum length of open trench shall be specified in the project specification.

PZ3.8 Not used

PZ3.8 PLANT

PZ3.8.1 Silencing of plant

With reference to SABS 1200 A amend: "built up areas": to read as "all areas within audible distance of residents (albeit urban, peri-urban or rural areas)."

Appropriate directional and intensity settings are to be maintained on all hooters and sirens.

Silencer units on equipment and vehicles are to be maintained in good working order.

Construction activities are to be confined to normal working hours as defined in the specification.

PZ3.8.2 Appropriate use of plant

The Contractor will at all times use plant which is appropriate to the task in order to minimise the extent of damage to the environment.

PZ3.9 DEALING WITH WATER ON WORKS

PZ3.9.1 Disinfection of Potable Water Infrastructure

Disinfection water is to be neutralised before release of this water to the environment.

PZ3.9.2 Discharge of water from site

Any water which is discharged from site is to comply with the relevant Water Quality Guidelines implemented by DWA.

Water discharged to the stormwater / sewer system may only be done so with the permission of the relevant local authority.

PZ3.10 CONTROL OF EROSION

Surface erosion protection measures will be required to prevent erosion where slopes are steeper than 1:8 on all soil types.

Erosion protection measures required may include all or some of the below, as specified in the project specification or upon instruction of the Employer's Agent in conjunction with the Environmental (Control) Officer:

- use of groundcover or grass
- construction of cut off berms (earth and/or rockpack) - these are to be angled across the contour and normally would approximate an angle of 30o from the bisector of the contour.
- placing of brush wood on bare surface;
- pegging of wattle trunks or branches along the contour;
- hard landscaping, e.g. use of Loffelstein walls, ground anchors, gabions etc.

Scour chambers are to be fitted with energy dissipaters, or the jet of water directed onto a protected (i.e. grouted stone pitching/ rock pack/ reno mattress) area to dissipate water velocity and to control and prevent erosion.

Storm water drainage measures might be required on site to control runoff and prevent erosion.

PZ3.11 CONTROL OF POLLUTION

No waste in a solid, liquid or gaseous state shall be emitted from or spilled on the site without the approval of the Employer's Agent.

No mixed concrete shall be deposited directly onto the ground prior to placing. A board or other suitable platform is to be provided onto which the mixed concrete can be deposited whilst it awaits placing.

Excess concrete from mixing shall be deposited in a designated area awaiting removal to an approved landfill site.

The Contractor will contain wash water from cement mixing operations, by directing the water into a sump for collection. The material contained in the sump will be removed to an appropriate landfill site.

No concrete rubble shall be present at the site.

Liquid wastes will not be disposed of to storm water drains. They may be disposed of to sewer only if permitted by (local council) legislation.

In the event of pollution of a water body (including sediment loading), the Contractor will provide alternative water supply to users of that water body until the quality of the water body is restored to its previous unpolluted state. For the sake of this clause, pollution is deemed to be a state which is substandard to the normal quality of the water body, but is not necessarily in contravention of the South African Water Quality guideline standards for a prescribed activity.

Any ancillary damages resulting from pollution of a water body will be repaired / remediated at the Contractor's cost.

Where, due to construction requirements, pollution of a water body may potentially occur, the Contractor is to ensure adequate measures (e.g. attenuation/ settlement dams / oil absorbent products) are in place to prevent pollution. A method statement is to be provided to this effect (see PZ3 1).

PZ3.12 CONTROL OF FIRE

The Contractor will ensure he has the necessary fire fighting equipment on site in terms of SABS 1200. This will include at least rubber beaters when working in 'veld' areas, and at least one fire extinguisher of the appropriate type when welding activities are undertaken, irrespective of the site.

PZ3.13 USE AND MAINTENANCE OF ACCESS FACILITIES

PZ3.13.1 Responsibility

The Employer's Agent [not the Contractor (SABS 1200 AD 5.3.1)] will be responsible for obtaining permission for temporary and permanent rights of way over all private property affected by project activities.

The Contractor shall be responsible to keep a photographic record of all access facilities and that these are reinstated to a state not worse than upon commencement of the project and to the satisfaction of the landowner (not withstanding that the project's objective is not to upgrade landowners' access roads).

PZ3.13.2 Fencing

Temporary fencing is to consist of 1.2 m bonnox fencing, or similar, suitably tensioned and supported on 1.8 m fencing standards at 3 m intervals, with all necessary straining posts and stays.

All temporary fencing as indicated by the Employer's Agent is removed on completion of the contract.

PZ3.13.3 New Access Roads

Any construction roads created for execution of the project are to be designed to incorporate adequate drainage and water attenuation structures.

Any access roads which incorporate 'cut and fill' aspects and/or which are to be surfaced during construction are to be authorised by the Environmental Control Officer. Prior to construction of the road, the Contractor will be required to provide a sketch plan of the road layout (referenced to local topographic, natural and man-made structures). Slope steepness, road width, drainage structures and their frequency will need to be documented and accompany the sketch layout.

Construction access roads may not be wider than that necessary (maximum width 4 m) for movement of vehicles in one direction only. Should two way traffic be required, points people are to control vehicle movement on the 'single lane' road or passing bays are to be used where specified in the project specification or as identified by the Employer's Agent in conjunction with the Environmental Control Officer, unless otherwise stated in the project specification.

The cut and fill slopes of permanent roads will require grassing, as specified in the project specification or by the Environmental Control Officer, to increase stability and reduce aesthetic impacts. Hard landscaping may be required as per the project specification.

Temporary construction roads will require rehabilitation on completion of construction activities for which they were required. These roads will require rehabilitation as per PZ4 4 or as specified in the project specification. In the case of access 'tracks', only ripping to loosen compaction will be required unless otherwise stated by the Environmental Control Officer or project specification.

Access roads created by the project may only remain unrehabilitated on written request of the landowner, with his acceptance of the state of the road and a clause that the landowner accepts all responsibility for the road and its state.

PZ3.13.4 Maintenance of Existing Access Roads

The Contractor will record, photographically, the state of existing roads which are to be used for access, prior to plant utilising these roads.

During the contract period, the Contractor will ensure that all existing water attenuation and drainage structures are maintained in a state in which they can optimally perform their function.

Upon completion of the construction period, the Contractor will ensure that the access roads are returned to a state not worse than prior to construction commencing.

PZ3.14 BORROW PITS

Where the Contractor is required to import material this shall be from commercial sources or borrow areas specified in the project specification.

The Contractor may source material from alternative borrow pits provided: the site location; method of winning material and reinstatement and rehabilitation are environmentally acceptable and approved by the Environmental Control Officer.

In this regard, the Contractor shall give the Environmental Control Officer in writing, 30 days prior to opening up alternative borrow pits the following information for acceptance:

- quantities of borrow material required;
- method statement for excavation of material including depth and extent of excavation;
- anticipated ‘active life’ of the borrow area;
- proposal for reinstatement and rehabilitation of borrow area, including final profile;
- written approval from the landowner/ relevant authority that material may be removed from their land subject to their stated conditions, requirements, and royalties, and if the proposal is acceptable to the Environmental Control Officer.

Development and rehabilitation of borrow pit areas are likely to include the following activities (but these must not be regarded as exhaustive):

- Stripping and stockpiling of topsoil as per PZ3 5.3 of this specification;
- Removal (to nominal depth of 500 mm) and stockpiling of sub-soil;
- Infill of borrow pit with spoil material;
- Contouring of borrow pit to approximate natural topography and/ or reduce erosion impacts on the site;
- Placement of excavated subsoil over spoil material;
- Placement of stripped topsoil on subsoil;
- Grassing of topsoil in terms of clause PZ4 4 of this specification.

The Contractor is to familiarise himself with the requirements of the Minerals Act No 50 of 1991 in terms of borrow pit development, and the requirements of the EMPR, as applicable.

PZ3.15 SPOIL SITES

Where the Contractor is required to spoil material, spoil sites must be identified which are environmentally acceptable and approved by the ECO, unless spoil site areas have been identified in the project specification, in which case these will be the designated spoil sites.

If no spoil sites have been previously identified together with reinstatement and rehabilitation criteria, the Contractor is to provide the following information to the ECO at least 30 days prior to requiring sites to spoil material:

- the location, description of and access to alternative sites identified in order that they may be assessed;
- the quantity of material to be spoiled;
- the type of material to be spoiled (i.e. blast rock/ excavated rock/ soft shale/ subsoil etc.);
- the proposed method of spoiling;
- the proposed reinstatement and rehabilitation plan including final profile;
- written approval from the landowner/ relevant authority that material may be spoilt on land subject to their stated conditions and requirements and if the proposal is acceptable to the ECO.

