O. R. TAMBO DISTRICT MUNICIPALITY

O.R. TAMBO
DISTRICT MUNICIPALITY

CONTRACT NO.: ORTDM SCMU 36-22/23

DESCRIPTION: ROSEDALE TO LIBODE REGIONAL WATER SUPPLY: COMPLETION OF CONSTRUCTION OF 3 x 1Ml RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA

MUNICIPAL INFRASTRUCTURE GRANT (MIG)

May 2023

NAME OF TENDERER: _____

TENDER AMOUNT: _____

CSD SUPPLIER NUMBER: _____

CLOSING DATE & TIME: **09 JUNE 2023 @ 12H00**

Prepared for:
The Municipal Manager
O. R. Tambo District Municipality
Private Bag X6043
MTHATHA
5099

Tel. No. (047) 501 6400

Prepared by:
The District Engineering Services
O. R. Tambo District Municipality
Private Bag C6043
MTHATHA
5099

Tel. No. (047) 501 6425

PLEASE CHECK **x / √**

1. That you have read all the pages of the tender document. ……..

2. That you have completed ALL the forms required to be completed in NON-ERASEABLE INK. …….

3. That your arithmetic calculation in the pricing schedule is correct. ……..

4. That you have attached ALL necessary documentation relating to the Composition of the tendering entity, i.e. ……..

   (a) Company registration documents naming the shareholders and Directors / members of the company, close corporation etc.

   (b) Joint venture agreement, if tendering entity is a joint venture.

5. That the **COMPLETE** tender document is submitted. ……

6. That the **FORM OF OFFER** is completed in full and signed. …….

7. That ALL returnable documents are submitted. ……..….

8. That ALL returnable schedules are completed and signed. ……..…..

9. Ensure that your tender is submitted by **12H00PM** on the closing date of the tender.

O. R. TAMBO DISTRICT MUNICIPALITY

CONTRACT NO.: ORTDM SCMU 36-22/23

ROSEDALE TO LIBODE REGIONAL WATER SUPPLY: COMPLETION OF CONSTRUCTION OF 3 x 1Ml RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA

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TENDERS ARE HEREBY INVITED FOR:

CONTRACT NO.: ORTDM SCMU 36-22/23:

ROSEDALE TO LIBODE REGIONAL WATER SUPPLY: COMPLETION OF CONSTRUCTION OF 3 x 1Ml RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA

To ensure that your Tender is not exposed to invalidation, documents are to be completed in accordance with the conditions and Tender rules contained in the Tender documents. Supporting documents must be sealed and externally endorsed **CONTRACT NO.: ORTDM SCMU 36-22/23: ROSEDALE TO LIBODE REGIONAL WATER SUPPLY: COMPLETION OF CONSTRUCTION OF 3 x 1Ml RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA** and be submitted in the open tender box, Ground Floor, O. R. Tambo District Municipality, Nelson Mandela Drive, Myezo Park, Mthatha, Eastern Cape, not later than 12H00pm on the **04 July 2023.**

The lowest or any Bid will not necessarily be accepted and the O. R. Tambo District Municipality reserves the right not to consider any tender not suitably endorsed or comprehensively completed as well as the right to accept a Tender in whole or part. Tenders will be adjudicated in accordance with the Supply Chain Management Policy of the O. R. Tambo District Municipality.

The following documents must be completed, signed (where applicable) and submitted as a complete set:

Document		**Colour of pages**
Number	**Heading**	
T1.1	Tender Notice and Invitation to Tender	White
T1.2	Tender Data	Pink
T2.1	List of Returnable Documents	Yellow
T2.2	Returnable Documents for tender evaluation purposes	Yellow
C1.1	Form of Offer and Acceptance	White
C1.2	Contract Data	White
C1.3	Operational Health & Safety Specification	White
C1.4	ORTDM Supply Chain Management Policy	White
C2.1	Pricing Instructions	Yellow
C2.2	Activity Schedule	Yellow
C3	Scope of Works	Blue
C4	Site Information	Green
C5	Additional Relevant Documents	White

T.1.1 TENDER NOTICE AND INVITATION TO TENDER

Tenders are hereby invited from suitably qualified and experienced contractors who are registered with CIDB for the Municipal Infrastructure Grant under the O. R. Tambo District Municipality.

Project Number	**Name and Description**	**CIDB Grading**	**Briefing session**
ORTDM SCMU 36-22/23	ROSEDALE TO LIBODE REGIONAL WATER SUPPLY: COMPLETION OF CONSTRUCTION OF 3 x 1Ml RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA	6CE PE/7CE or higher	Date: 09 June 2023 Time: 10h00 Venue: Nyandeni Local Municipality Offices- Libode

A compulsory briefing/clarification meeting with representatives of the Municipality will take place on the aforementioned date(s), time(s) and venue(s), then proceed to site.

THE MUNICIPALITY WILL NOT REPEAT ANY MATTERS ALREADY COVERED IN THE COMPULSORY BRIEFING MEETING TO THE BIDDERS WHO ARRIVE MORE THAN 10 MINUTES LATE TO THE MEETING, NOR WILL IT ALLOW SUCH BIDDERS TO COMPLETE THE ATTENDANCE REGISTER. ANY BID RECEIVED FROM A BIDDER WHO DID NOT ATTEND THE BRIEFING MEETING AND SIGN THE ATTENDANCE REGISTER WILL NOT BE CONSIDERED.

Bid documents should be downloaded on the e-Tender website (www.etenders.gov.za) alternatively on the O. R. Tambo website (www.ortambodm.gov.za) at no cost.

Bids must be completed in black ink, enclosed in a sealed envelope and clearly marked with the **"Project number, project name and description"**, deposited in the Open Tender Box, Ground Floor, O. R. Tambo District Municipality Building, Nelson Mandela Drive, Myezo Park, Mthatha, Eastern Cape, not later than **12H00pm** on **Tuesday, 04 July 2023.**

It must be expressly understood that the Municipality does not accept responsibility for ensuring that bid submissions sent by courier or post, or delivered in any other way, are deposited in the Tender Box. It is therefore preferable for the bidder to ensure that its bid submission is placed in the Tender Box by its own staff or representative(s).

Tender submissions will be opened in public at 12H00pm on Tuesday, 04 July 2023. The Municipality reserves the right not to accept the lowest priced tender or any tender at all, or to accept the whole or part of any tender.

RETURNABLE DOCUMENTS TO BE SUBMITTED WITH THE BID:

- Copy of business registration documents, as issued by CIPC.
- Certified copy of identity documents of directors/ shareholders/ partners / members, as the case may be.
- Original Valid Tax Clearance Certificate or a Confirmation of Tax Validity with the pin issued by SARS.
- Proof of latest municipal rates and taxes statement **of the bidder** indicating that rates and taxes are not in arrears for more than 3 months.
- Proof of latest municipal rates and taxes statement of each **company director** indicating that rates and taxes are not in arrears for more than 3 months.
- Proof of latest municipal water and sanitation charges statement **of the bidder** indicating that rates and taxes are not in arrears for more than 3 months for bidders who reside in the O. R. Tambo District Municipality area.
- Proof of latest municipal water and sanitation charges statement of each **company director** indicating that rates and taxes are not in arrears for more than 3 months for bidders who reside in the O. R. Tambo District Municipality area.

- Confirmation of address from a ward councillor where the bidder and company directors operate and reside in a peri-urban area where no rates, taxes, and service charges are not billed.
- A copy of a valid lease agreement where the bidder does not own the property they are operating from.

NB: Certification of Documents must not be more than six (06) Months from date certified by Commissioner of Oaths

INVALID OR NON-SUBMISSION OF THE FOLLOWING RETURNABLE DOCUMENTS WILL DISQUALIFY A BID SUBMISSION:

- CSD supplier number;
- Proof of latest municipal rates and taxes statement indicating that rates and taxes are not in arrearsfor more than 3 months;
- Proof of registration with CIDB;
- Audited annual financial statements of the bidding entity (for projects in excess of R10 million);
- Unaudited annual financial statements for close corporations, as required by the Close CorporationsAct (if applicable);
- Joint venture agreement or consortium agreement (in CIDB format), signed and initialed on eachpage (where applicable).

PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT NO 5, 2000 (PPPFA) POINTS WILL BE AWARDED AS FOLLOWS:-

Bids will be evaluated in three stages, namely:

- Stage 1 – Compliance with the Bid Rules and other Requirements
- Stage 2 – Minimum Conditions of tender
- Stage 3 – Price and Specific goals

Item	Weight
Stage 2 of Evaluation- Minimum Conditions of tender	**100**
• Company Experience with respect to similar projects	60
• Qualifications and Experience of key staff assigned to the contract	40
Stage 3 of Evaluation- Price & Specific Goals	**100**
• Specific Goal Points	20
• Price	80

CONDITIONS OF THE TENDER WITH REGARDS TO SUB-CONTRACTING

ITS IS THE CONDITION OF THIS TENDER THAT SUCCESSFUL TNDERER MUST SUBCONTRACT A MINIMUM OF 10% OF THE VALUE OF THE CONTRACT TO THE DESIGNATED GROUPS AS INDICATED IN THE TENDER DOCUMENT

Tenders may only be submitted on tender documentation issued. No late, faxed, e-mailed, or other form of tender will be accepted.

Technical enquiries: Mr. N. Noto, telephone number 047 501 6425 or email:nkosiyabon@ortambodm.gov.za.

All Supply Chain Management enquiries may be directed to Mr. S. Hopa, telephone number 047 5016449 or Email: sakhiwoh@ortambodm.org.za during office hours: Monday to Friday 08H00-13H00 and 13H30-16H30.

Tenders will be evaluated in terms of the Supply Chain Management policy of the O. R. Tambo District Municipality.

The lowest tender will not necessarily be accepted and the Municipality reserves right to accept the whole or part of any tender or not to consider any tender not suitably endorsed. An 80/20-point system shall apply where 80 points is allocated for price and 20 points allocated for Specific Goal Points as follows:

The specific goals allocated points in terms of this tender	**Number of points allocated (80/20 system)**
The promotion of enterprises located in a specific province (Eastern Cape):**The Tenderer and Directors are based in the Eastern Cape and paytheir municipal rates and taxes**	**10**
The promotion of enterprises located in a specific region (O.R Tambo District): **The Tenderer and Directors are based in the O. R. Tambo District Municipality region and pay their municipal rates and taxes**	**10**

Tenderers must submit copies of all supporting documents necessary to prove conformance with Specific Goal criteria listed above in order to be eligible for Specific Goal points.

B. B. Matomela
Acting Municipal Manager

T1.2 TENDER DATA

The Standard Conditions of Tender are those contained in the Construction Industry Development Board (CIDB) *Standard for Uniformity in Engineering and Construction Works Contracts (August 2019)* as published in Board Notice 423 of 2019, in Government Gazette No. 42622, on 08 August 2019. (Refer to www.cidb.org.za and/or www.gpwonline.co.za).

The Standard Conditions of Tender Procurement make several references to the Tender Data for details that apply specifically to the Tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the standard conditions of Tender. Each item of data given below is cross-referenced to the clause in the Standard Conditions of Tender to which it mainly applies.

Please note that the word "Client" is used in this document and referred to as "Employer" in the Standard Conditions of Tender document.

Clause Number	
F.1	**General**
F.1.1	The Client is: **O. R. Tambo District Municipality** Private Bag X6043 Mthatha, 5099
F.1.2	The Tender documents issued by the Client comprise: **Tender** T1.1 Tender Notice and invitation to tender T1.2 Tender Data T2.1 List of Returnable Documents T2.2 Returnable Documents for tender evaluation purposes T2.3 Returnable Documents to be incorporated into the contract
	Contract **Part 1 : Agreements and Contract data** C1.1 Forms of Offer and Acceptance C1.2 Contract Data C1.3 Occupational health and safety specification C1.4 O. R. Tambo District Municipality's Health and Safety Specification **Part 2 : Pricing Data** C2.1 Pricing Instructions C2.2 Bill of Quantities **Part 3 : Scope of Works** C3.1 Description of the Works C3.2 Engineering C3.3 Procurement C3.4 Construction C3.5 Management C3.6 Annexures (Specification) **Part 4: Site Information** C4 Site information **Part 5: Additional Relevant Documents** **Tender Drawings:** Book of Drawing issued Separately

F1.3	**Interpretation** The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these tender conditions.	
F.1.4	**Communication:** Communication with all stakeholders shall be through the O. R. Tambo Municipality's Engineering Services Manager. Communications shall be in the English language. The Employer shall not take any responsibility for non-receipt of communications from or by a tenderer.	
	The Employer is **O. R. Tambo District Municipality** Private Bag x6043 Mthatha, 5099 Tel: (047) 501 6425 Email: nkosiyabon@ortambodm.gov.za Contact person: Mr. N. Noto	The Employer's Agent is: **Lead Consultant** GIBB (Pty) Ltd 36 Standford Terrance Mthatha, 50100 (047) 504 6129 Email: nmkhwanazi@gibb.co.za Contact Person : Mr N Mkhwanazi
F.1.5	**The employer's right to accept or reject any tender offer**	
F.1.5.1	**Reject or accept** The employer may accept or reject any variation, deviation, tender offer, or alternative tender offer, and may cancel the tender process and reject all tender offers at any time before the formation of a contract. The employer shall not accept or incur any liability to a tenderer for such a cancellation and rejection, but will give written reasons for such action upon written request to do so.	
F.1.6	**Procurement procedures**	
F.1.6.1	A contract will, subject to F.3.13, be concluded with the tenderer who in terms of F.3.11 is the highest ranked or the tenderer scoring the highest number of tender evaluation points, as relevant, based on the tender submissions that are received at the closing time for tenders.	
F.2	**Tenderer's obligations**	
F.2.1.1	**Eligibility** Only those tenders who are registered with CIDB and have in their employ management and supervisory staff satisfying the requirement of the scope of work for labour intensive competencies for supervisory and management staff are eligible to submit tenders.	
F.2.1.2	**CIDB Grading** The required CIDB grading for this project is **6CE PE/ 7CE** or Higher.	
F.2.2	**Cost of tendering** Accept that the Employer will not compensate the tenderers for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer satisfy requirements.	
F.2.3	**Check documents** Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.	
F.2.4	**Confidentiality and copyright** Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the employer only for the purpose of preparing and submitting a tender offer in response to the invitation.	
F.2.5	**Reference documents** Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, conditions of contract and other publications, which are not attached but which are incorporated into the tender documents by reference.	

F2.6	**Acknowledge Addenda** Acknowledge receipt of addenda to the tender documents, which the employer may issue, and if necessary apply for an extension of the closing time stated in the tender data, in order to take the addenda into account.	
F.2.7	The arrangements for a **compulsory clarification meeting** are:	
	Date: 09 June 2023 **Starting time:** 10h00	**Location:** Nyandeni Local Municipality, Libode Municipal Offices, then proceed to site
F.2.8	**Seek clarification** Request clarification of the tender documents, if necessary, by notifying the employer at least five working days before the closing time stated in the tender data.	
F2.10	**Pricing the tender**	
F.2.10.1	Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the tender data.	
F.2.10.2	Show VAT payable by the employer separately as an addition to the tendered total of the prices.	
F.2.10.3	Provide rates and prices that are fixed for the duration of the Contract, and not subject to adjustment except as provided for in the conditions of contract identified in the Contract data.	
F.2.10.4	State the rates and prices in South African Rand.	
F2.11	**Alterations to documents** Not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations. Erasures and the use of masking fluid are prohibited.	
F.2.12	**Alternative tender offers** *Delete the contents of* ***Clause F.2.12*** *and replace with the following:* "No alternative offers will be accepted. This includes offering fixed rates in lieu of Contract Price Adjustment and/or changes to the 'as-scheduled' allowance for Contingencies and escalation."	
F.2.13.5	The Client's address for delivery of Tender offers and identification details to be shown on each Tender offer package are:	
	Location of Tender box: Tender Box, Ground Floor, O. R. Tambo District Municipality Building, Nelson Mandela Drive, Myezo Park, Mthatha, Eastern Cape.	
	Physical address: O. R. Tambo House, Nelson Mandela Drive, Mthatha	
F.2.14	**Information and data to be completed in all respects** Accept that tender offers, which do not provide all the data or information requested completely andin the form required, may be regarded by the employer as non-responsive.	
F.2.15	**Closing time** The closing times for submission of Tenders are **12H00pm 04 July 2023.**	
F.2.15	Telephonic, telegraphic, telex, facsimile or e-mailed Bid offers will **not** be accepted.	
F.2.16	**Tender offer validity** The Tender offer validity period is 90 Days as stated in the tender data.	
F.2.17	**Clarification of tender offer after submission** The tenderer shall provide clarification of a tender offer in response to a request to do so from the employer during the evaluation of tender offers. This may include providing a breakdown of rates or prices and correction of arithmetical errors by the adjustment of certain rates or item prices (or both). No change in the competitive position of tenderers or substance of the tender offer is sought, offered, or permitted.	

F.2.18	**Provide other material** The tenderer shall, when requested by the Employer to do so, Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer's commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment. Should the tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the employer's request, the employer may regard the tender offer as non-responsive.
F2.20	**Submit securities, bonds, policies** Submit to the employer before formation of the contract, certificates of insurance required in terms of the conditions of contract identified in the contract data.
F.2.23	**The tenderer is required to submit with his tender:** (1) a valid Tax Verification Pin issued by the South African Revenue Services; and (2) Certified copy of the original of all the Companies / CC Registration documents. (3) Joint Venture Agreement where applicable in CIDB format (signed and initialed on each page). (4) Proof of registration with CIDB (5) Certified copies of the original green bar-coded ID copies of Members of the companies.
F.3	**The employer's undertakings**
F.3.1	**Respond to requests from the tenderer**
F.3.1.1	Respond to a request for clarification received up to five working days before the tender closing time stated in the Tender Data and notify all tenderers who drew procurement documents.
F.3.2	**Issue Addenda** If necessary, issue addenda that may amend or amplify the tender documents to each tenderer during the period from the date that tender documents are available until seven days before the tender closing time stated in the Tender Data. If, as a result a tenderer applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, shall then notify all tenderers who drew documents.
F.3.4	**Opening of tender submissions**
F.3.4.1	The employer shall open valid tender submissions in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data. Tender submissions for which acceptable reasons for withdrawal have been submitted will not be opened.
F.3.4.2	Announce at the meeting held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened and, where applicable, the total of his prices, preferences claimed and time for completion for the main tender Offer only.
F.3.4.3	The Client shall not be obliged to make available the record outlined in F.3.4.2 to any tenderer who fail to attend the tender opening.
F.3.6	**Non-disclosure** The client shall not disclose to tenderers, or to any other person not officially concerned with such processes, information relating to the evaluation and comparison of tender offers, the final evaluation price and recommendations for the award of a contract, until after the award of the Contract to the successful tenderer.
F.3.7	**Grounds for rejection and disqualification** Determine whether there has been any effort by a tenderer to influence the processing of tender offers and instantly disqualify a tenderer (and his tender offer) if it is established that he engaged in corrupt or fraudulent practices.
F3.9	**Arithmetical errors, omissions and discrepancies**
F.3.9.1	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 in words shall govern.

F.3.9.2	Check the highest ranked tender or tenderer with the highest number of tender evaluation pointsafter the evaluation of tender offers in accordance with F.3.11 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 quantitiesor schedules of prices; or ii) The summation of the prices.
F.3.9.3	Notify the tenderer of all errors or omissions that are identified in the tender offer and invite the tenderer to either confirm the tender offer as tendered or accept the corrected total of prices.
F.3.9.4	Where the tenderer elects to confirm the tender offer as tendered, correct the errors as follows: a) If bills of quantities or pricing schedules apply and there is an error in the line item total resultingfrom the product of the unit rate and the quantity, the line item total shall govern and the rate shallbe corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, 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 govern and the tenderer will be asked to revise selected item prices (and their rates if bills of quantities apply) to achieve the tendered total of the prices.
F.3.10	**Clarification of a tender offer** Obtain clarification from a tenderer on any matter that could give rise to ambiguity in a contract arising from the tender offer.
F3.11	**Evaluation of tender offers** *Replace the contents of the entire sub-clause with the following:* The procedure for evaluation of responsive tender offers will be Method 2 of table F.1 of SANS 294: 2004. Financial offer & Preferences. The bid will be awarded to the bidder who has scored the highestpoints for price and preferences combined **BUT** the prerequisite will be to obtain at least **70 points** for minimum conditions of tender which will be explained in Stage 2 below. Nevertheless, O. R. Tambo District Municipality retains the right to accept any bid. **C.** First stage in evaluation: Compliance with Bid Rules and other Requirements The bids will be checked to ensure that they comply with the bid rules and all other requirements of the project document. In particular, the following documentation must be completed and/or included within the bid. • The form of Offer and Acceptance • Audited financial statements for any tender price over R10million • Certified company registration documents and ID of members • Form C: Compulsory Enterprise Questionnaire • Form D: Certificate of Authority for Signature • Form E: Amendments, Qualifications and Alternatives • Form H: Certificate of Good Standing • Form I: Relevant experience • Form J: Details of key staff and CVs • Form M: Preference Points Claim Form in Terms of the Preferential Procurement Regulations2022 Note: • All information supporting the above forms such as Curricula Vitae of staff who will work onthe project and their functions, details of ownership, relevant experience etc. • Addenda issued during the bid period, if any. • The pricing schedule Failure to supply the required information will compromise the bid.

Next Stage in Evaluation: Quality / Minimum conditions of tender; Price & Preference (Specific Goals). The next state in the evaluation process will consist of two stages, as follows:

STAGE 2: MINIMUM CONDITIONS OF TENDER

ITEM	WEIGHT
Functionality (see detailed criteria below)	**100**
• Experience with respect to similar projects	60
• Qualifications and Experience of key staff assigned to the contract	40

Only bidders who score ***70 points or more*** on stage 1 will be evaluated further and therefore eligible for award.

The maximum score for functionality shall be **100**, distributed as follows:

Tender functionality / quality claimed

	Category of Quality / Functionality	Maximum tender evaluation pointsprovided
B1.1	**Experience on similar projects**	**60**
	Experience on similar projects: Proven experience in the construction of projects of similar scope and value i.e. reinforced concrete reservoir of at least 0,5Ml or any other concrete water retaining structure of at least 0.5Ml capacity in the last 10 years**. Copies of Certificate of Completion MUST be submitted with the bid. No points will be awarded where Certificates of Completion have not been submitted with the Bid. If the value of completed project is not the certificate, provide contractor's appointment letter from the client or letter from the client with values.**	**60**
	The Contractor has successfully completed at least **Four (4)** projects that satisfies the sub-criteria and provided evidence whose total sum of a value of at least **R40 Million**.	60
	The Contractor has successfully completed at least **Three (3)** projects that satisfies the sub-criteria and provided evidence whose total sum of a value of at least **R30 Million**.	40
	The Contractor has successfully completed at least **Two (2)** projects that satisfies the sub-criteria and provided evidence whose total sum of a value of at least **R20 Million**.	20
	Contractor failed to provide evidence of experience	00
B1.2	**Qualifications and Experience of key personnel (NB no key personnel member may be assigned more than one duty on the Contract, i.e. different personnel must be assigned for each of the following key positions) Contracts Manager = Minimum ND Civil Engineering/ NQF level 6, Site Agent = Minimum N6 Civil Engineering and Concrete Foreman = Minimum Grade 12/ N3 Civil Engineering/ b u i l d i n g . Bidders must submit CV's/Resume and contactable references.**	**40**
	Contracts Manager, Site Agent, Foreman	
	Favourable previous experience in the Civil Engineering field with a minimum of 5 years; **Contracts Manager** = 20 points, 3-4 years = 15 points & 1-2 years = 10 points.	20
	Favourable previous experience in the Civil Engineering field with a minimum of 5 years; **Site Agent** = 12 points, 3-4 years = 8 points & 1-2 years = 6 points.	12

		Favourable previous experience on construction sites in the role of Main or Assistant Concrete Foreman on contracts involving in-situ reinforced concrete structures such as reservoirs or other reinforced concrete water retaining structures with aminimum of 5 years; **Concrete Foreman** = 8 points, 3-4 years = 6 points & 1-2 years = 4 points.	8
		Contractor failed to provide evidence of qualification and experience.	**0**

STAGE 3: EVALUATION FOR PRICE AND SPECIFIC GOALS (80/20)

The procedure for Stage 2 of evaluation of responsive tenders is **Method 2**

a) PRICE 80

b) SPECIFIC GOAL POINTS CONTRIBUTION: 20

a) Points Awarded for Price (Ps)

A total of 80 points will be awarded to the Tenderer with the lowest balanced price. The **other tenders will be awarded points on the ratio to bench mark price as follows**

$$Ps = 80\left(1 - \frac{Pt - Pmin}{Pmin}\right)$$

Where
Ps = Points scored for price of bid under consideration
Pt = Rand value of bid under consideration
Pmin = Rand value of lowest acceptable bid

b) Points awarded for Specific Goals Contribution

In terms of Regulation 5 (2) and 6 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the Specific Goal Points contribution in accordance with the table below:

The specific goals allocated points in terms of this tender	**Number of points allocated (80/20 system)**
The promotion of enterprises located in a specific province (Eastern Cape): **The Tenderer and Directors are based in the Eastern Cape and pay their municipal rates and taxes**	**10**
The promotion of enterprises located in a specific region (O.R Tambo District): **The Tenderer and Directors are based in the ORTDM region and pay their municipal rates and taxes**	**10**

Tenderers must submit copies of all supporting documents necessary to prove conformance with Specific Goal criteria listed above in order to be eligible for Specific Goal points.