Development and rehabilitation of spoil areas are likely to include the following activities (but these must not be regarded as exhaustive):

- Stripping and stockpiling of topsoil as per PZ3 5.3 of this specification;
- Removal (to nominal depth of 500 mm) and stockpiling of sub-soil;
- Placement of spoil material;
- Contouring of spoil site to approximate natural topography and/ or reduce erosion impacts on the site;
- Placement of excavated subsoil over spoil material;
- Placement of stripped topsoil on subsoil;

Grassing of topsoil in terms of clause PZ4 4 of this specification.

PZ3.16 NUISANCE

PZ3.16.1 Dust

At all times the Contractor shall control dust on the site, access roads, borrow pits and spoil dumps with water, chemical soil stabilisers or temporary surfacing as specified in the project specification or upon instruction of the Employer's Agent.

Dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments. These impacts include visual pollution, decreased safety due to reduced visibility, health aspects, and ecological impacts due to dust particle accumulation.

On gravel or earth roads, vehicle speeds may not exceed 30 km per hour.

PZ3.16.2 Noise

The operational layout of the construction site is to be designed to control and reduce noise from source (see clause PZ2 1).

Machinery and vehicle silencer units are to be maintained in good working order. Offending machinery and /or vehicles will be banned from use on site until they have been repaired.

Construction activities generating output levels of 85 dB(A) or more (excessively noisy), in residential areas, are to be confined to working hours (08h00 - 17h00) Friday
s to Fridays only.

'Normal' or 'noisy' working hours may only be extended with the prior written approval of the Employer's Agent, who shall have been notified, at least 7 days in advance, of the impending work requiring extension.

The Employer's Agent and the ISD Office will ensure that the neighbours are timeously forewarned of imminent noisy activities.

Should community complaints be received with regard to noise generation, the Contractor will, at the discretion of the Employer's Agent and Environmental Control Officer, provide an independent and registered noise monitor to undertake a survey of noise output levels from site, and implement measures to reduce noise to legislated levels.

PZ3.16.3 Visual

All site establishment components, as well as equipment, will be positioned to limit visual intrusion to neighbours (see clause PZ2 1 above).

The type and colour of roofing and cladding materials are to be selected to reduce reflection.

Security lighting (both temporary and permanent) and lighting required for specific works activities must be placed such that it is not a nuisance to residents and the general public.

PZ3.16.4 Interference with neighbours and public

No construction staff may approach site neighbours, for whatever reason, without the knowledge and permission of the Employer's Agent.

Complaints from neighbours and public with regard to interference from contract staff will be regarded in a serious light, and the offender(s) may be subject to disciplinary action.

PZ3.16.5 Disruption of Services

Disruption of services, e.g. road access, water and electricity, must be kept to a minimum at all times.

Where service disruption is unavoidable, the Contractor is to advise the Employer's Agent (at least 7 days in advance), who in turn will timeously warn the affected parties.

PZ3.17 SPECIAL ENVIRONMENTS

PZ3.17.1 Wetlands

Pipeline trenches which traverse wetlands shall be constructed as specified in the project specification. The Contractor will submit a method statement for work in wetland areas as per PZ3.1.1

Construction may not permanently alter the surface or subsurface flow of water through the wetland.

The Contractor shall submit a method statement for review at least 14 days prior to commencing construction in a wetland.

The Contractor will remove all wetland vegetation with their root ball intact. This vegetation is to be kept moist at all times. It is to be placed in the shade and covered with moistened hessian cloth until replanting, which is to be undertaken immediately surface reinstatement is complete.

No construction materials may be stockpiled in any wetland areas.

The pre-construction profile of the wetland shall be returned to one similar as before construction, with no created "ridge or channel" features present.

PZ3.17.2 River/ stream courses

The Contractor shall submit a method statement for review 14 days prior to commencing construction. The method statement should highlight (but not be confined to) the following issues:

- detailed plan of crossing including pipe protection works;
- how water flow will be diverted during construction (if applicable);
- containment of contaminated runoff and waste water;
- width of working servitude (if not already detailed in project specification);
- final expected profile of river/ stream banks;
- reinstatement and rehabilitation of river/ stream banks.

The Contractor will remove herbaceous riparian vegetation as indicated in the project specification or by the Environmental Control Officer, with their root ball intact. This vegetation is to be kept moist by means of placing it in the shade, covered with moistened hessian cloth until it is replanted.

The Contractor shall not modify the banks or bed of a water course unless as specified in the project specification.

Rocks for use in gabion baskets/reno mattresses may not be obtained from a water course.

The Contractor will not pollute any water body as a result of construction activities (see also PZ3.11).

The Contractor shall not cause any physical damage to any aspects of a water course, other than those necessary to complete the works as specified and in accordance with the accepted method statement

Where a stream or river crossing requires the diversion of water, a method statement is to be provided to the Environmental Control Officer in this regard for review.

PZ4 REINSTATEMENT AND REHABILITATION

Scope: Generally reinstatement shall be carried out by a specialist environmental rehabilitation firm as a sub-contract to the Main Contract. This section is provided for illustrative purposes to enable the Contractor to anticipate, and work in conjunction with, the reinstatement efforts.

The actions and approach of the Contractor are of crucial importance in the success of the reinstatement and rehabilitation, with the objective to ensure that the condition of the areas disturbed by the project are returned to a state that approximates what they were before the project or better, within reason.

Any rehabilitation plan submitted in this regard will supersede this section PZ4 once approved by the Employer.

The concept of progressive reinstatement is fundamental to cost effective (both financial and environmental) rehabilitation of a site. This concept must be followed at all times. Where landscaping is utilised, the concept is to utilise and restore indigenous plants to the site, in terms of the concept of xeriscaping.

Reinstatement will be required for all areas disturbed by the project. For pipeline projects, this will include the full working servitude, not just the top of actual excavation as per SABS 1200 DB (subclause 5.9.1.1).

The Contractor will reinstate and rehabilitate all disturbed areas outside of the demarcated working area (as defined in terms of clause PZ3 2 or the project specification) at his own cost and to the satisfaction of the Environmental Control Officer and Employer's Agent.

PZ4.1 HOUSEKEEPING

All areas are to be cleared of rubble associated with construction. This includes the removal of surplus materials, excavation and disposal of consolidated waste concrete and concrete wash water, litter, etc.

All soil contaminated by hydrocarbons, for example from leaking machines, refuelling spills etc., is to be excavated to the depth of contaminant penetration, placed in 200 litre drums and removed to an appropriate landfill site.

PZ4.2 FINISHING

PZ4.2.1 Final Grading

Final levels of all disturbed areas are, where feasible in terms of the project requirement, to be consistent with the natural topography of the area.

In certain instances, it will be acceptable to reinstate rock onto a works area (e.g. pipeline servitude), provided that that rock does not exceed 250 mm in maximum dimension and is placed in a manner consistent with the natural surrounds as indicated by the Environmental Control Officer and Employer's Agent.

All drainage lines affected by construction are to be reinstated to approximate their original profile. Where this is not feasible due to technical constraints, the profile is to be agreed upon by the Environmental Control Officer and Employer's Agent.

All compacted (disturbed) areas (including stockpile areas) are to be ripped (along contour) to a depth of 150 mm prior to the replacement of topsoil.

PZ4.2.2 Topsoiling

Topsoil is to be replaced to a minimum depth of 100 mm or as otherwise stipulated in the specification.

Topsoil is not to be compacted, but once replaced is to be scarified (to a depth of 50mm) consistent with the natural contour.

If insufficient topsoil is available, subsoil or similar material may be used that may be a suitable substrate after addition of soil improving substances e.g. compost, pH rectifiers (lime or gypsum) etc. Soil testing may be required at an approved facility.

PZ4.3 REINSTATEMENT OF WATER COURSES AND WETLAND AREAS

The Contractor will ensure that water course banks are returned to their original profile unless the project specification states otherwise.

The surface reinstatement of wetland areas is to ensure that no depressions remain which could act as channels for preferential water flow thereby affecting the hydrological regime of the wetland.

The Contractor will preserve all riparian and wetland vegetation for use in rehabilitation of those environments. This vegetation is to be kept moist at all times. It is to be placed in the shade and covered with moistened hessian cloth until replanting, which is to be undertaken immediately surface reinstatement is complete.

Plants are to be, as nearly as possible, replanted in areas from which they were removed.