The total calculated points will be rounded to the second decimal place.

F.3.13	**Acceptance of tender offer**
F3.13.1	Accept the tender offer, if in the opinion of the employer, it does not present any unacceptable commercial risk and only if the tenderer: a) is not under restrictions, or has principals who are under restrictions, preventing participating in the employer's procurement, b) can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract, c) has the legal capacity to enter into the contract, d) is not insolvent, in receivership, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of any of the foregoing,
	e) complies with the legal requirements, if any, stated in the tender data, and f) is able, in the opinion of the employer, to perform the contract free of conflicts of interest.
F3.13.2	Notify the successful tenderer of the employer's acceptance of his tender offer by completing and returning one copy of the form of offer and acceptance before the expiry of the validity period stated in the tender data, or agreed additional period. Providing the form of offer and acceptance does not contain any qualifying statements, it will constitute the formation of a contract between the employer and the successful tenderer as described in the form of offer and acceptance.
F.3.14	**Notice to unsuccessful tenderers** After the successful tenderer has acknowledged the employer's notice of acceptance, after written request, the employer will notify the tenderers that their tender offers have not been accepted on the O. R. Tambo District Municipality's website: www.ortambodm.gov.za, by listing the successful tender.
F.3.15	**Prepare Contract documents** If necessary, revise documents that shall form part of the Contract and that were issued by the employer as part of the tender documents to take account of: a) addenda issued during the tender period, b) inclusion of some of the returnable documents, c) other revisions agreed between the employer and the successful tenderer, and d) The schedule of deviations attached to the form of offer and acceptance, if any.
F.3.16	**Issue final contract** Prepare and issue the final draft of the contract to the successful tenderer for acceptance as soon as possible after the date of the employer's signing of the form of offer and acceptance (including the schedule of deviations, if any).

T2.1 LIST OF RETURNABLE DOCUMENTS

The Tenderer must complete the following returnable documents:

T2.2 Returnable Documents required for Tender evaluation purposes		
1	Form 2.2.1	General Information of the Tenderer
2	Form 2.2.2	Authority for Signatory
3	Form 2.2.3	Schedule of Previous Experience
4	Form 2.2.4	Schedule of Current Projects
5	Form 2.2.5	Declaration of good standing regarding tax
6	Form 2.2.6	Certificate of Attendance at Site Meeting
7	Form 2.2.7	Proposed Key Personnel
8	Form 2.2.8	Schedule Equipment to be used
9	Form 2.2.9	Schedule of Proposed Sub-Contractors
10	Form 2.2.10	Financial References
11	Form 2.2.11	Municipal Bidding Documents (MBD forms)

T2.3 Returnable Documents that will be incorporated into the contract		
1	Form 2.3.1	Record of Addenda to Tender Documents
2	Form 2.3.2	Procurement Form

T2.2 RETURNABLE DOCUMENTS

RETURNABLE DOCUMENTS REQUIRED FOR TENDER EVALUATION PURPOSES

Form 2.2.1 General Information of Tenderer
Form 2.2.2 Authority of Signatory
Form 2.2.3 Schedule of Previous Experience
Form 2.2.4 Schedule of Current Projects
Form 2.2.5 Declaration of good standing regarding tax
Form 2.2.6 Registration on the Central Supplier Database
Form 2.2.7 Certificate of Attendance at Site Meeting
Form 2.2.8 Proposed Key Personnel
Form 2.2.9 Schedule of Proposed Sub-consultants
Form 2.2.10 Financial References
Form 2.2.11 Municipal Bidding Documents (MBDs)

FORM 2.2.1 GENERAL INFORMATION OF TENDERER

1. Name of Tenderer: ……

2. Contact details

Address : ……

Tel no : ……

Fax no : ……

Cell no : ……

E-mail address: ……

3. Legal entity: Mark with an X.

Sole proprietor	
Partnership	
Close corporation	
Company (Pty) Ltd	
Joint venture	

In the case of a Joint venture, provide details on joint venture members:

Joint venture member	Type of entity (as defined above)

4. Income tax reference number: ……..
(in case of a joint venture, provide for all joint venture members)

5. Municipal services area where the enterprise is registered: ……..
(in case of a joint venture, provide for all joint venture members)

6. Company / close corporation Registration Number: ……..
(in case of a joint venture, provide for all joint venture members)

7. VAT Registration number: ……..
(in case of a joint venture, provide for all joint venture members)

8. CIDB registration number: ……..……..
(in case of a joint venture, provide for all joint venture members)

ATTACH THE FOLLOWING DOCUMENTS HERETO

1. For Closed Corporations

   Certified copies of CK1 or CK2 as applicable (Founding Statement)

2. For Companies

   Certified copies of Shareholders register

3. ID copies

   Certified ID Copies for members

4. CIDB registration

   Proof of registration with CIDB

5. CSD registration

   Proof of registration with Central Supplier Database

6. For Joint Venture Agreements

   Copy of the Joint Venture Agreement between all the parties, as well as the certified documents in (1), and or (2) and (4) and (4) of each Joint Venture member.

7. Copy of the latest municipal service account where enterprise is registered

8. Director's / Shareholder's Municipal Rates

9. Specific Goal Points Contribution

10. Central Supplier Database Summary Report

FORM 2.2.2 AUTHORITY OF 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.

A Company	B Partnership	C Joint Venture	D Sole Proprietor	E Close Corporation

A. Certificate for Company

I,……., chairperson of the board of directors of ……, hereby confirm that by resolution of the board (copy attached) taken on……..202…., Mr/Mrs…….acting in the capacity of…..... ……..., was authorised to sign all documents in connection with this tender and any contract resulting from it on behalf of the company.

As witness

1……. .....……

Chairman

2……. .....……..

Date

B. Certificate of Partnership

We, the undersigned, being the key partners in the business trading as …… hereby authorise Mr/Mrs……., acting in the capacity of……to sign all documents in connection with the tender for Contract……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.

C. Certificate for Joint Venture

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorise Mr/Mrs……., authorised signatory of the company ....., acting in the capacity of lead partner, to sign all documents in connection with the tender offer for Contract.....and any other contract resulting from it on our behalf.

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

NAME OF FIRM	ADDRESS	DULY AUTHORISED SIGNATORY
Lead partner CIDB registration no ……		Signature : ..... Name : ..... Designation : .....
CIDB registration no ……		Signature : ..... Name : ..... Designation : .....
CIDB registration no ……		Signature : ..... Name : ..... Designation : .....
CIDB registration no ……		Signature : ..... Name : ..... Designation : .....

A copy of the Joint Venture Agreement showing clearly the percentage contribution of each partner to the Joint Venture shall be appended to this Schedule.

D. Certificate for Sole Proprietor

I, ……..……., hereby confirm that I am the sole owner of the business trading as……...

As Witness:

1…….. ……
Signature: Sole owner

2……. …….
Date

E. Certificate for Close Corporation

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

authorise Mr/Mrs……..……..…

Acting in the capacity of……, to sign all documents in connection with the tender

for Contract……and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

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

ATTACH HERETO THE DULY SIGNED AND DATED ORIGINAL OR CERTIFIED COPY OF AUTHORITY OF SIGNATORY ON COMPANY LETTERHEAD

FORM 2.2.3 SCHEDULE OF PREVIOUS EXPERIENCE

Provide the following information on relevant previous experience (indicate specifically projects of similar or larger size and/or which is similar with regard to type of work).

Description	Value (R) VAT excluded	Year(s) work executed	Reference		
			Name	Organisation	Tel no

Name of Tenderer: …… Date: ……

Signature: ……...

Full name of signatory: ……

FORM 2.2.4 SCHEDULE OF CURRENT PROJECTS

Provide the following information on current relevant projects. **This information is material to the award of the Contract.**

Description	Value (R) VAT excluded	Date Appointed	Reference		
			Name	Organisation	Tel no

Name of Tenderer: …… Date: ……

Signature: ……...

Full name of signatory: ……

FORM 2.2.5 DECLARATION OF GOOD STANDING REGARDING TAX

SOUTH AFRICAN REVENUE SERVICES	Tender No: …….. Closing Date: ……

DECLARATION OF GOOD STANDING REGARDING TAX

PARTICULARS

1. Name of Taxpayer/Tenderer: .....

2. Trade Name: .....

3. Identification Number: (If applicable) | | | | | | | | | | | | | |

4. Company / Close Corporation registration number: | | | | | | | | | | |

5. Income Tax reference number: | | | | | | | | | | |

6. VAT registration number: (If applicable) | | | | | | | | | | |

7. PAYE employer's registration number: (If applicable) | | | | | | | | | | |

8. Monetary value of Bid:

DECLARATION

I, ... the undersigned, the above taxpayer/Bidder, hereby declare that my Income Tax, Pay-As-You-Earn (PAYE) and Value-Added-Tax (VAT) obligations of the above-mentioned taxpayer, which include the rendition of returns and payment of the relevant taxes:

(i) Have been satisfied in terms of the relevant Acts; or

(ii) That suitable arrangements have been made with the Receiver of Revenue,….....to satisfy them.*

…….…..…	……..……	……
SIGNATURE	**CAPACITY**	**DATE**

PLEASE NOTE:* **The declaration (ii) cannot be made unless formal arrangements have been made with the Receiver of Revenue with regard to any outstanding revenue/outstanding tax returns.**

ATTACH SARS TAX COMPLIANCE PIN:

FORM 2.2.6 REGISTRATION ON THE CENTRAL SUPPLIER DATABASE

Attach proof of registration with the Central Supplier Database. **This information is material to the award of the Contract.**

ATTACH CERTIFIED PROOF OF REGISTRATION ON THE NATIONAL CENTRAL SUPPLIER DATABASE

FORM 2.2.7 CERTIFICATE OF ATTENDANCE AT SITE MEETING

This is to certify that I, ...(Name)

duly authorized Competent representative of……..…….(Tenderer)

Address: ……

Date: ……..

Visited the site on…… (date) in the presence of

……..……..……
(Engineer)

I have made myself familiar with the sites and all the local conditions likely to influence the work and the cost thereof.

I further certify that I am Competent enough and satisfied with the description of the work and explanations given by the said Engineer above and that I understand perfectly the work to be done, as specified and implied, in the execution of this contract.

REPRESENTATIVE OF TENDERER

REPRESENTATIVE OF EMPLOYER

FORM 2.2.8 PROPOSED KEY PERSONNEL

The Tenderer shall list below the key personne1 (including first nominee and the second choice alternate), whom he proposes to employ on the project should his Tender be accepted, both at his headquarters and on the Site, to direct and for the execution of the work, together with their CV depicting their experience, positions held, their nationalities and certified qualifications.

No	Name	Qualification	Designation	YEARS WITH CURRENT COMPANY

Name of Tenderer: …… Date: ……

Signature: ……...

Full name of signatory: ……

FORM 2.2.9 SCHEDULE OF PROPOSED SUB-CONTRACTORS

NAME OF SUB-CONTRACTOR	FULL DESCRIPTION OF WORK TO BE PERFORMED BY SUB- CONTRACTORS

NB: It is NOT a Condition of Contract that a minimum of 30% of the construction work shall be subcontracted to QSEs and EMEs as contemplated in the 'The Broad-Based Black Economic Empowerment Act (No. 53 of 2003) as amended by B-BBEE Act 46 of 2013 (The Act)'. The Contractor shall take all reasonable and practical measures to support, mentor, train, upskill and supervise such subcontractors as envisaged in the Strategic Objectives of the Amended Construction Sector Code.

Acceptance of this tender shall not be construed as approval of all or any of the listed subcontractors. Should any of the subcontractors not be approved subsequent to acceptance of the tender, this shall in no way invalidatethis tender, and the tendered unit rates for the various items of work shall remain final and binding, even in theevent of a subcontractor not listed above being approved by the Engineer.

Name of Tenderer: …… Date: ……

Signature: ……...

Full name of signatory: ……

FORM 2.2.10 FINANCIAL REFERENCES

FINANCIAL STATEMENTS

I/We agree to furnish an audited copy of the latest set of financial statements together with my/our Directors' and Auditors' report for consideration by the Client.

DETAILS OF TENDERERS BANKING INFORMATION

I/We hereby authorise the Client/Engineer to approach all or any of the following banks for the purposes of obtaining a financial reference:

BANK NAME:	
ACCOUNT NAME: *(e.g. ABC Civil Construction cc)*	
ACCOUNT TYPE: *(e.g. Savings, Cheque etc)*	
ACCOUNT NO:	
ADDRESS OF BANK:	
CONTACT PERSON:	
TEL. NO. OF BANK / CONTACT:	
How long has this account been in existence:	0-6 months ☐ 7-12 months ☐ 13-24 months ☐ More than 24 months ☐ (Tick which is appropriate)

Name of Tenderer: …… Date: ……

Signature: ……...

Full name of signatory: ……

ATTACH AUDITED FINANCIAL STATEMENTS

FORM 2.2.11 MUNICIPAL BIDDING DOCUMENTS (MBD)

MBD 1

PART A
INVITATION TO BID

BID NUMBER:	**ORTDM SCMU 36-22/23**	**CLOSING DATE:**	**04 JULY 2023**	**CLOSING TIME:**	**12H00**
DESCRIPTION:	**COMPLETION OF CONSTRUCTION OF 3 x 1Ml RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA**				

BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT:

TENDER BOX, GROUND FLOOR, O. R. TAMBO DISTRICT MUNICIPALITY BUILDING

NELSON MANDELA DRIVE

MYEZO PARK

MTHATHA

EASTERN CAPE

SUPPLIER INFORMATION

NAME OF BIDDER				
POSTAL ADDRESS				
STREET ADDRESS				
TELEPHONE NUMBER	**CODE**		**NUMBER**	
CELLPHONE NUMBER				
FACSIMILE NUMBER	**CODE**		**NUMBER**	
E-MAIL ADDRESS				
VAT REGISTRATION NUMBER				
TAX COMPLIANCE STATUS	**TCS PIN:**		**CSD No:**	☐
STATEMENT OF RATES AND TAXES OF THE BIDDER	☐ **YesNo**	**STATEMENT OF RATES AND TAXES OF THE COMPANY**	☐ **Yes** **No**	

[STATEMENT OF RATES AND TAXES OF THE BIDDER AND OF THE COMPANY/ LEASE AGRREEMENT FOR LEASED PROPERTY MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS]

ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ **Yes** ☐ **No** **[IF YES ENCLOSE PROOF]**	**ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?**	☐ **Yes** ☐ **No** **[IF YES, ANSWER PART B:3]**
TOTAL NUMBER OF ITEMS OFFERED		**TOTAL BID PRICE**	**R**
SIGNATURE OF BIDDER	.....	**DATE**	
CAPACITY UNDER WHICH THIS BID IS SIGNED			

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:		**TECHNICAL INFORMATION MAY BE DIRECTED TO:**	
DEPARTMENT	**SCM DEPARTMENT**	**CONTACT PERSON**	**Mr. N. Noto**
CONTACT PERSON	**Mr. Sakhiwo Hopa**	**TELEPHONE NUMBER**	**047 501 6425**
TELEPHONE NUMBER	**047 501 6449**	**FACSIMILE NUMBER**	**N/A**
FACSIMILE NUMBER	**N/A**	**E-MAIL ADDRESS**	**nkosiyabon@ortambodm.gov.za**
E-MAIL ADDRESS	**sakhiwoh@ortambodm.org.za**		

PART B
TERMS AND CONDITIONS FOR BIDDING

1.	**BID SUBMISSION:**
1.1.	BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
1.2.	**ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED–(NOT TO BE RE-TYPED).**
1.3.	THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
2.	**TAX COMPLIANCE REQUIREMENTS**
2.1	BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
2.2	BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS.
2.3	APPLICATION FOR THE TAX COMPLIANCE STATUS (TCS) CERTIFICATE OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA.
2.4	FOREIGN SUPPLIERS MUST COMPLETE THE PRE-AWARD QUESTIONNAIRE IN PART B:3.
2.5	BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
2.6	IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
2.7	WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
3.	**QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS**
3.1.	IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)? ☐ YES ☐ NO
3.2.	DOES THE ENTITY HAVE A BRANCH IN THE RSA? ☐ YES ☐ NO
3.3.	DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA? ☐ YES ☐ NO
3.4.	DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA? ☐ YES ☐ NO
3.5.	IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION? ☐ YES ☐ NO
	IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 ABOVE.

NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.
NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE.

SIGNATURE OF BIDDER: ……

CAPACITY UNDER WHICH THIS BID IS SIGNED: ……

DATE: ……..

MBD 4

DECLARATION OF INTEREST

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

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.

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

   3.1 Full Name of bidder or his or her epresentative:……..

   3.2 Identity Number: ……

   3.3 Position occupied in the Company (director, trustee, shareholder[2]):

   …….....

   3.4 Company Registration Number: …….

   3.5 Tax Reference Number: ……..

   3.6 VAT Registration Number: ……

   3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.

   3.8 Are you presently in the service of the state?..... **YES / NO**

   3.8.1 If yes, furnish particulars…….....

   ……..

[1] 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.

[2] Shareholder" means a person who owns shares in the company and is actively involved in the management of the company orbusiness and exercises control over the company.

3.9 Have you been in the service of the state for the past twelve months? ..... **YES / NO**

3.9.1 If yes, furnish particulars……..……

……

3.10 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**

3.10.1 If yes, furnish particulars ……..

……

3.11 Are you, aware of any relationship (family, friend, other) between any other 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**

3.11.1 If yes, furnish particulars……

…….....

3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?. .....**YES / NO**

3.12.1 If yes, furnish particulars …….....

……

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

3.13.1 If yes, furnish particulars…….....

……

3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract?. .....**YES / NO**

3.14.1 If yes, furnish particulars ……

……

4. Full details of directors / trustees / members / shareholders.

Full name	**Identity number**	**State employee number**

…… ……

Signature **Date**

…… ……..

Capacity **Name of Bidder**

MBD 5

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:

NO.	QUESTION	ANSWER (TICK WHICH RESPONSE IS APPLICABLE)	
		YES	NO
1.	Are you by law required to prepare annual financial statements?		
1.1	If yes, submit audited annual financial statements for the past three years or since the dateof establishment if established during the last 3 years.		

NO.	QUESTION	ANSWER (TICK WHICH RESPONSE IS APPLICABLE)	
		YES	NO
2.	Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than 3 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 3 months or other service provider in respect of which payment is overdue for more than 30 days.		
2.2	If yes, provide details: …….. …….. ……..		

NO.	QUESTION	ANSWER (TICK WHICH RESPONSE IS APPLICABLE)	
		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 details: …… …… ……..		

NO.	QUESTION	ANSWER (TICK WHICH RESPONSE IS APPLICABLE)	
		YES	NO
4.	Will any portion of the goods of services be sourced from outside the Republic, and if so, what portion, and whether any portion of payment from the municipality is expected to be transferred outside of the Republic?		
4.1	If yes, provide details: …… …… ……		

CERTIFICATION

I, THE UNDERSIGNED (NAME) ……
CERIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.

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

…… ……

Signature Date

…… ……

Position Name of Bidder

MBD 6.1

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for specific goals.

NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF THE TENDER AND PREFERENTIAL PROCUREMENT REGULATIONS, 2022

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1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to invitations to tender:

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

1.2 To be completed by the organ of state

a) The applicable preference point system for this tender is the 80/20 preference pointsystem.

b) The lowest acceptable tender will be used to determine the accurate system once tenders are received.

c) The maximum points for this tender are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOAL POINTS	20
Total Points For Price and Specific Goal Points	**100**

1.3 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to meanthat preference points for specific goals are not claimed.

1.4 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state

2. DEFINITIONS

(a) **"tender"** means a written offer in the form determined by an organ of state in responseto an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;

(b) **"price"** means an amount of money tendered for goods or services, and includesall applicable taxes less all unconditional discounts;

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

(d) **"the Act"** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5of 2000).

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

3.1.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

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

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

Where

Ps = Points scored for price of tender under considerationPt

= Price of tender under consideration

Pmin = Price of lowest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

The specific goals allocated points in terms of thistender	**Number of points allocated (80/20 system)**	**Number of points claimed by Tenderer (To be completedby the Tenderer)**
The promotion of enterprises located in a specific province (Eastern Cape): **The Tenderer and Directors are based in the Eastern Cape and pay their municipal rates and taxes**	10	
The promotion of enterprises located in a specific region(O.R Tambo District): **The Tenderer and Directors are based in the ORTDM region and pay their municipal rates and taxes**	10	

The following documents shall be submitted to prove compliance with the aboveSpecific Goals where claimed:

- Copy of business registration documents, as issued by CIPC.
- Certified copy of identity documents of directors/ shareholders/ partners / members, asthe case may be.
- Original Valid Tax Clearance Certificate or a Confirmation of Tax Validity with the pinissued by SARS.
- Proof of latest municipal rates and taxes statement **of the bidder** indicating that ratesand taxes are not in arrears for more than 3 months.
- Proof of latest municipal rates and taxes statement of each **company director** indicatingthat rates and taxes are not in arrears for more than 3 months.
- Proof of latest municipal water and sanitation charges statement **of the bidder** indicatingthat rates and taxes are not in arrears for more than 3 months for bidders who reside inthe O. R. Tambo District Municipality area

- Proof of latest municipal water and sanitation charges statement of each **company director** indicating that rates and taxes are not in arrears for more than 3 months for bidders who reside in the O. R. Tambo District Municipality area.
- Confirmation of address from a ward councillor where the bidder and company directorsoperate and reside in a peri-urban area where no rates and taxes and service chargesare not billed.
- A copy of a valid lease agreement where the bidder does not own the property they areoperating from

5. DECLARATION WITH REGARD TO COMPANY/FIRM

5.1. Name of company/firm…….

5.2. Company registration number: ……...

5.3. TYPE OF COMPANY/ FIRM

- □ Partnership/Joint Venture / Consortium
- □ One-person business/sole propriety
- □ Close corporation
- □ Public Company
- □ Personal Liability Company
- □ (Pty) Limited
- □ Non-Profit Company
- □ State Owned Company

[TICK APPLICABLE BOX]

5.4. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I 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 inparagraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

iv) If the specific goals have been claimed or obtained on a fraudulent basis or any ofthe conditions of contract have not been fulfilled, the organ of state may, in additionto any other remedy it may have:

(a) disqualify the person from the tendering 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 asa result of having to make less favourable arrangements due to suchcancellation;

(d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted 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, if deemed necessary.

……..

SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME: ……

DATE: ……

ADDRESS: ……

……

……

……

MBD 8

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

1 This Municipal Bidding 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 bid of any bidder may be rejected if that bidder, 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 (No 12 of 2004).

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

Item	Question	Yes	No
4.1	**Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with thepublic sector?** (Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the *audi alteram partem* rule was applied). **The Database of Restricted Suppliers now resides on the National Treasury's website (www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.**	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		
4.2	Is the bidder 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 (No 12of 2004)? The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.	Yes ☐	No ☐
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court oflaw outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars:		

Item	Question	Yes	No
4.4	**Does the bidder 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 bidder 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 ☐
4.7.1	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 Bidder**

MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

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

2 Section 4 (1) (b) (iii) of the Competition Act No. 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 *pe 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.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

PROJECT NO.: ORTDM SCMU 36-22/23:

COMPLETION OF CONSTRUCTION
OF 3 x 1MI RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA

in response to the invitation for the bid made by**:**

O. R. TAMBO 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 No 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 No 12 of 2004 or any other applicable legislation.

…… ……..

Signature Date

…… ……

Position

Name of Bidder

T2.3 RETURNABLE DOCUMENTS

RETURNABLE DOCUMENTS THAT WILL BE INCORPORATED INTO THE CONTRACT

Form 2.3.1 Record of Addenda to Tender Documents
Form 2.3.2 Procurement Form

FORM 2.3.1 RECORD OF ADDENDA TO TENDER DOCUMENTS

(Addenda received from Engineer for amendments on Tender Documentation)

	Date	**Title or Details**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Name of Tenderer: …… Date: ……

Signature: ……...