PZ4.4 VEGETATION RE-ESTABLISHMENT

The Contractor will ensure that all areas disturbed by contract activities are revegetated to the specified standard.

This standard is deemed to be an 85 % cover with no areas in excess of 0.04 m^2 / m^2 remaining unvegetated.

Revegetation shall match the vegetation type which previously existed (e.g. kikuyu pastures are to be returned to kikuyu pasture; 'veld' grass to 'veld' grass, etc.), unless stated otherwise in the project specification.

Prior to re-grassing, and if required:

- the area is to be scarified or ripped (along contour) to a depth of 50 mm to loosen compaction.
- weeds present on site are to be removed.

Re-grassing, where required, will be either by means of seeding, instant turf (sods), sprigs or plugs as specified in the project specification or as specified by the ECO.

Where sprigs or plugs are utilised, they are to be planted at 200 mm centres. The fertiliser shall be applied as per PZ4 5.2. During summer, 25mm of irrigation shall be applied each week until reasonable (60%) ground cover has been obtained. During winter 15mm of irrigation shall be applied each week until reasonable (60%) ground cover has been obtained. The amount of irrigation to be applied will make up the difference between rainfall recorded on site and minimum requirement.

Where instant turf is utilised, it shall be laid as specified in the project specification. The fertiliser shall be applied as per PZ4 5.2. During summer, 25mm of irrigation shall be applied each week until all the turf is visibly growing. During winter 15mm of irrigation shall be applied each week until all the turf is visibly growing. The amount of irrigation to be applied will make up the difference between rainfall recorded on site and minimum requirement.

Grassing shall be undertaken by a specialist grassing Sub-contractor, unless permission is granted otherwise by the Employer's Agent upon receipt of a written motivation from the Contractor.

The Contractor shall state in writing when the regrassing operation will commence and its expected duration (dates).

Grassing in 'veld' areas is to be undertaken as per PZ4 5 below. Cynodon dactylon species may be excluded or substituted from this mixture at the discretion of the Environmental Control Officer, or as specified in the project specification. The seed bulk may be made up with the Eragrostis tef.

PZ4.5 "VELD GRASS" GRASSING SPECIFICATION

The area to be grassed should be estimated and converted to hectares,
e.g. 100m X 100m = 10 000m^2 = 1ha. All fertilizer and seeding rates used in this specification are with respect to hectares.

PZ4.5.1 Regional areas

For re-grassing three distinctive areas exist. These are defined as:

- the Coastal area (a narrow band running from the coast to ≈15km inland of the coast)
- the Coastal hinterland (a broad band (≈50km wide), generally defined as westwards of the coastal belt, and below 800m a.s.l.)

PZ4.5.2 Fertiliser

Standard 2:3:2 (N:P:K) fertiliser shall be used on all sites.

The rate of application will be:

- 200 kg/ha in the Coastal Hinterland areas, and
- 300 kg/ha in the Coastal areas.

PZ4.5.3 Planting times

Summer (includes Spring) is considered to be between the 1 September and 28 (29) February.

Winter (includes Autumn) is considered to be between 1 March and 31 August.

Re-grassing will be undertaken (as far as possible) in summer as germination and establishment of grasses is most effective, assuming reasonable spring rains.

Vegetation re-establishment is likely in many cases to be held off until this suitable growing season.

Hydroseeding with a winter mix will only be specified where regrassing is urgently required and cannot wait until the summer season. In this case irrigation will be required as per PZ4 5.4 below.

PZ4.5.4 Establishment and maintenance

During summer, 25mm of irrigation shall be applied each week until reasonable (60%) ground cover has been obtained.

During winter (where annual rye grass is specified) 15mm of irrigation shall be applied each week until reasonable (60%) ground cover has been obtained.
If rapid establishment is required, additional watering may be necessary as specified in the project specification

The amount of irrigation to be applied will make up the difference between rainfall recorded on site and the minimum requirement.

PZ4.5.5 Grass Seed Selection and Application Rates

The specific seed selection and application rates for each of the defined areas are covered separately, as follows.

PZ4.5.5.1 Coastal area

Summer mix (1 September - 28 February)

Grass species	Common name	General application rate (kg/ha)
Eragrostis tef	Teff	5
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	10
Digitaria eriantha	Smuts' fingergrass	5
Total		30

Winter mix (1 March - 31 August)

Grass species	Common name	General application rate (kg/ha)
Lolium multiflorum cultivar - Midmar	Annual/Italian rye grass	10
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	5
Total		25

PZ4.5.5.2 Coastal hinterland.

Summer mix (1 September - 28 February)

Grass species	Common name	General application rate (kg/ha)
Eragrostis tef	Teff	5
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	10
Cenchrus ciliarus	Blue buffalo grass	2
Cynodon dactylon	Couch/Kweek/Star grass	10
Total		37

Winter mix (1 March - 31 August)

Grass species	Common name	General application rate (kg/ha)
Lolium multiflorum cultivar - Midmar	Annual/Italian rye grass	10
Eragrostis curvula	Weeping lovegrass	10
Chloris gayana	Rhodes grass	5
Cenchrus ciliarus	Blue buffalo grass	2
Cynodon dactylon	Couch/Kweek/Star grass	3
Total		30

PZ4.5.6 Seeding methods

Two methods are recommended, namely hydroseeding and hand-broadcasting. The required method shall be as specified in the project specification.

All seed supplied should be labelled in accordance with the Government Seed Act No. 20 of 1961 and the Contractor shall be required to produce such certification, if requested by the Employer's Agent.

PZ4.5.6.1 Hydroseeding

The Grassing Contractor shall be conversant with this method.

Cellulose pulp (consisting of either wood shavings, shredded straw, shredded paper or cotton waste) shall be added to the mix to be applied at a rate of 250 kg/ha.

In addition to the cellulose pulp, compost (consisting of either chicken litter, kraal manure, sugar cane filter cake or mushroom compost) shall be incorporated at a rate of 5m3/ha (≈100 X 50kg fertiliser bags/ha).

PZ4.5.6.2 Hand-broadcasting

Fertiliser, at the appropriate rate, is to be distributed by hand in a manner to ensure that there is an even spread of fertiliser over the site. This is to be done prior to seeding.

The seed mix is to be weighed and made up in an appropriately large container which shall be stirred to ensure no settling out of the grass seed, and a uniform distribution of the different types of seed.

The seed is to distributed by hand in a regular grid broadcasting manner to ensure that there is an even spread of grass over the entire site.

The area seeded is to be raked over once the seed and fertiliser have been applied to incorporate these elements into the topsoil.

PZ4.5.7 General

Where there is a possibility of neighbourhood livestock grazing a rehabilitated site these should, as

far as is practicable, be excluded for the first 3 months of re-grassing.

PZ4.6 LANDSCAPING

Landscaping of the site may be required as indicated in the project specification.

Compensatory planting of trees or shrubs may be required should the transplantation of such not be successful in terms of PZ3 5.5 or due to plants removed in terms of PZ3 5.4

Planting of trees will be in accordance with the following method:

- All tree holes shall be square in plan;
- Tree holes shall be a minimum of 600 mm by 600 mm square by 700 mm deep;
- Holes are to be backfilled with excavated soil in a ratio of 3:1 with compost. The compost is to be weed free and have been composted at temperatures in the order of 65^{o}C. Where possible, any available topsoil should be placed in the hole at the level where the tree rootball will rest. A handful (half-a-cup) of each Superphosphate and 2.3.2 should be mixed into the soil-compost mix;
- The tree holes are to be backfilled to the point where the tree and its rootball are in the desired position. The tree is to be removed temporarily and the hole filled with water and allowed to drain away. This operation of watering and draining should be repeated at least four times in order that the surrounding ground and hole are thoroughly moist. The tree is then to be replaced and the remaining soil replaced;
- All trees shall be tied (using a tree tie) to a suitable timber stake planted in the ground to a depth of at least 500 mm. The stake shall have a minimum diameter of 35 mm and shall be at least 300 mm higher than the planted tree;
- Water retaining basins of at least 500 mm diameters are to be formed around each tree;
- The Contractor is to apply at least 10 litres of water per tree per fortnight for a period of at least 3 months.

The planting of shrubs will be in accordance with the tree planting method with the exception that the holes are to be a minimum of 400 mm by 400 mm square by 500 mm deep, and that the tree stakes and ties are not required.

PZ4.7 ALIEN PLANT CONTROL

All sites disturbed by construction activities will be monitored for colonisation by invasive alien plant species.

The Environmental Control Officer will identify those plants which require removal during both the construction and maintenance period, for the Contractor’s action.