Full name of signatory: ……

FORM 2.3.2 PROCUREMENT FORM

Acceptable Tenders will be evaluated using a system that awards points on the basis of Tender price and the meeting of specific goals.

DEFINITIONS

"Acceptable Tender" means any Tender which, in all respects, complies with the conditions of Tender and specifications as set out in the Tender document, including conditions as specified in the Preferential Procurement Policy Framework Act (Act 5 of 2000) and the Supply Chain Management of Council.

"Council" refers to the O. R. TAMBO DISTRICT Municipality.

"Equity ownership" refers to the percentage ownership and control, exercised by individuals within an enterprise and they are involved in the day to day running of the Company.

"HDI equity ownership" refers to the percentage of an enterprise, which is owned by individuals, or in the case of a company, the percentage shares that are owned by individuals meeting the requirements of the definition of a HDI.

"**Historically disadvantaged individuals (HDIs)**" means all South African citizens –

(i) Who had no franchise in national elections prior to the introduction of the 1983 and 1993 constitutions (Referred to as Previously Disadvantaged Individuals (PDIs) in this document)
(ii) Women
(iii) Disabled persons.

"SMME's" (small, medium and micro enterprises) refers to separate and distinct business entities, including co-operative enterprises and NGOs, managed by one owner or more, as defined in the National Small Business (Act 102 of 1996). Refer to the attached addendum for a definition of SMME's for different economic sectors.
Tenders are adjudicated in terms of NDM Procurement Policy, and the following framework is provided as a guideline in this regard.

1. Technical adjudication and General Criteria

- Tenders will be adjudicated in terms of inter alia:
- Compliance with Tender conditions
- Technical specifications

If the Tender does not comply with the Tender conditions, the Tender will be rejected. If technical specifications are not met, the Tender may also be rejected.

With regard to the above, certain actions or errors are unacceptable, and warrants **REJECTION OF THE TENDER**, for example:

- A Tax Verification Pin. (**Only valid tax verification pin** must be attached to the Tender document).
- Pages to be completed, removed from the Tender document, and have therefore not been submitted.
- Failure to complete the schedule of quantities as required
- Scratching out without initialing next to the amended rates or information.
- Writing over / painting out rates / the use of tippex or any erasable ink, eg. Pencil.
- Failure to attend compulsory site inspections
- The Tender has not been properly signed by a party having the authority to do so, according to the **Form 2.2.2 – "Authority for Signatory"**
- No authority for signatory submitted.
- Form of Offer not completed.
- Particulars required in respect of the Tender have not been provided – non-compliance of Tender requirements and/or specifications.
- The Tenderer's attempts to influence, or has in fact influenced the evaluation and/or awarding of the contract.
- The Tender has been submitted after the relevant closing date and time
- Each page of the Contract portion of this Tender document (Part C1 – C4) must be initialed by the authorised person in order for the document to constitute a proper Contract between the Employer (ORTDM) and the undersigned.
- If any municipal rates and taxes or municipal service charges owed by that Tenderer or any of its directors to the municipality, or to any other municipality or municipal entity, are in arrears for more than three months.
- If any Tenderer who during the last five years has failed to perform satisfactorily on a previous contract with the municipality or any other organ of state after written notice was given to that Tenderer that performance was unsatisfactory.

2. Size of enterprise and current workload

Evaluation of the Tenderer's position in terms of:

- Previous and expected current annual turnover
- Current contractual obligations
- Capacity to execute the contract

3. Staffing profile

Evaluation of the Tenderer's position in terms of:

- Staff available for this contract being Tendered for
- Qualifications and experience of key staff to be utilised on this contract

4. Financial ability to execute the contract:

Evaluation of the Tenderer's financial ability to execute the contract. Emphasis will be placed on the following:

- Contact the Tender's bank manager to assess the Tenderer's financial ability to execute the contract and the Tenderer hereby grants his consent for this purpose.

5. Good standing with SA Revenue Services

- Determine whether an original tax pin an original valid tax clearance certificate has been submitted.
- The Tenderer must affix a Tax Verification Pin to page T2.2.9 of the Tender document.

6. Penalties

The O. R. Tambo District Municipality will if upon investigation it is found that a preference in terms of the Contract has been obtained on a fraudulent basis, or any specified goals are not attained in theperformance of the contract, on discretion of the Municipal Manager, one or more of the following penaltieswill be imposed:

- Cancel the contract and recover all losses or damages incurred or sustained from the Tenderer.
- Impose a financial penalty of twice the theoretical financial preference associated with the claim, which was made in the Tender.
- Restrict the suppliers, its shareholders and directors on obtaining any business from the O. R. TamboDistrict Municipality for a period of 5 years.

DECLARATION

I/We the undersigned, who warrants that he/she is duly authorised to do so on behalf of the firm, certifies that the items mentioned in part of the foregoing procurement form and returnable documents qualifies/qualify for the preference(s) shown and acknowledge(s) that:

The information furnished is true and correct.

The contractor may be required to furnish documentary proof to the satisfaction of the O. R. Tambo District Municipality that the claims are correct.

If the claims are found to be inflated, the O. R. Tambo District Municipality may, in addition to any other remedy it may have, recover from the contractor all cost, losses or damages incurred or sustained by the O. R. Tambo District Municipality as a result of the award of the Contract and/or cancel the contract and claim any damages which the O. R. Tambo District Municipality may suffer by having to make less favourable arrangements after such cancellation.

Signature of Tenderer

Signed at_____on_____day of_____202___

_____

For the tenderer

WITNESSES:

1. _____

2. _____

C1 AGREEMENTS AND CONTRACT DATA

FORM C1.1 FORM OF OFFER AND ACCEPTANCE

OFFER

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract in respect of the following works: **PROJECT NO.: ORTDM SCMU 36-22/23: ROSEDALE TO LIBODE REGIONAL WATER SUPPLY: COMPLETION OF CONSTRUCTION OF 3 x 1Ml RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA**

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.

Signature(s) _____

Name(s) _____ _____

Capacity _____

For the tenderer _____
(Name and address of organisation)

Name & Signature
Of Witness

_____ _____
Name Date

ACCEPTANCE

By signing this part of this 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 Agreements and Contract Data (which includes this Agreement)
Part 2 Pricing Data
Part 3 Scope of Work
Part 4 Site information
Part 5 Additional Relevant Documentation
Part 6 Contract Drawings

and drawings and documents or parts thereof, which may be incorporated by reference into Parts 1 to 6 above.

Deviations from and amendments to the documents listed in the Tender Data, including the proposed key personnel 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 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 fulfil 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.

Signature(s) _____

Name(s) _____

Capacity _____

For the tenderer _____
(Name and address of organisation)

Name & Signature
Of Witness _____ _____
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 letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid becomes 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 _____

3 Subject _____

Details _____

4 Subject _____

Details _____

5 Subject _____

Details _____

6 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:

Signatures (s) _____ _____

Name(s) _____ _____

Capacity _____ _____

_____
(Name and address of Organisation)

Name & Signature
Of Witness _____ Date _____

FOR THE EMPLOYER

Signatures (s) _____ _____

Name(s) _____ _____

Capacity _____ _____

_____
(Name and address of Organisation)

Name & Signature
Of Witness _____ Date _____

FORM C1.2 CONTRACT DATA

PART C1.2 DATA PROVIDED BY THE EMPLOYER

Notes to Tenderer:

1. The Tenderer is not required to complete this data in full.
2. Please read both the General Conditions of Contract for Construction Works, Third Edition, 2015.(GCC 2015) and the relevant parts of its Guidance Notes to understand the implications of this Data which the tenderer is required to complete.
3. Copies of these conditions of contract may be obtained from the South African Institution of Civil Engineering www.saice.org.za
4. The number of the clause which requires the data is shown in the left-hand column for each statement; however, other clauses may also use the same data
5. Each item of data given below is cross-referenced to the clause in the General Conditions of Contract for Construction Works to which it mainly applies.
6. The General Conditions of Contract for Construction Works make several references to the Contract Data for specific data, which together with these conditions collectively describe the risks, liabilities, and obligations of the contracting parties and the procedures for the administration of the Contract. The Contract Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the general conditions of contract.
7. The General Conditions of Contract shall be read in conjunction with the variations, amendments and additions set out in the Contract Data below. Each item of data given below is cross-refencedto the clause in the General Conditions of Contract to which it mainly applies
8. The following contract specific data are applicable to this Contract:

Clause	Statement	Data
	The *conditions of contract* are	The General Conditions of Contract for Construction Works, Third Edition, 2015. (GCC 2015)
1		**General**
1.1.1.13	*Defects Liability Period* is	**12 months** after the Practical Completion Date
1.1.1.14	*Due Completion Date* is	**As tendered (not to exceed 32 weeks)** from the access date (as described inclause 5.4.1)
1.1.1.15	The *Employer* is	O. R. Tambo District Municipality
1.1.1.16	The *Employer's Agent*	To which this *Contract* relates shall be the delegated individual specified in writing by the Employer within seven days of the commencement date.
1.1.1.17	The *Employer's Agent Representative*	To which this *Contract* relates shall be the delegated individual specified in writing by the Employer's Agent within seven (7) days of the commencement date.
1.1.1.26	The *Pricing Strategy* is	A *re-measurement contract*
1.1.1.29	The *Site is*	All villages within the boundaries of **Mpangele**, **Mamfengwini and Dalaghubha** sites. Refer to Part C3.1, Clause PS2.1
1.1.1.30	The *Site Information* is	Specified in Part C4 : Site Information of this document
1.1.1.33	The *Works* are	Specified in Part C3: Employer's Works Information of this document

1.2.1	**The *Employer's* delivery address is**	
	Physical Address	O. R. Tambo House Nelson Mandela DriveMthatha 5100
	Postal Address	Private Bag X 6043 Mthatha 5100
	Email Address	Shall be specified by the *Employer* withinFourteen days of the commencement date.
1.2.1	The *Employer's* Agent's delivery address	**Lead Consultant: GIBB (Pty) Ltd** 36 Stanford Terrace Mthatha 5100 Telephone: (047) 532 6573 E-mail: nmkhwanazi@gibb.co.za
1.3.2	The law of the contract is the law of	the Republic of South Africa that applies to agreements executed and wholly performed within the Republic of South Africa
1.3.3	The *language of this Contract* is	English
3		**Employer's Agent**
3.2.3	1. The *Employer's Agent* shall first consult and obtain specific approval all the *Employer Agent's* actions ascontemplated in Clause 6.4.1	from the *delegated* ***Lead Consultant***, ***GIBB (Pty) Ltd*** prior to executing any of its functions or duties, with respect to following clauses: 2. all the *Employer Agent's* actions as contemplated in Clause 3.3.1 3. all the *Employer Agent's* actions as contemplated in Clause 3.3.4 4. all the *Employer Agent's* actions as contemplated in Clause 5.11.1 5. all the *Employer Agent's* actions as contemplated in Clause 5.12.4 6. *Employer Agent's* actions as contemplated in Clause 10.1.5 7. all the *Employer Agent's* actions as contemplated in Clause 10.2.3
3.2.4	The *Employer's Agent* for Health and Safety	To which this Contract relates shall be the delegated individual specified in writing by the Employer's Agent within seven days of the commencement date.
3.2.4	The *Employer's Agent* for Social Facilitation	To which this Contract relates shall be the delegated individual specified in writing by the Employer's Agent within seven days of the commencement date.
5		**Time and Related Matters**
5.1.1	The special non-working days set out in the *Contract* are	the following: 1. South African Public Holidays, and 2. Annual builders' holiday traditionally starts onor around 15 December and ends in the second week of January.

5.3.1	The *Engineer's Agent* shall issue an *instruction* to the Contractor to commence with the Work	On approval of the following documentation: 1. Health and Safety Plan 2. OHS Agreement 3. Department of Labour (DoL) notification of construction work 4. Initial Programme 5. Letter of Good Standing 6. Performance Guarantee 7. Insurance for the Works 8. Contractor's Key Personnel Which will be within 14 days after the approval of the Documentation required from the Contractor
5.3.2	The Contractor is to submit the documentation stipulated in clause 5.3.1	Within 14 days of the Commencement Date
5.4.1	Access to and possession to the Site	is granted on the date of the site handover meeting which should occur no later than Fourteen (14) days after Employer's Agent's instruction to commence carrying out the Works referred to in Clause 5.3.1.
5.8.1	The non-working days set out in the *Contract* are	weekends
	The special non-working days set out in the Contract are	the following: 1. all South African gazetted public holidays, and 2. Annual builders' holiday traditionally starts on or around 15 December and ends in the second week of January. The year-end builders' holiday does not exceed 15 working days in duration
5.12.2.2	Extension of time for practical completion due to abnormal climatic conditions.	Add the following to the end of ***Clause 5.12.2.2***: "Extension of time resulting from abnormal weather will be calculated as per the provisions stated in C3.1: Project Specifications Clause PS 6.9."