The Environmental Control Officer will provide advice as to effective methods of removal and control of alien plant species.

PZ 8 MEASUREMENT AND PAYMENT

PZ8.1 MEASUREMENT

Final rehabilitation and reinstatement is in the scope of the specialist environmental sub-contractor.

Payment for compliance with this specification and with the EMPr attached in Section C4 is deemed to be covered by the items provided in Section A of the Bill of Quantities for fixed and time related obligations respectively or otherwise included in the Contractor's tendered rates.

PZ8.2 PAYMENT

Measurement and payment for activities as ordered by the Employer's Agent are those listed below. The Contractor shall obtain approval prior to commencing any activities under payment clause PZ8.2.

All other costs of compliance with the Environmental Specification and EMPr that are not included in payment clause PZ8.2 are deemed to be included in the Contractor's rates.

	Item	Unit
PZ8.2.1	Ripping of compacted and disturbed areas to 150 mm depth	m²
PZ8.2.2	Handtrimming	m²
	(ii) Topsoiling	
PZ8.2.3	Soil testing at an approved facility	sum per sample
PZ8.2.4	(a) Soil Improvements required prior to vegetation re-establishment:	
	(a) Compost (supplied, placed and mixed into the soil).....	ton
	(b) pH Rectifiers (supplied, placed and mixed into the soil).....	kg or ton
	(c) Fertiliser (2:3:2) (supplied, placed and mixed into the soil)	ton
PZ8.2.5	Maintenance	m² or ha
	Deemed to be inclusive of watering, weeding, etc.	

PUBLIC COMPLAINTS REGISTER

DATE	COMPLAINANTS NAME	DESIGNATION/ AFFILIATION	REASON FOR COMPLAINT	ACTION TAKEN	ACTION BY	ACTION BY DATE	ACHIEVED BY DATE	DATE REFERRED TO NW environmental control officer

MONITORING OF COMPLIANCE WITH ENVIRONMENTAL SPECIFICATIONS

PROJECT NAME :

CONTRACT NUMBER :

Employer's Agent REPRESENTATIVE / SUPERVISOR :

CONTRACTOR :

CONTRACT PERIOD (including start and completion dates) :

PERIOD COVERED :

REPORT PREPARED BY :

Signature

Environmental Control Officer REPORT

PROJECT NAME: **CONTRACT N°.**

DATE OF SITE INSPECTIONS DURING REPORTING PERIOD:

Specification Breach	Spec. No.	Remedial Action Recommended	Due Date	Authority Responsible	Action Taken

PUBLIC COMPLAINTS

Complainant	Designation/ Affiliation	Date of complaint	Reason for Complaint	Action taken and date

GOOD PERFORMANCE REPORT

List any aspects of the Contract in which the Contractor is performing well and beyond that which is required in terms of the specification.

Photographs

Include photographs which illustrate aspects of non-compliance and good performance.

Photograph 1 Caption	Photograph 2 Caption

C3.8.8 PVC: FUSION-BONDED MEDIUM DENSITY POLYETHYLENE COATING OF STEEL PIPES

TABLE OF CONTENTS **PAGE**

PVC1 Scope C3.229
PVC2 Surface Preparation C3.229
PVC3 FBMDPE Coating C3.231

C3.8.8 PVC: FUSION-BONDED MEDIUM DENSITY POLYETHYLENE COATING OF STEEL PIPES

PVC 1 SCOPE

Generally the repair and make good of FBMDPE (Sintakote) coatings and three layer PE coatings of Employer supplied pipes is described in project specification PSL. This specification covers the application of FBMDPE coatings either in the factory or in-situ and shall only apply where instructed by the Employer's Agent. It covers the basic materials to be used, the quality, manufacture, curing, tolerances, and testing of the completed coating.

The Contractor shall seek the guidance of the Employer's Agent before applying the content of this specification.

PVC 1.1 Quality Assurance

A detailed Quality Control Procedure shall be prepared by the Contractor and approved by the Employer's Agent prior to any work commencing.

PVC 2 SURFACE PREPARATION

PVC 2.1 Preparation of Pipe Surfaces

The surfaces of all pipes and fittings that are to be coated shall, prior to the application of any coating be prepared in accordance with the following requirements.

Pipes shall be in rust condition A to C of Swedish Standard SIS 05 5900. Pipes in rust condition D are not acceptable.

Weld splatter shall be removed by chipping or grinding to a smooth surface flush with the surrounding steel surface. Weld seams shall have a smooth contour, free from sharp edges, protrusions and undercuts. Sharp edges and protrusions shall be removed by grinding to a smooth radius of curvature of not less than 3 mm. Pipes shall be in rust condition A to C of Swedish Standard SIS 05 5900. Pipes in rust condition D are not acceptable.

PVC 2.2 Degreasing

Pipes shall be grease free prior to the application of a coating or lining. In the event that degreasing is required, pipes shall be degreased by the use of a water based solvent degreaser such as that complying with SANS 1216 - Solvent Emulsion or, for use in enclosed systems, with SANS 1365.

Pipes shall be thoroughly washed with clean potable water to remove all residues. The surface shall be water break free. The pipe shall then be allowed to dry.

PVC 2.3 Blast Cleaning

Abrasive material used for blast cleaning shall be free from oil or grease, as shall be the compressed air used in air blast cleaning.

The surface of the pipe to be coated shall be blast cleaned by centrifugal or air blast cleaning methods, then vacuum cleaned or blown off to achieve the following standards:

- Cleanliness shall be equal to SA 2,5 of ISO 8501-1 when tested in accordance with SANS 5772:2004.
- The profile produced by blast cleaning shall be angular and shall have an average peak to valley height of 60 to 100 microns, when tested in accordance with SANS 5772: 2004.
- Hackles shall be removed with coarse abrasive paper.
- Residual dust and debris shall not exceed 0.2% when tested in accordance with SANS 8502-3.

- Water-soluble salts shall not exceed 100 mg/m^2 at any point when tested with the Weber-Reilly reagent.
- Any laminations revealed by blast cleaning shall be ground out and re-blast cleaned to meet the above requirements. If grinding penetrates the steel to a depth greater than 3,5% of the nominal wall thickness, the pipe will be rejected.
- The pipe surface shall not be contaminated by oil, grease or other harmful contaminant.

PVC 2.4 Cut Back of Coated Pipe

The blast cleaned surface shall be stopped off or cut back by suitable masking which shall not contaminate the cleaned surface. Cut-backs shall comply with the requirements as set out in the table below:

Cut-Back of Coatings		
Pipe End	**Cut-Back (mm)**	**Comment**
Pipe ends prepared for field butt welding	100	All coatings to be mitred or feathered to prevent air entrapment in the joint coating system.
Pipe ends prepared for flexible joint couplings	Various	The coating shall be cut back a sufficient distance to accommodate a standard coupling for the particular diameter of pipe.
“Belled" and plain ended pipe ends prepared for fillet welding	100	The cut back shall be measured from either side of the (field) external fillet weld position when the spigot is fully inserted into the “belled" end.

PVC 2.5 Handling of Cleaned Pipe

After cleaning, the pipe surface shall not be contaminated in any way. Operators shall wear clean gloves and all surfaces in contact with the pipe surface shall be clean and free from oil, grease, grit, dirt and other contamination.

PVC 2.6 Protection of Pipe Ends on Pipes with Cut-Back

Before delivery cut backs of each pipe for field welds shall be coated with an approved rust inhibitor. This inhibitor shall be "Sigmaweld 120" or similar approved and shall provide corrosion protection for up to 6 months and shall enable good cutting and welding properties). Plain ended pipes (to be joined by flexible couplings) are to be coated with an approved rust inhibitor for a distance of 100 mm from the pipe-ends on the inside and the outside of each pipe. Careful attention must be paid to ensuring the pipe ends are also completely covered. The inhibitor used must be compatible with both the lining and the coating.

PVC 3 FBMDPE COATING

PVC 3.1 General

The coating shall be applied in accordance with the requirements of the Australian Standard Specification AS 4321-1955 entitled “Fusion-bonded Medium Density Polyethylene Coating and Lining for Pipes and Fittings” subject to the amendments in PVC 2.2 below.

PVC 3.2 Amendments to AS 4321-1955

AS 5.1 Preparation of Surface

Delete sub-Clause 5.1 and substitute:

“Surface preparation shall be in accordance with PVC 2 above."

AS 8.1 Repairs

Delete the last sentence of Sub-Clause 8.1 and substitute:

”Damaged areas that pass the continuity test need not be repaired provided that the coating or lining thickness is equal to or greater than the thickness specified in Table 1 of AS 4321-1995. Generally no more than three repairs will be allowed per 9,5 m length of pipe and the area of a single repair is not to exceed 0,01 square m. If the area of a single repair does exceed 0,01 square m the pipe will be rejected. Repairs may be undertaken in accordance with Clause 8 of AS 4321 for the following methods of repair:- Fusion bond; Heat shrink sleeve or Hot gas welding. A wrapping system may also be used if applied as detailed hereunder.

Repairs with Tape

When repairs are permissible the repairs shall be made using a repair system comprising (1) a polymer bitumen primer ("Denso Primer D" or equivalent approved), (2) an inner seal of modified rubber bitumen sealing tape ("Denso Mastic Sealing Tape" or equivalent approved) and (3) an outer protective layer of acrylic coated/modified bitumen adhesive pipeline tape ("Denso Acrylic Pipeline Tape" or equivalent approved) is to be applied with a 50% overlap, ensuring that it is placed 50 mm wider all round than the inner repair tape. The outer protective tape is to be wrapped around the entire pipe.

Pinholes

At each pinhole detected by the electrical test, the surrounding area shall be abraded to at least a minimum area of 175 mm by 175 mm around the hole. The abrasion shall be carried out (with clean emery paper of 80 to 100 mesh) around the repair so as to provide a suitable rough surface profile without causing the removal or excessive amounts of coating material. The repair area is to be feathered into the surrounding sound coating. Debris and other deleterious matter are to be removed by means of a clean rag moistened with Cleaning Solvent. The primer is applied and once it has dried the prepared surface is covered with a patch of modified rubber bitumen sealing tape ("Denso Mastic Sealing Tape" or equivalent approved) of size 150 mm by 150 mm. The bond is to be free of air bubbles and smoothed out by hand or using an aluminium fluted roller. Finally, acrylic bitumen adhesive pipeline tape ("Denso Acrylic Pipeline Tape" or equivalent approved) is to be applied with a 50% overlap, ensuring that it is placed 50 mm wider all round than the inner repair tape.

Larger Damaged Areas

The edges of the damaged coating must be chamfered back to remove all potential void areas. The primer and modified bitumen rubber are applied as for pinholes but the modified bitumen rubber tape is pre-cut and applied with 55% overlap Finally acrylic bitumen adhesive pipeline tape ("Denso Acrylic Pipeline Tape" or equivalent approved) is to be applied with a 50% overlap, ensuring that it is placed 50 mm wider all round than the inner repair tape.

Weld beads are repaired with suitable lengths of the above size tapes. When covering weld beads, the centre portion of the square must make contact first. Smooth the tape out with an outward direction to remove all entrapped air."

AS 11 Storage, Handling, Transport and Marking

Add to Sub-Clause 11:

"Clause 1.5 of this specification entitled "Plant and Rigging for the handling and delivery of Pipe and Specials".

C3.8.9 PVA: CEMENT MORTAR LINING OF STEEL PIPES

TABLE OF CONTENTS **PAGE**

PVA1 Scope C3.234
PVA2 Definitions C3.234
PVA3 Materials C3.234
PVA4 Plant C3.235
PVA5 Application of Lining C3.235
PVA6 Tolerances C3.238
PVA7 Inspection and Testing C3.239
PVA8 Measurement and Payment C3.241

C3.8.9 PVA: CEMENT MORTAR LINING OF STEEL PIPES

PVA 1 SCOPE

Generally the repair and make good of cement mortar lining of Employer supplied pipes is described in project specification PSL. This specification covers the requirements for the lining of steel pipes and fittings with cement mortar either in the factory or in-situ and shall only apply where instructed by the Employer's Agent. It covers the basic materials to be used, the quality, manufacture, curing, tolerances, and testing of the completed linings. The Contractor shall seek the guidance of the Employer's Agent before applying the content of this specification.

Unless otherwise specified, all steel pipes, fittings, and specials with a cement mortar lining shall be lined generally in accordance with the requirements of the Australian Standard ASW 1281:2001 but more particularly, in accordance with the requirements of this specification which take preference over ASW 1281:2001.

PVA 2 DEFINITIONS

Approved Laboratory: A laboratory suitably equipped and staffed for the purposes of concrete testing.

AWWA: American Water Works Association.

PVA 3 MATERIALS

PVA 3.1 Cement

Unless agreed to otherwise by the Employer's Agent, the cement used on the works shall be either Type Cem 1, Type Cem II A-S, CEM II A-V, CEM II B-S or Cem II B-V.

PVA 3.2 Storage of Cementitious Material

Cement shall not be kept in storage before use for more than 4 weeks without the Employer's Agent permission.

PVA 3.3 Water

Water used for cement mortar lining shall be free from injurious amounts of acids, alkalis, organic matter and other substances that may impair the strength or durability of the lining.

PVA 3.4 Aggregates

The aggregate for cement mortar linings shall be specially graded washed silica sand complying with the grading requirements of SABS 1090 Table 1 Column 3. Special care must be taken during storage to prevent contamination by wind blown seeds and grasses. The aggregate stockpile shall be kept covered at all times when cement mortar is not being produced.

The batching plant shall be such that the cement, aggregate and water can be mixed to an accuracy of 2% of the mass required. All mortar shall be mixed in suitable mortar mixers. Hand mixing will not be permitted.

The Contractor is to deliver a sufficient quantity of proposed aggregates to an approved laboratory in order that suitability tests may be carried out by that laboratory. The aggregate selected by them as being the most suitable shall be used throughout the Contract. The provision of samples and the testing thereof shall be to the account of the Contractor. All test results are to be submitted to the Employer's Agent within 4 weeks of the commencement date of the Contract.

To ensure consistency of the aggregate, further samples shall be submitted by the Contractor to an approved laboratory from time to time throughout the Contract as may be required by the Employer's Agent.

PVA 3.5 Mortar

The Contractor shall also arrange for the design and testing of mortar mixes (using the recommended aggregate) by the laboratory and submit the results obtained to the Employer's Agent for his approval.

The lining of pipes and/or specials shall not commence before the proposed mortar mix has been approved by the Employer's Agent in writing.

Fly ash may not be added.

The total content of cementitious materials shall not be less than 600 kg/m^3 of mortar.

The total water content of the mortar mix shall be the minimum required to produce a suitable consistency for application of the lining but subject to a maximum water:cement ratio of 0,45:1 by mass.

At least six cubes shall be made for each mix used for pipe lining, three shall be tested by the Contractor after 7 days of curing and the other three cubes after 28 days. Test results shall be submitted to the Employer's Agent.

The minimum compressive strength to be achieved by the mortar shall be 17 MPa after 7 days and 31 MPa after 28 days.

PVA 4 PLANT

PVA 4.1 Batching and Mixing Plant

The batching plant shall be such that the masses of each ingredient, namely cement, aggregate and water can be measured to within a tolerance of +2% to - 2% of the mass required.

All mortar shall be mixed in suitable mortar mixers, each mix being of not less than two minutes duration. Hand mixing will not be permitted.

To ensure consistency of the aggregate, further samples shall be submitted by the Contractor to an approved laboratory from time to time as may be required by the Employer's Agent throughout the duration of lining application.

PVA 5 APPLICATION OF LINING

PVA 5.1 Surface Preparation

The internal surfaces which are to be lined shall be prepared as follows:

1) Weld spatter, loose rust, mill scale and any other loosely adhering material shall be removed by chipping, scraping or other mechanical means.
2) Deposits of grease, oil, bitumen and similar contaminants shall be removed by scraping and cleaning with a suitable non-toxic solvent.
3) The standard of preparation to be achieved shall be at least to ISO 8501-1, Grade Sa 2.
4) Any residual dust or debris on the pipe surface shall be removed by brushing immediately prior to applying the lining.

PVA 5.2 Factory Applied Lining

The application of linings at the factory or at a site yard shall comply with the requirement of the relevant portions of ASW 1281:2001 except as may be amended by the requirements of this specification.

PVA 5.2.1 Application by Rotating the Pipes

As soon as possible after cleaning the surfaces (maximum of 12 h) the pipes shall have the lining applied thereto.

Each pipe pre-loaded in one operation with the calculated quantity of material to complete the entire lining shall be rotated in a suitable machine. The speed of rotation shall initially be that required to produce a uniform distribution of lining material over the full length and circumference of the pipe. When this has been achieved the speed shall be increased to the maximum possible (consistent with pipe stability in the lining machine) in order to compact the lining.