5.13.1	The penalty for delay or late completion is	If the Contractor fails by the Due Completion Date to complete the Works, or any specific portion thereof that is identified in the Scope of Works to the extent which entitles him in terms of Clause 5.14.2 to receive a Certificate of Practical Completion for the Works, then the Contractor shall be liable to the Employer for the sum(s) stated below as (a) penalty/ies for every day which shall elapse between the Due Completion Date for the Works or the specific portion of the Works and the actual Date of Practical Completion of the Works or of the specific portion. The penalty for delay shall be **R5 000 or 0.02% of the Contract Value (excluding VAT) per day**; **whichever is the higher value**."
6		**Payment and related matters**
6.2.1	***The performance guarantee*** for liability of the *Contractor* for claims made against the *Contractor* arising out of the *Contractor's* failure to deliver the requested *Works* per the standards, practices, methods and procedures conforming to applicable laws and exercising that degree of skill, care, diligence, prudence and foresight thatwould reasonably and ordinarily be expected from a skilled and experienced person engaged in a similar type ofundertaking under similar circumstance is	***10% of the Contract Price***
6.2.2	The security of ten percent retention of the value of the Works	*Shall be deducted from the Contractor's first* three *payment certificates in equal increments as per the SCM Policy.*
6.8.2	Contract Price Adjustment Factor	is not applicable for this contract
6.10.1.5	The advance payment percentage limit for plant and materials delivered to *Site* but not yet built into the *Permanent Works* is	***80% of the value of the materials***.
6.10.1.5	The advance payment percentage limit for plant and materials not yet supplied to Site	is not applicable for this contract
6.10.3	The percentage retention is	***10% of the value of the Works***
6.10.3	The limit of retention money is	***5%*** *of the value of the Contract Price (Including VAT)*
8		**Risks and related matters**
8.6.1.1.2	The value of plant and materials supplied by the Employer to be included in the insurance sum is	NIL
8.6.1.3	The minimum limit of indemnity for insurance in respect of loss of or property damage (except for the *Works*, Plant and Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the *Contractor*) caused by activity in connection with this *Contract* for any one event is:	R5,000,000

8.6.1 .5	a) The minimum limit of indemnity for insurance in respect of loss of or damage to the Works, Plant and Materials	The replacement cost thereof.
	b) The minimum limit of indemnity for insurance in respect of the death of or bodily injury to employees of the *Contractor* arising out of and in the course of their employment inconnection with this *Contract* for any one event is	As prescribed by the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 and the *Contractor's* common-law liability for people falling outside the scope of the Act with a limit of indemnity of not less than R1 000 000 (One Million South African Rand).

10		**Claims and disputes**
10.5.3	The Adjudication Board shall consist of	one (1) member
10.7.1	The determination of disputes shall be by arbitration	
10.7.2	The arbitration procedure is	the latest edition of Rules for the Conduct of Arbitrations published by the Association of Arbitrators (Southern Africa) or its successor body.
	The place where arbitration is to be held is	Mthatha
	The person who shall choose an arbitrator	the Chairman of the Association of Arbitrators (www.arbitrators.co.za) or its successor body.

PART C1.2.3 DATA PROVIDED BY THE *CONTRACTOR*

Notes to Tenderer:

9. The Tenderer is required to complete this data in full.
10. Please read both the General Conditions of Contract for Construction Works, Third Edition, 2015. (GCC 2015) and the relevant parts of its Guidance Notes to understand the implications of this Data which the tenderer is required to complete.
11. The number of the clause which requires the data is shown in the left-hand column for each statement; however, other clauses may also use the same data

CLAUSE	STATEMENT	DATA
	The *conditions of contract* are	The General Conditions of Contract for Construction Works,Third Edition, 2015. (GCC 2015)
1		**General**
1.1.1.9	*The Contractor* is	
1.2.1	The Contractor's delivery address is Physical Address Postal Address Email Address	
4		**Contractor's General Obligations**
4.4.2	The *Contractor* must Sub-Contract any parts of the Contract.	To which this Contract relates shall be the ***minimum of 10% of the Value of the Works*** that must be Sub-Contracted to a Local SMME or the Designated Groups as agreed during the Procurement of the Sub-Contractors.
4.10.2	Contractor shall provide monthly reports outliningcompliance with	Site progress and Employer's CPG and EPWP objectives at intervals specified in Part C3: Employer's Works Information ofthis document.
4.11.1	*Contractor*'s Competent Employees are: **Title** Name Qualifications Tel No Email	 **Construction Manager**

Title	**Site Agent**
Name	
Qualifications	
Tel No	
Email	

Title	**Concrete Foreman**
Name	
Qualifications	
Tel No	
Email	

Title	**Safety Officer**
Name	
Qualifications	
Tel No	
Email	
SACPMP Registration Number	

Should the Contractor decide to use other Personnel rather than the one's listed above, must do it in writing, and the proposed Personnel must have the same or very similar Qualifications and experience

Security

6.2.1 The security to be provided by the Contractor shall be one of the following:

Type of security	**Select (Tick)**
1. Cash Deposit of 10% of the Contract Sum plus retention of 5% of the value of Works	
2. Fixed Performance Guarantee of 10% of the Contract Sum plus retention of 5% of the value of Works	

A Note.

The **Performance Guarantee** shall be of an Insurance Company listed on the Johannesburg Stock Exchange or owned by such a company, a Registered South African Bank or a recognised government sponsored, provincial or national development agency

Part C1.4 Special Conditions of Contract

Notes to Tenderer:

1. Particular Conditions of the Contract defines conditions that are specific to a Project.
2. The Particular Conditions of the Contract are used for addition/ omission and change of GeneralConditions of the Contract.
3. The number of the clause which requires the data is shown in the left-hand column for eachstatement; however, other clauses may also use the same data

Clause	Statement	Data
		Amendment of GCC 2015 Clauses
	Employer's SCM Policy	
	Insertion of additional clause	The parties agree that this contract shall be subject to the Employer's Supply Chain Management Policy ('SCM Policy') that was applicable on the date the bid was advertised. Abuse of the supply chain management system is no permitted and may result in cancellation of the contract, restriction of the supplier, and/or the exercise by the Employer of any other rights and remedies available to it as described in the SCM Policy
	Ambiguity and discrepancy	
	Insertion of additional wording:	All parts of the Contract should be read together and that their original purpose is to be mutually explanatory. However, if there is a discrepancy between the information provided, the order of priority of contract documents is as stated below: 1. the Contract Agreement 2. the Letter of Acceptance (this is the formal acceptance of the contractor's tender and usually presents the point in time when Contractual Parties enter the Contract), 3. the Contract Data, 4. the Particular Conditions of the Contract 5. the General Conditions of the Contract, 6. the Specification, 7. the Drawings, and 8. the Schedules and any other document forming part ofthe Contract In the event of a discrepancy or ambiguity, the documentof higher priority takes precedence.
	Assignment	
	Delete wording and replace with thefollowing:	The Employer will, at all times, be entitled to cede its rightsand/or delegate its obligations under this Contract and/or assign this Contract to any financier and/or nominee of any financier of the Employer for purposes of the programme. Any cession and/or delegation and/or assignment by the Employer to any such financier or nominee of any financieris expressly permitted. The Contractor shall, if requested thereto by the Employer and/or any such financier, sign a separate authority giving effect to the aforementioned in such form as the Employer and/or any financier of the Employer may reasonably require.

The Employer will, at all times, be entitled to cede its rights and/or delegate its obligations under this Contract and/or assign this Contract to any financier and/or nominee of any financier of the Employer for purposes of the programme. Any cession and/or delegation and/or assignment by the Employer to any such financier or nominee of any financier is expressly permitted. The Contractor shall, if requested thereto by the Employer and/or any such financier, sign a separate authority giving effect to the aforementioned in such form as the Employer and/or any financier of the Employer may reasonably require

The Contractor shall not be entitled to cede any of its rights and/or delegate any of its obligations under this *Contract* to any person without the prior written consent of the *Employer*.

Access to and possession of Site

Insertion of additional wording:

The Employer allows access to, possession and use of each part of the Site to the *Contractor* which is necessary for the work included in this contract. The *Employer* shall grant access and use of the Site no later than seven days after *Employer's Agent's* instruction to commence with the Works.

If the *Employer* does not give the *Contractor* access to, possession and use of the *Site* within seven days of the *Employer's Agent* instruction to commence with the Works, access to, possession and use of the *Site* shall be as the date when *Employer's Agent* instructed the *Contractor* to commence with the Works.

Some reasons for extension of time

Insertion of additional wording:

No extension of time will be granted in respect of any delays attributed to normal climatic conditions. Normal climatic conditions shall be deemed to include normal rainfall and associated wet conditions and materials, strong winds and extremes of temperature. However, in the eventthat delays to critical activities exceed the number of working dates listed below for each month, then abnormalclimatic conditions shall be deemed to exist, and an extension of time may be claimed in accordance with the provisions of clause 5.12

The number of days quoted C3.1 Clause PS6.9 shall be regarded as fair estimate of the delays to be anticipated and allowed for under normal climatic conditions where inclement weatherprevents or disrupts critical work

Claims for delays for abnormal climatic conditions shall be accompanied by substantiating facts and evidence, which shall be submitted timeously as each day or half-day is experienced.

It shall be noted that where the critical path is not affected,no extension of time for abnormal climatic conditions or forany other reason will be considered.

Termination by the Employer

Insertion of additional wording

9.2.1.3.9	Has substantially broken a health or safety regulation.
9.2.1.3.10	Failure to obtain access to Site due to non-compliant documentation as stated in clause 5.3.1
9.2.1.3.11	Has failed to provide or update the required insurances within the prescribed time
9.2.1.4	Where the *Works* are no longer required
9.2.1.5	Where the funding for the *Works* is no longer available
9.2.1.6	An event occurs that stops the Contractor from completing the works by the date shown on the Accepted Programme and is forecast to delay Completion by more than13 weeks
9.2.1.7	The Service Provider becomes insolvent or liquidated
9.2.1.8	If as a result of Force Majeure, the Service provider is unable to perform part or the whole service for a period of thirty 30 days.

Right of Retention

The *Contractor* hereby waive and abandons any and all lien and/or any other right of retention that the *Contractor* now has or in future may have, in terms of the Contract, the common law or otherwise, in respect of the works, the Site or any property belonging to the *Employer* and shall under no circumstances be entitled to withhold delivery of the same to the *Employer*. The Contractor warrants that all Subcontractors shall, mutatis mutandis, waive and abandon any such Subcontractor's lien or any other right of retention, in favour of the *Employer*.

Joint Ventures

Suppose the *Contractor* constitutes a joint venture, consortium, or other unincorporated groupings of two or more persons or organisations. In that case, these persons or organisations are deemed to be jointly and severally liable to the *Employer* for the performance of this *Contract*.

Unless already notified to the *Employer*, the persons or organisations notify the *Employer's* Agent within two weeks of the date of acceptance of the Contract of the key person who has the authority to bind the *Contractor* on their behalf.

The *Contractor* does not alter the composition of the joint venture, consortium, or other unincorporated groupings of two or more persons without the consent of the *Employer* having been given to the *Contractor* in writing.

Nothing in this Contract shall be deemed to create any joint venture, partnership or principal-agent relationship between the Parties and neither Party shall hold itself out in its advertising or otherwise in any manner which would indicate or imply such relationship with the other Party according to this Contract

The dissolution of the *Joint Venture* shall be deemed as a separation and that constitutes the Contract to be Terminated.

Illegal or Corrupt Practices

Any offer, payment, consideration, or benefit of any kind made by the *Contractor*, which constitutes or could be construed either directly or indirectly as an illegal or corrupt practice, an inducement or reward for the award or in the execution of this *Contract* constitutes grounds for terminating the *Contractor's* obligation to Provide the Works or taking any other action as appropriate against the *Contractor* (including civil or criminal action).

The Employer may terminate the *Contractor's* obligation to provide the Works if the *Contractor* (or any member of the *Contractor* where the *Contractor* constitutes a joint venture, consortium or other unincorporated groupings of two or more persons or organisations), or a director of any such entity, is found guilty by a competent court, administrative or regulatory body of participating in illegal or corrupt practices.

SCC4.3 Such practices include, but are not limited to, the making of offers, payments, considerations, or benefits of any kind or otherwise, whether in connection with any procurement process or contract with the Employer or other people or organisations and including in circumstances where the *Contractor* or any such member is removed from the approved vendor database of the *Employer* as a consequence of such practice.

Confidentiality

The *Contractor* does not disclose or make any information arising from or in connection with this *Contract* available to Others. This undertaking does not, however, apply to information which at the time of disclosure or thereafter, without default on the part of the *Contractor*, enters the public domain or to information which was already in possession of the *Contractor* at the time of disclosure (evidenced by written records in existence at that time). Should the *Contractor* disclose information to Others in terms of clause 25.1, the *Contractor* ensures that the provisions of this clause are complied with by the recipient.

Any information communicated by the *Employer* to the *Contractor* in connection with the Contract and any secret and/or confidential information of the *Employer* otherwise acquired by the *Contractor* shall be regarded by the *Contractor* as strictly confidential and shall not, without the prior written consent of the *Employer* in each instance, be published or disclosed to any other party or be used for any purpose whatsoever other than to execute the Works.

If the *Contractor* is uncertain about whether any such information is confidential, it is to be regarded as such until notified otherwise in writing by the *Employer's Agent*.

Suppose the Contractor is, at any time, required by law to disclose any such information which is required to be kept confidential. In that case, the *Contractor*, to the extent permitted by law before disclosure, notifies the *Employer* so that an appropriate protective order and/or any other action can be taken if possible, before any disclosure. If such protective order is not, or cannot, be obtained, then the *Contractor* may only disclose that portion of the information which it is required to be disclosed by law and uses reasonable efforts to obtain assurances that confidential treatment shall be afforded to the information so disclosed.

The taking of images (whether photographs, video footage or otherwise) of the works or any portion thereof, in the course of Providing the Works and after Completion, requires the prior written consent of the *Employer's Agent*. All rights in and to all such images vests exclusively in the *Employer*.

The Contractor ensures that all his subcontractors abide by the undertakings in this clause.

Existing Services and Housekeeping

The Site may be in continuous operation and, accordingly, the *Contractor* shall assume that existing services and access ways shall be in continuous use and fully operational at all times.

The Contractor shall be held responsible for repair or making good of existing installations that may be required due to any act or omission of whatever nature by the *Contractor* and for any costs to the *Employer* which may arise, due to the *Contractor* preventing in any manner whatever the normal operation and use of such services and access ways.

In the execution of the Works, the *Contractor* shall keep the Site reasonably free from all unnecessary obstructions and shall store or dispose of any *Contractor*'s Equipment and surplus materials and without delay clear away and remove from the Site any wreckage, rubbish or temporary works no longer required.

The *Contractor* must use and/or attend to all areas of the Site which are used by it or under its control from time to time in a safe, professional and responsible manner.

The Contractor shall be responsible for all areas of the *Site* which are used by it or under its control from the time the area in question is made available to the *Contractor* until the time the *Employer* requires the *Site* to be returned to it or otherwise when the *Contractor* demobilises from the area of the *Site* in question and returns to the *Employer* all of the *Employer's* property.

The *Contractor* must ensure that all such areas of the *Site* are kept at all times in a safe, clean and hygienic condition and in good working order and repair and the *Contractor* shall promptly repair, at its cost, any damage to the *Site* which is attributable to the *Contractor* or its employees of sub-contractors, failing which the *Employer* shall be entitled to repair the *Site* and recover the cost of such repairs from the *Contractor*.

Any damages suffered by the *Employer* as aforesaid shall be paid by the *Contractor* within ten business days or shall be set off against any amounts owing to the *Contractor* by the *Employer*.

Any damages suffered by the *Community or Resident* as aforesaid shall be paid by the *Contractor* within ten business days or shall be set off against any amounts owing to the *Contractor* by the *Employer*.

The *Contractor* shall not unnecessarily interfere with the operations of the *Employer* or Others at the *Site*. The *Employer* has the right to refuse access to the *Site* to any of the *Contractor's* employees, representatives and/or subcontractors whom it suspects of being a health and safetyor other risk.

The Contractor shall not have any lien or right of retention in respect of the *Site*, the *works* and/or any other property belonging to the *Employer*.

Indemnity against *Contractor*'s Design

The *Contractor* indemnifies and keeps indemnified the *Employer* against any losses and costs, including legal costs between attorney and client, and all other expenses whatsoever that the *Employer* may incur as a result of any action, proceeding or claim made against the *Employer* arising from the use of a design constituting an infringement of patent rights, design registration, registered trademarks or other exclusive rights in respect thereof. This indemnity does not apply to any infringement which is solely due to the *Contractor* having followed in its entirety instructions stipulated by the *Employer*.

The *Employer* shall give the *Contractor* prompt notice of any such action, proceeding, claim or threat instituted or made against it or both of them. Promptly after the giving of such notice the

Parties are to consult together about the subject of the notice and the *Employer* may at its optiondecide to a) permit the Contractor at the *Contractor*'s own expense to conduct any litigation that may ensue and all negotiations for a settlement of such litigation or claim with the proviso that the*Contractor* keeps the *Employer* informed of all steps that are taken and of the outcome; or b) conduct any litigation that may ensue and all negotiations for a settlement, in which event the *Employer* shall act in consultation with the *Contractor* and shall keep the *Contractor* informed of all aspects that are taken and of the outcome.

The *Contractor* hereby cedes and agrees to cede all intellectual property, excluding intellectual property in respect of which the *Contractor* can demonstrate proprietorship prior to the date of signature hereof, but including intellectual property specifically developed by the *Contractor* on behalf of the *Employer* under instruction and payment by the *Employer* and including all current and future technical information relating to the works; technical concepts; know-how; specifications; data; formulae; computer programs; design; patent and / or applications in respectthereof; copyrighted works; memoranda; scripts; reports; manuals; diagrams; drawings; includingengineering drawings; prototypes; drafts in performing the works, whether completed or not and whether accepted, amended or rejected, and the like relating to the works, whether patented or not, and includes all intellectual property relating to the works developed by or on behalf of the *Employer*, to the *Employer*, its successors, assigns or legal representatives locally and / or internationally, together with the right to apply for Letters Patent in respect thereof.

It is further agreed that the *Employer* may apply in its name and its own cost for Letters Patent inrespect of such inventions and registration of such designs locally and/or internationally.

The *Contractor* hereby agrees that when requested, he shall without any charges to the *Employer*,but at the latter's expense, sign all papers, take all rightful oaths, and do all acts which may be necessary, desirable or convenient for securing and maintaining patents relating to the works and/or the patent applications in any and all countries and for vesting titled thereto in the *Employer*, its successors, assign or legal representatives and the *Contractor* confirms and agrees that he shall assist the *Employer* to ensure that total and complete cession and transfer of all right, title and interest in the intellectual property takes place.

Time

The *Contractor* acknowledges that time is of the essence to the performance of its obligations interms of this Contract.

Discovery/Reproduction of Documentation

The *Contractor* hereby authorises the *Employer* to reproduce all documentation made available by the *Contractor* to the *Employer* in connection with this *Contract*. In so far as the *Contractor* hasany copyright protection in the items that are so reproduced by the *Employer*, the *Contractor* hereby grants a right and license to the *Employer* to reproduce the same for the purposes specifiedin this *Contract*. The *Contractor* keeps the *Employer* informed of any threats or claims made against it in respect of infringement of patent or other exclusive rights by virtue of the provision ofthe works.

Damages

The *Employer* shall be entitled, in its sole discretion, to claim and recover from the *Contractor* damages *in lieu of* any penalty agreed upon in terms of this *Contract*.

Accrual

Unless otherwise provided *herein*, rights which accrue to a Party in terms of this *Contract* shallsurvive its termination.

Commitments and Undertakings

Neither Party shall be bound by any express, tacit or implied term, representation, warranty, promise nor the like not recorded *herein*. This *Contract* supersedes and replaces all priorcommitments, undertakings or representations, whether oral or written, between the Parties in respect of the subject matter hereof.

Validity and Enforceability of *Contract*

If any provision of this *Contract* is found to be invalid, unlawful or unenforceable, that provision shall be severable from the remaining provisions of this *Contract*, which shall continue to be validand enforceable.

Strategic Socio-Economic Objectives

in terms of which the *Contractor* gives unconditional warranties and undertakings committing itselfto the promotion of the strategic socio-economic objectives stipulated herein, including, but not limited to, warranties and undertakings to the effect that the BEE information disclosed to the *Employer* in the bid response to the Tender Invitation

pursuant to which it was appointed, as supplemented subsequently in writing, is accurate andcomplete and that it shall maintain at least those levels of BEE for the duration of the contract;

it shall only subcontract aspects of the Works to Subcontractors with which it has concluded Subcontracts and actively take steps towards achieving the *Employer*'s CPG requirements for theempowerment of Subcontractor/s

it shall ensure that the execution of the *Works* and the expenditure of the project costs results inthe achievement of the general socio-economic and empowerment objectives

it shall keep detailed records of –

its equity ownership and control and, where applicable, that of its duly appointed Subcontractors and/or suppliers.

a) its total spends on targeted enterprises used to fulfil its obligations in terms of the *contract*.
b) any transformation programmes and/or initiatives relating to skills development and transfer, employment equity and enterprise development of the Subcontractors and Target Individuals;and
c) any public benefits and/or job opportunities created according to the fulfilment of its obligationsin terms of the *contract* and provide monthly reports outlining compliance with such objectivesto the *Employer*;

Contractor Obligations

in terms of which the *Contractor* unconditionally warrants and undertakes that, in its performanceof its obligations under the *Contract*, it shall, at all times, -

owe a duty of care to the ORTDM and comply with the reasonable directions issued to it by the

Employer, *Employer's Agent* and/or *Employer's Agent Representative*;

not do anything that constitutes, or is reasonably likely to constitute, a corrupt act or that isotherwise intended or is likely to harm the reputation of the ORTDM, the Contract; and

Undertake the *Works* in accordance with the standards, practices, methods and procedures conforming to applicable law, and exercising that degree of skill, care, diligence, prudence and foresight that would reasonably and ordinarily be expected from a skilled and experienced personengaged in a similar type of undertaking under similar circumstances.

FORM OF GUARANTEE

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: **O. R. TAMBO DISTRICT MUNICIPALITY**

"Contractor" means:.....

"Employer's Agent" means: **GIBB (Pty) Ltd**

"Works" means: **ROSEDALE TO LIBODE REGIONAL WATER SUPPLY: COMPLETION OF CONSTRUCTION OF 3 x 1Ml RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA**

"Site" means: The Site as defined by clause 1.1.1.29 of the General Conditions of Contract, 2015.

"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: **FIXED** *(Insert Variable or Fixed)*

"Expiry Date" means: .....*(Give date which should not be earlier than the anticipated date of issue of the Certificate of Completion)* 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

2.1 The Guarantor hereby acknowledges that:

2.1.1 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

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

2.2 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:

2.2.1 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;

2.2.2 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;

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

2.3 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:

2.3.1 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

2.3.2 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

2.3.3 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.

2.4 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.

2.5 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 to 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.

2.6 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.

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

2.8 The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may consider 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.

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

2.10 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.

2.11 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.

2.12 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 the Magistrate's Court.

SIGNED AT: .....

GUARANTOR (1)	**SIGNATURE**
DATE	**CAPACITY**
GUARANTOR (2)	**SIGNATURE**
DATE	**CAPACITY**
WITNESS (1)	**SIGNATURE**
WITNESS (2)	**SIGNATURE**

FORM C1.3 SPECIAL CONDITION

Payment for the labour-intensive component of the Works

Payment for works identified in the Scope of Work as being labour-intensive shall only be made in accordance with the provisions of the Contract if the works are constructed strictly in accordance with the provisions of the Scope of Work. Any non-payment for such works shall not relieve the Contractor in any way from his obligations either in contract or in delict.

Applicable labour laws

The Ministerial Determination, Special Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in Government Notice N° R63 of 25 January 2002, as reproduced below, shall apply to works described in the scope of work as being labour intensive and which are undertaken by unskilled or semi-skilled workers.

1 Introduction

1.1 This document contains the standard terms and conditions for workers employed in elementary occupations on a Special Public Works Programme (SPWP). These terms and conditions do NOT apply to persons employed in the supervision and management of a SPWP.