Arrangements to be made by the lining applicator:

1) To ensure circularity of the pipe and the thickness of the lining at each end by the provision of of temporary steel end rings
2) to drain off surplus water emerging from the lining during compaction without causing damage to the surface of the lining
3) to produce a smooth finish to the lining trowelling or other means.

PVA 5.2.2 Application by Machine Spraying and Trowelling

This method of application shall be carried out by spraying and trowelling the lining material using a machine that travels through each pipeline from one end to the other.

Where this system is used it is essential to observe the following requirements:

1) The mortar shall be applied with sufficient force to compact the lining as it is placed.
2) The spray nozzles shall be equidistant from the pipe centre-line to achieve uniform lining thickness around the periphery.
3) The speed of forward travel by the spraying machine must be at a uniform rate to prevent the formation of corrugations in the pipe wall. The rate shall be that necessary to apply the required lining thickness and produce the trowelled surface finish in one pass.
4) The blades of the drag trowel shall be kept clean and in good condition to prevent the formation of longitudinal score marks in the pipe wall. Particular attention shall be paid to the area where trowelling blades overlap each other.
5) It is recommended that the mortar be applied in a maximum of 20 m lengths, by forming appropriate joints in the lining, to limit the extent of the contractor's risk of any catastrophic failure of the newly applied mortar. The contractor is at liberty to form joints at closer centres to further limit this risk.

PVA 5.3 In-Situ Applied Lining

The application of cement mortar linings in-situ shall comply with the requirements of Section 8 of the American Water Works Association standard AWWA C 602, except as may be amended by the requirements of this specification.

The requirements of PVA 5.2.2 above, also apply to in-situ applied linings.

PVA 5.4 Methods of Application to Fittings and Specials

Where it is not possible to line fittings and specials by machine due to their shape and/or size the lining shall be applied manually. The work shall be carried out carefully and expertly in order to achieve the same density and quality of finish as the machine placed linings.

PVA 5.5 Thickness of Lining

The thickness of the applied lining shall be in accordance with the following table:

Pipe Diameter			Thickness of Lining (mm)		
DN 150	**up to**	**DN 300**	8	6	11
over DN 300	up to	DN 600	10	8	13
over DN 600	up to	DN 1600	12	10	16

PVA 5.6 Length of Lining

Pipes with flanged ends shall be lined for the full length of pipe and shall have the lining ends slightly tapered to prevent them touching when the pipes are jointed.

Pipes to be jointed with flexible couplings shall be lined for the full length of pipe and the lining shall finish square with the end of the pipe.

For pipes that are to be butt welded in-situ, the lining shall terminate 50 mm back from the end of each pipe and shall be chamfered at approximately 85° to the pipe wall. This will form a dovetail joint in the pipeline suitable for in-situ making good the lining after welding is completed.

For pipes that are to be sleeve or "belled-end" jointed and fillet welded, the spigot end shall be lined up to the end of the pipe and finished off square to the pipe, whilst the sleeve end shall have the lining finished approximately 30 mm from the end of the sleeve with a chamfer at 85° to the pipe wall.

Where unlined pipes are to be lined in-situ after welding, joints should be formed in the lining at the recommended maximum spacing or closer. Joints formed in the lining shall be 80 mm wide and shall be chamfered at approximately 85° to the pipe wall to form a dovetail joint in the mortar suitable for in-situ making good the lining.

PVA 5.7Surface Finish of Lining

The surface finish required for the lining is that which will give an effective roughness by the Colebrook-White formula of k = 0,13 mm or less for the entire completed pipeline including joint losses. This will be checked in the field after completion of the pipeline at the Employer's Agent's discretion.

Should the roughness be such that it does not achieve the foregoing requirement, and the Employer's Agent is satisfied that pipe jointing has been properly carried out by the pipe layers, a reduction in payment for the pipes up to a maximum of 20% of the total value of the internal lining to the pipes will be applied.

The finished surface shall be free of excessive laitance, the maximum acceptable thickness being 10% of the total lining thickness or 1,25 mm whichever is the lesser. Mortar projections exceeding 1,5 mm in height shall be removed by rubbing with a carborundum block or in exceptional circumstances by grinding after the lining is fully cured.

PVA 5.8 Curing of Lining

Curing of the lining shall be carried out by keeping the surface continuously moist for a period of at least 7 days and thereafter cured in air for a further 14 days.

Curing shall be done by temporarily covering the end of each pipe with plastic material which has one hole of about 50 mm diameter cut therein at the centre. A shallow pond shall then be made over the full length of each pipe and topped up as necessary. No pipe shall be moved during the 21 days curing period from the date of lining the pipe except where authorised to the contrary by the Employer's Agent.

No accelerated curing by steam or other means will be permitted.

PVA 5.9 Repair of Defective Lining

Defective cement mortar lining shall be that which has not bonded to the inner wall of the steel pipe or cement mortar lining which has failed to pass the tests specified under PVA 7 below, except for those items which may be accepted by the Employer's Agent.

All defective lining shall be removed and the surrounding area chipped back to where the lining is firmly bonded to the steel pipe wall or to the limits called for by the Employer's Agent whichever is the lesser. The edges of the chipped back area shall be sloped at an angle of 85° normal to the pipewall with the slope being in the direction to give a dovetailed key for the replacement lining. The pipe surface shall be thoroughly cleaned immediately prior to commencing the repair.

The pipe surface over the area to be repaired shall be given a coat of neat cement grout and the fresh mortar mix placed by hand thereupon whilst the grout is still wet. The mortar mix shall be of the mix and consistency specified for the pipe lining. The application shall fill all voids at the edges and shall be finished to the thickness of the surrounding lining. The repaired areas shall be cured with water and shall remain wetted continuously for a period of at least 7 days from the time of completion of each repair.

PVA 5.10 Protection of Lining During Transport

Every pipe, fitting and special shall be fitted with suitable end closures as a precautionary measure against damage being caused to the lining material. The end closures shall be capable of preventing the ingress of dirt and at the same time allow air to ventilate through the pipework which they protect. They shall be secured in such a manner that they cannot be dislodged or damaged by normal pipe handling operations.

PVA 6 TOLERANCES

The tolerances permitted on the thickness of concrete linings shall be those tabulated under PVA 5.5 above.

The tolerance permissible on the length of linings for butt welded pipes shall be ±3 mm at each end of the pipe.

PVA 7 INSPECTION AND TESTING

PVA 7.1 Linings Applied at Factory or Yard

The following inspections and tests shall be carried out by the Contractor on the lining of all pipes, fittings and specials. The Contractor shall provide all necessary equipment, labour and materials to carry out all tests specified above. He/she shall also make arrangements to have all the laboratory tests carried out at either a laboratory on site provided by him or alternatively at an independent approved laboratory. All test results shall be submitted in duplicate to the Employer's Agent.

The Contractor shall also provide all reasonable facilities to enable an inspector, if so appointed by the Employer, to witness any or all the specified tests and to record the results. The inspector shall have the power to stop delivery of any item from the place of application of the lining and report his findings to the Employer's Agent who shall then decide what action to take. No claims for delays caused to the Contractor, or for costs incurred by him as a consequence of failure to pass any test specified for the linings, will be considered by the Employer's Agent.

PVA 7.1.1 Visual Inspection

A visual inspection of linings will be carried out not earlier than 21 days after application of the lining. The lining, when inspected using strong light, shall present a smooth steel floated appearance and shall have no projections exceeding a height of 1,5 mm above the surrounding lining surface within a radius of 100 mm from the projection. The lining shall not be corrugated in appearance. Some cracking and crazing will be tolerated provided the average crack width does not exceed 0,5 mm with a crack length not exceeding 300 mm.

Cracks which a probe of 1,5 mm diameter can penetrate to a depth of 50% of the specified minimum lining thickness will not be acceptable and shall be repaired in accordance with the relevant specification included hereunder.

PVA 7.1.2 Lining Thickness

The thickness of lining shall be measured by a suitable electronic device which has been precalibrated to the satisfaction of the Employer's Agent.

Four readings shall be taken equally spread around the circumference of each and every lined pipe at six places, namely at each end of the pipe and at distances of 1,3 m and 3,5 m in from each end of the each pipe up to 9,5 m long. An additional set of four readings shall be taken at approximately midway along each pipe which is in excess of 9,5 m long.

Special apparatus is to be provided for use in pipes smaller than 550 mm internal diameter where entry for inspection is not possible.

A total of eight thickness reading shall be taken for each and every fitting and special as applicable.

PVA 7.1.4 Water Absorption

A sample of lining 150 x 150 mm shall be cut from every 50th pipe (with a minimum of three samples for each of the diameters) which has been lined. These lining samples shall be used for water absorption tests. The samples shall be oven dried at 100° C until no further loss of mass occurs. When cooled the dry mass shall be determined, following which the samples shall be immersed in clean water for 24 hours and the saturated mass determined. Should the saturated mass exceed the dry mass by more than 6% the linings of the batch of pipes may be rejected.

PVA 7.1.5 Strength of Lining

Six 150 mm size cubes shall be prepared, cured and tested in accordance with SANS Method 863 from one batch of mortar selected at random from each day's lining production. Three cubes shall be tested after 7 days and the other three after 28 days. Should any one of the cubes fail to reach the minimum specified compression strength given under PVA 3.5 above, the Employer's Agent shall decide what action to take, but should two or more cubes fail, all pipe linings applied from that day's output shall be rejected.

PVA 7.2 Linings Applied In-Situ (Pipes 550 mm internal diameter or less)

The following inspections and tests shall be carried out along pipelines of less than 550 mm internal diameter, where the lining has been carried out in-situ. Inspection and testing of lining in pipes which are 550 mm bore and larger shall be carried out in accordance with the requirements of PLA 7.1 above.

PVA 7.2.1 Inspection by Camera

A trolley mounted camera shall be so arranged to take photographs of the entire lining periphery at approximately 15 m centres throughout the length of the applied lining.

All records, processed film and photographs shall become the property of the Employer but shall initially be handed to the Employer's Agent.

Repeat exposures shall be made where the quality of the original does not show the lining clearly and completely. Additional exposures may be ordered by the Employer's Agent where a lining defect is suspected. Should the defect exist the additional costs will be payable by the Contractor but should there be no non-acceptable defect then the additional costs will be reimbursed to the Contractor by the Employer.

PVA 7.2.2 Crack Measurement

Crack measurements will be estimated from the photographic evidence produced under PLA 7.2.1 above.

PVA 7.2.3 Lining Thickness

The lining thickness shall be measured in sets of four, spaced equally around the lining periphery at the following placed:

a) At each end of the pipe at each and every access point along the lined pipe
b) At 1,0 m into the pipe from each access point
c) At 2,0 m into the pipe from each access point

PVA 8 MEASUREMENT AND PAYMENT

PVA 8.1 Payment for Linings

Where the application of linings is scheduled separately in the Bills of Quantities, payment will be made per length of completed lining in the case of pipes and by number in the case of fittings and specials. ..... Unit: m or No

The rate shall include for the provision of all labour, plant and materials necessary to carry out the complete lining in full compliance with this Specification, including for forming and making good joints in the lining, all testing and analyses and all repairs where they required, as well as for any additional transportation over that required for delivery of the steel pipes, fittings and specials to Site.

Where no separate item is scheduled for the application of the lining, the costs of complying with this specification shall be included in the rates tendered for supplying, laying and bedding of the pipeline as per SABS 1200L Sub-Clause 8.

PVA 8.2 Payment for Inspection and Testing

Should additional expenditure be incurred by the Employer's inspector, due to any failure of the prescribed tests, then such additional expenditure shall be reimbursed to the Employer by the Contractor.

C4: SITE INFORMATION

C4.1: GEOTECHNICAL

C4.2: ATMOSPHERIC/CLIMATIC

C4.3: ENVIRONMENTAL

C4.4: LOCALITY PLAN

C4.5: NAMEBOARD DRAWING

C4: SITE INFORMATION

TABLE OF CONTENTS **PAGE**

C4.1: Geotechnical C4.3

C4.2: Atmospheric/Climatic C4.4

C4.3: Environmental C4.6

C4.4: Locality Plan C4.7

C4.5: Nameboard Drawing C4.8

C4.1 GEOTECHNICAL

Tenderers must familiarise themselves with the site of the works and satisfy themselves as to the nature of materials to be excavated under this contract.

Information is provided on the pages following for five trial pits excavated and logged for another project that is related to the present contract (refer Table C4.1 below). The trial pits listed in Table C4.1 are not located on the site of the present works but are in the general area. The geographical coordinates for each trial pit are provided on the report form. The chainage numbers stated in the trial pit report forms relate to a different project and bear no connection to the present contract. No responsibility is accepted for any conclusions drawn by Tenderers from the results and information supplied.

Tenderers are at liberty to excavate any further trial holes or to carry out other investigations to satisfy themselves as to the nature of the ground that will be encountered in carrying out the Works, provided that they advise the Employer's Agent of their intention to carry out such further trial hole excavations or other investigations so that the necessary safety requirements can be ensured. Any trial hole excavated in areas close to pedestrian or vehicular traffic shall be barricaded and shall be backfilled immediately after inspection of the soil conditions.

The Tenderer shall be fully liable for any claims for losses, damage or injuries whatsoever arising out of, or as a consequence of, carrying out trial hole excavations for the purpose of his tender. Furthermore, the Employer's Agent authority for the carrying out of any exploratory excavations is subject to the Tenderer indemnifying the Employer and the Employer's Agent against any such claims.

Table C4.1: Trial Pit Information provided in C4.1

ID of Trial Pit	Date of Excavation
Hole No IP10	06 June 2013
Hole No IP11	06 June 2013
Hole No IP12	06 June 2013
Hole No IP13	06 June 2013
Hole No IP14	06 June 2013
Hole No IP15	06 June 2013
Hole No IP16	06 June 2013

C4.2 ATMOSPHERIC/CLIMATIC

Supply of electricity	400 volt, 50 hertz, 3-phase supply from the Eskom grid (subject to load shedding and other system constraints)
Altitude above sea level	Jozini Town Waterworks 90 m
Ambient temperatures	Maximum : 42ºC Minimum : -4ºC 24 hour Average Max : 30ºC
Maximum relative humidity	100%
Environmental atmosphere	Dusty and corrosive
Lightning	Severe

Extension of time will be considered for abnormal rainfall. The numbers of days per month on which work is expected not to be possible as a result of normal rainfall, and for which the Contractor shall make provision in his tendered rates, prices and programme, are listed in Table C4.2.1 hereafter. Only the number of days lost as a result of adverse weather conditions, exceeding the number of days listed in Table C4.2.1, will qualify for consideration of extension of time.

Table C4.2.1: Expected Number of Working Days Lost per Month due to Normal Rainfall

Month	**Expected number of working days lost as result of normal rainfall**
January	*5*
February	*5*
March	*4*
April	*1*
May	*1*
June	*1*
July	*1*
August	*1*
September	*2*
October	*3*
November	*4*
December	*5*
TOTAL	***33 days***

(The number of working days lost for December and January exclude the rain days for the builders' holidays from 16 December to 02 January.)

During the execution of the Works, the Employer's Agent Representative will certify a day lost due to abnormal rainfall and adverse weather conditions only:

- if no work was possible on the relevant working day on any item which is on the critical path according to the latest approved construction programme; or
- if less than 30% of the work force and plant on site could work during that specific working day.

Extension of time as a result of abnormal rainfall and adverse weather conditions shall be calculated monthly being equal to the number of working days certified by the Employer's Agent's Representative as lost due to rainfall and adverse weather conditions, less the number of days allowed for as in Table C4.2.1, which could result in a negative figure for certain months. The total extension of time as a result of abnormal climatic conditions, for which the Contractor may apply, shall be the cumulative algebraic sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as nil.

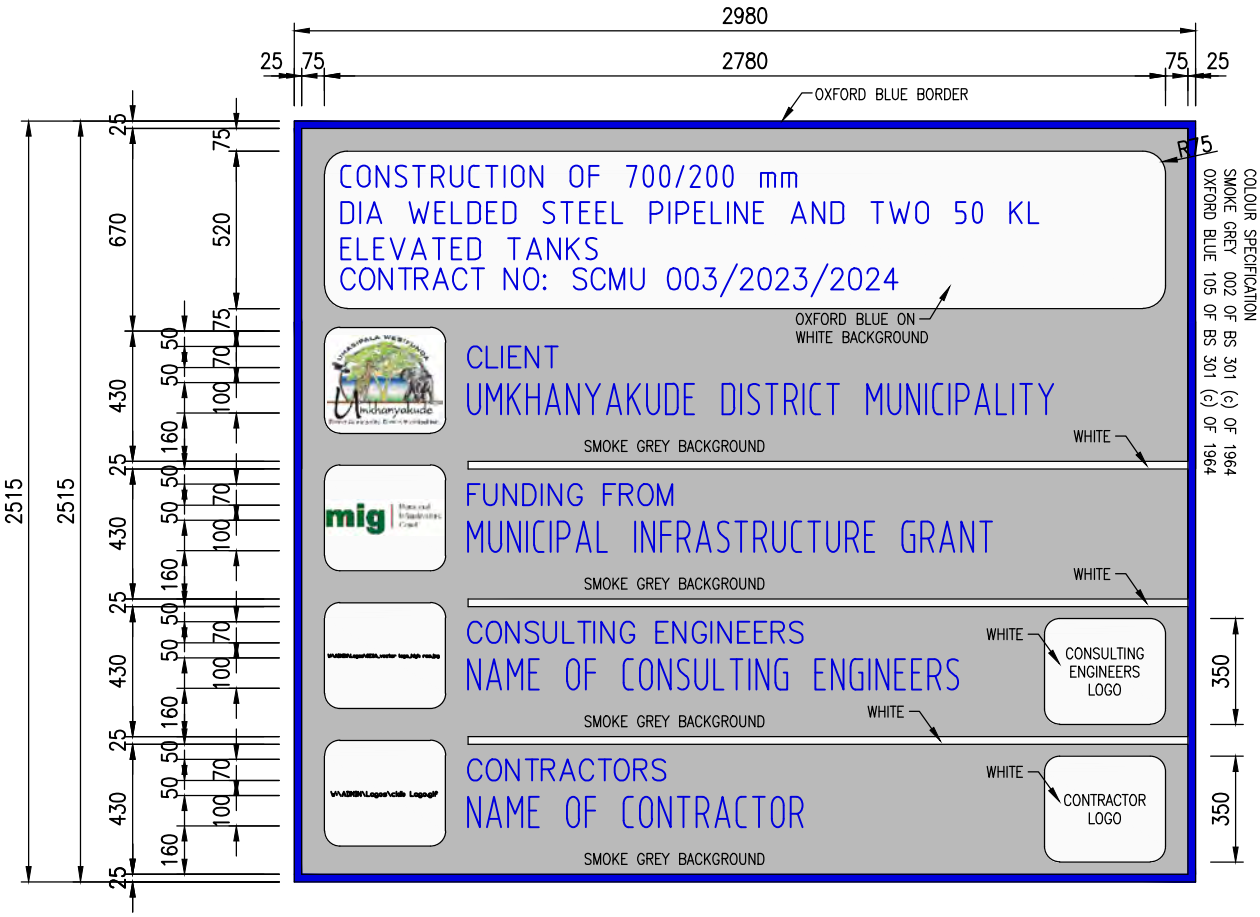
C4.3 ENVIRONMENTAL

The Contractor will be responsible for environmental control on site during construction and the maintenance period. The construction activities will be monitored by an independent environmental specialist (Environmental Control Officer) and will be subject to environmental audits with reference to the Environmental Specification and Environmental Management Programme (EMPr) applicable to the contract.

The Contractor shall be required to rectify all non-conformances with the Environmental Specification and/or Environmental Management Programme (EMPr), as reported by the ECO via the environmental audit reports or by the Employer's Agent Representative in a timely manner. Failure to rectify non-conformances in a timely manner may attract sanctions as set out in this tender document and as determined by statutory authority and regulation.

C4.4 LOCALITY PLAN

C4.5 NAMEBOARD DRAWING



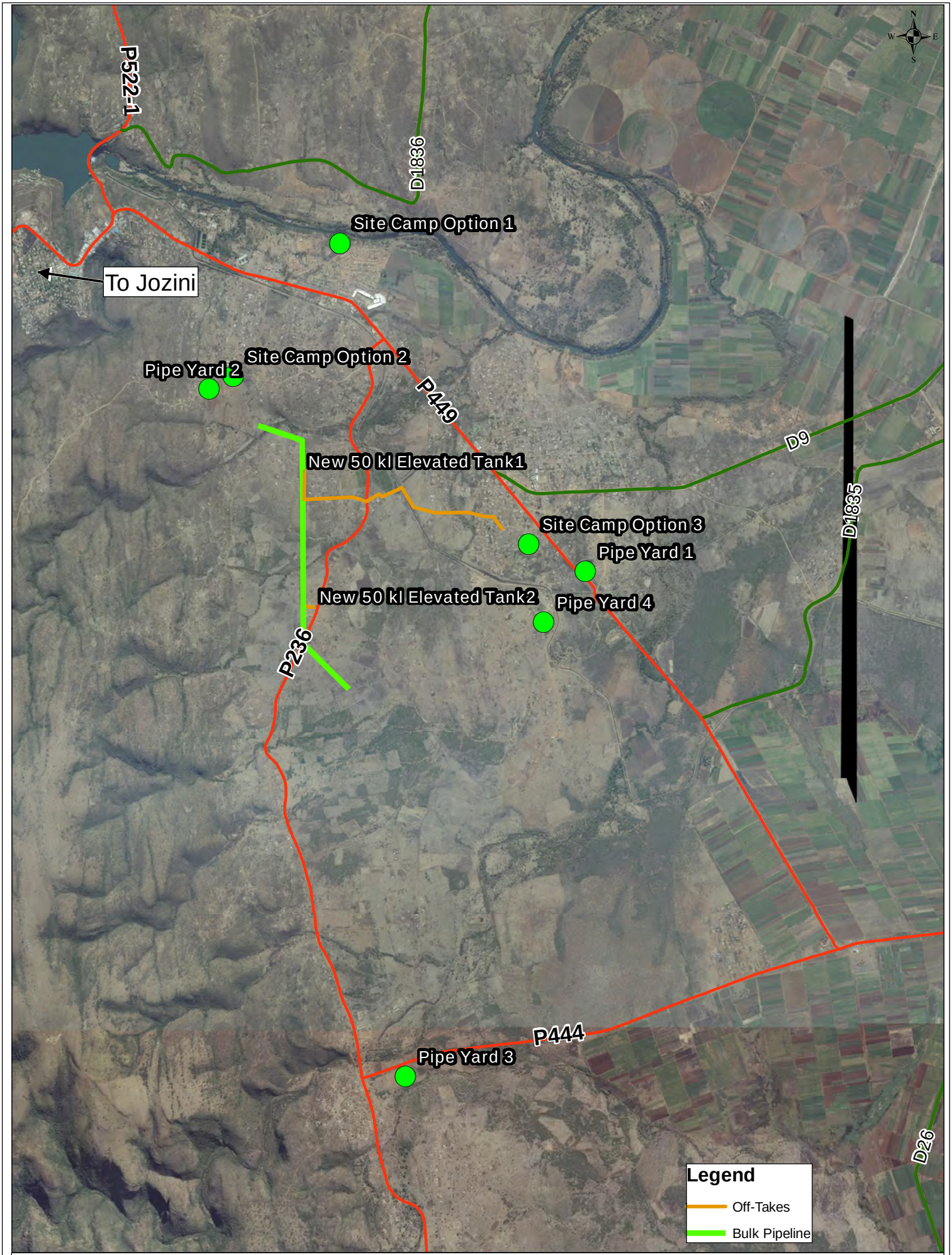
Royal HaskoningDHV
Enhancing Society Together
PO Box 1066
PIETERMARITZBURG
3200
Tel: (031) 3281000
Fax: (031) 3281006
Email:pietermaritzburgwater@rhdhv.com

TITLE CONSTRUCTION OF 5.6 km LONG 700 mm DIA WELDED STEEL PIPELINE – NAMEBOARD

PROJECT No.	SCALE	DRAWING No.	REV
MD1993	1 : 25	MD1993–04–C	△

APPROVED :	DRAWN	DATE	CHECKED	DATE

DRAWING SIZE : A4 SSI_AUTOCAD.CTB 05/07/2023 NAMEBOARD – PLAN AND ELEVATION.DWG



Royal HaskoningDHV
Enhancing Society Together
P.O. Box 1066
Pietermaritzburg
3200
Tel: (033) 328 1000
Fax: (033) 328 1007
Email: pietermaritzburgwater@rhdhv.com

PROJ/DWG TITLE

UMKHANYAKUDE DISTRICT MUNICIPALITY
JOZINI REGIONAL COMMUNITY WATER SUPPLY SCHEME
PHASE 1A-2 - LOCALITY PLAN

PROJECT No.	SCALE	DRAWING No.	REV	
MD1993	1: 50 000	MD1993-03-B	0	
APPROVED	DRAWN	DATE	CHECKED	DATE
I.K.R.	R.W.	01/10/2015	J.E.	01/10/2015