1.2 In this document –

(a) "**Department**" means any department of the State, implementing agent or contractor;

(b) "**Employer**" means any department, implementing agency or contractor that hires workers to work in elementary occupations on a SPWP;

(c) "**Worker**" means any person working in an elementary occupation on a SPWP;

(d) "**Elementary** occupation" means any occupation involving unskilled or semi-skilled work;

(e) "**Management**" means any person employed by a department or implementing agency to administer or execute an SPWP;

(f) "**Task**" means a fixed quantity of work;

(g) "**task-based work**" means work in which a worker is paid a fixed rate for performing a task;

(h) "**task-rated worker**" means a worker paid on the basis of the number of tasks completed;

(i) "**time-rated worker**" means a worker paid on the basis of the length of time worked.

(j)* "Task rate or daily rate**" = ***As per Government Gazette

2 Terms of Work

2.1 Workers on a SPWP are employed on a temporary basis.
2.2 A worker may NOT be employed for longer than 24 months in any five-year cycle on a SPWP.
2.3 Employment on a SPWP does not qualify as employment as a contributor for the purposes of the Unemployment Insurance Act 30 of 1966.

3 Normal Hours of Work

3.1 An employer may not set tasks or hours of work that require a worker to work–

(a) More than forty hours in any week
(b) On more than five days in any week; and
(c) For more than eight hours on any day.

3.2 An employer and worker may agree that a worker will work four days per week. The worker may then work up to ten hours per day.

3.3 A task-rated worker may not work more than a total of 55 hours in any week to complete the tasks allocated (based on a 40-hour week) to that worker.

4 Meal Breaks

4.1 A worker may not work for more than five hours without taking a meal break of at least thirty minutes duration.

4.2 An employer and worker may agree on longer meal breaks.

4.3 A worker may not work during a meal break. However, an employer may require a worker to perform duties during a meal break if those duties cannot be left unattended and cannot be performed by another worker. An employer must take reasonable steps to ensure that a worker is relieved of his or her duties during the meal break.

4.4 A worker is not entitled to payment for the period of a meal break. However, a worker who is paid on the basis of time worked must be paid if the worker is required to work or to be available for work during the meal break.

5 Special Conditions for Security Guards

5.1 A security guard may work up to 55 hours per week and up to eleven hours per day.

5.2 A security guard who works more than ten hours per day must have a meal break of at least one hour or two breaks of at least 30 minutes each.

6 Daily Rest Period

Every worker is entitled to a daily rest period of at least eight consecutive hours. The daily rest period is measured from the time the worker ends work on one day until the time the worker starts work on the next day.

7 Weekly Rest Period

Every worker must have two days off every week. A worker may only work on their day off to perform work which must be done without delay and cannot be performed by workers during their ordinary hours of work ("emergency work").

8 Work on Sundays and Public Holidays

8.1 A worker may only work on a Sunday or public holiday to perform emergency or security work.

8.2 Work on Sundays is paid at the ordinary rate of pay.

8.3 A task-rated worker who works on a public holiday must be paid –

(a) The worker's daily task rate, if the worker works for less than four hours;
(b) Double the worker's daily task rate, if the worker works for more than four hours.

8.4 A time-rated worker who works on a public holiday must be paid –

(a) The worker's daily rate of pay, if the worker works for less than four hours on the public holiday;

(b) Double the worker's daily rate of pay, if the worker works for more than four hours on the public holiday.

9 Sick Leave

9.1 Only workers who work four or more days per week have the right to claim sick-pay in terms of this clause.

9.2 A worker who is unable to work on account of illness or injury is entitled to claim one day's paid sick leave for every full month that the worker has worked in terms of a contract.

9.3 A worker may accumulate a maximum of twelve days' sick leave in a year.

9.4 Accumulated sick-leave may not be transferred from one contract to another contract.

9.5 An employer must pay a task-rated worker the worker's daily task rate for a day's sick leave.

9.6 An employer must pay a time-rated worker the worker's daily rate of pay for a day's sick leave.

9.7 An employer must pay a worker sick pay on the worker's usual payday.

9.8 Before paying sick-pay, an employer may require a worker to produce a certificate stating that the worker was unable to work on account of sickness or injury if the worker is –

(a) Absent from work for more than two consecutive days; or
(b) Absent from work on more than two occasions in any eight-week period.

9.9 A medical certificate must be issued and signed by a medical practitioner, a qualified nurse or a clinic staff member authorised to issue medical certificates indicating the duration and reason for incapacity.

9.10 A worker is not entitled to paid sick-leave for a work-related injury or occupational disease for which the worker can claim compensation under the Compensation for Occupational Injuries and Diseases Act.

10 Maternity Leave

10.1 A worker may take up to four consecutive months' unpaid maternity leave.

10.2 A worker is not entitled to any payment or employment-related benefits during maternity leave.

10.3 A worker must give her employer reasonable notice of when she will start maternity leave and when she will return to work.

10.4 A worker is not required to take the full period of maternity leave. However, a worker may not work for four weeks before the expected date of birth of her child or for six weeks after the birth of her child, unless a medical practitioner, midwife, or qualified nurse certifies that she is fit to do so.

10.5 A worker may begin maternity leave –

(a) four weeks before the expected date of birth; or
(b) On an earlier date –

(i) If a medical practitioner, midwife or certified nurse certifies that it is necessary for the health of the worker or that of her unborn child; or
(ii) if agreed to between employer and worker; or

(c) on a later date, if a medical practitioner, midwife or certified nurse has certified that the worker is able to continue to work without endangering her health.

10.6 A worker who has a miscarriage during the third trimester of pregnancy or bears a stillborn child may take maternity leave for up to six weeks after the miscarriage or stillbirth.

10.7 A worker who returns to work after maternity leave has the right to start a new cycle of twenty-four months employment, unless the SPWP on which she was employed has ended.

11 Family responsibility leave

11.1 Workers, who work for at least four days per week, are entitled to three days paid family responsibility leave each year in the following circumstances -

(a) When the employee's child is born;
(b) When the employee's child is sick;

(c) In the event of a death of –
  (i) The employee's spouse or life partner;
  (ii) The employee's parent, adoptive parent, grandparent, child, adopted child, grandchild, or sibling.

12 Statement of Conditions

12.1 An employer must give a worker a statement containing the following details at the start of employment –

(a) The employer's name and address and the name of the SPWP;
(b) The tasks or job that the worker is to perform; and
(c) the period for which the worker is hired or, if this is not certain, the expected duration of the contract;
(d) The worker's rate of pay and how this is to be calculated;
(e) The training that the worker will receive during the SPWP.

12.2 An employer must ensure that these terms are explained in a suitable language to any employee who is unable to read the statement.

12.3 An employer must supply each worker with a copy of these conditions of employment.

13 Keeping Records

13.1 Every employer must keep a written record of at least the following –

(a) The worker's name and position;
(b) In the case of a task-rated worker, the number of tasks completed by the worker;
(c) In the case of a time-rated worker, the time worked by the worker;
(d) Payments made to each worker.

13.2 The employer must keep this record for a period of at least three years after the completion of the SPWP.

14 Payment

14.1 An employer must pay all wages at least monthly in cash or by cheque or into a bank account.

14.2 A task-rated worker will only be paid for tasks that have been completed.

14.3 An employer must pay a task-rated worker within five weeks of the work being completed and the work having been approved by the manager or the contractor having submitted an invoice to the employer.

14.4 A time-rated worker will be paid at the end of each month.

14.5 Payment must be made in cash, by cheque or by direct deposit into a bank account designated by the worker.

14.6 Payment in cash or by cheque must take place –
(a) At the workplace or at a place agreed to by the worker;
(b) during the worker's working hours or within fifteen minutes of the start or finish of work;
(c) In a sealed envelope which becomes the property of the worker.

14.7 An employer must give a worker the following information in writing –

(a) The period for which payment is made;
(b) The numbers of tasks completed or hours worked;
(c) The worker's earnings;
(d) Any money deducted from the payment;
(e) The actual amount paid to the worker.

14.8 If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it.

14.9 If a worker's employment is terminated, the employer must pay all monies owing to that worker within one month of the termination of employment.

15 Deductions

15.1 An employer may not deduct money from a worker's payment unless the deduction is required in terms of a law.

15.2 An employer must deduct and pay to the SA Revenue Services any income tax that the worker is required to pay.

15.3 An employer who deducts money from a worker's pay for payment to another person must pay the money to that person within the time period and other requirements specified in the agreement law, court order, or arbitration award concerned.

15.4 An employer may not require or allow a worker to –

(a) Repay any payment except an overpayment previously made by the employer by mistake;
(b) State that the worker received a greater amount of money than the employer actually paid to the worker; or
(c) Pay the employer or any other person for having been employed.

16 Health and Safety

16.1 Employers must take all reasonable steps to ensure that the working environment is healthy and safe.

16.2 A worker must –

(a) Work in a way that does not endanger his/her health and safety or that of any other person;
(b) Obey any health and safety instruction;
(c) Obey all health and safety rules of the SPWP;
(d) Use any personal protective equipment or clothing issued by the employer;
(e) Report any accident, near-miss incident, or dangerous behaviour by another person to theiremployer or manager.

17 Compensation for Injuries and Diseases

17.1 It is the responsibility of the employers (other than a contractor) to arrange for all persons employed on a SPWP to be covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993.

17.2 A worker must report any work-related injury or occupational disease to their employer or manager.

17.3 The employer must report the accident or disease to the Compensation Commissioner.

17.4 An employer must pay a worker who is unable to work because of an injury caused by an accident at work 75% of their earnings for up to three months. The employer will be refunded this amount by the Compensation Commissioner. This does NOT apply to injuries caused by accidents outside the workplace such as road accidents or accidents at home.

18 Termination

18.1 The employer may terminate the employment of a worker for good cause after following a fair procedure.

18.2 A worker will not receive severance pay on termination.

18.3 A worker is not required to give notice to terminate employment. However, a worker who wishes to resign should advise the employer in advance to allow the employer to find a replacement.

18.4 A worker who is absent for more than three consecutive days without informing the employer of an intention to return to work will have terminated the contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period.

18.5 A worker who does not attend required training events, without good reason, will have terminated the contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period.

19 Certificate of Service

19.1 On termination of employment, a worker is entitled to a certificate stating –

(a) The worker's full name;
(b) The name and address of the employer;
(c) The SPWP on which the worker worked;
(d) The work performed by the worker;
(e) Any training received by the worker as part of the SPWP;
(f) The period for which the worker worked on the SPWP;
(g) Any other information agreed on by the employer and worker

MONTHLY REPORTING

The successful bidder will be expected to assist with monthly reporting. These will include progress reports, labour reports, etc, submitted to the Project Manager on the dates to be stipulated.

FORM C1.4 HEALTH AND SAFETY AGREEMENT

HEALTH AND SAFETY SPECIFICATION

THE OCCUPATIONAL HEALTH AND SAFETY ACT 1993
CONSTRUCTION REGULATIONS 2003

SECTION 1

1. INTRODUCTION

This document was construed in order to comply with the provisions of the **OCCUPATIONAL HEALTH AND SAFETY ACT NO 85 OF 1993, CONSTRUCTION REGULATIONS 2014 and COVID-19** Occupational Health and Safety Measures in Workplace 2020**.**

Definitions of words are those described in the Act and the Construction Regulations of 2003.

This document formulates the specification of the O. R. Tambo District Municipality in terms of the above act and forms part of the constitution of the organisation.

This document forms part of the employment contract of all employees and is as such accepted in writing by each employee. It also forms part of the agreement between the O. R. Tambo District Municipality and all service providers.

No clause in this document shall be amended in any contract document construed by agents, designers or anyone else except so ordered or sanctioned by the O. R. Tambo District Municipality in writing.

SCHEDULE

1.1 Definitions

1. In these Policy any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the context otherwise indicates—

"Agent" means any person who acts as a representative for a client in the managing the overall construction work.

"**angle of repose**" means the steepest angle of a surface at which a mass of loose or fragmented material will remain stationary in a pile on a surface, rather than sliding or crumbling away;

*"***Batch plant***" means machinery, appliances or other similar devices that are assembled in such a manner so as to be able to mix materials in bulk for the purposes of using the mixed product for construction work***;**

"**Client"** *means O. R. Tambo District Municipality***;**

"competent person" in relation to construction work, means any person having the knowledge, training and experience specific to the work or task being performed: Provided that where appropriate qualifications and training are registered in terms of the provisions of the South African Qualifications Authority Act, 1995 (Act No. 58 of 1995), these qualifications and training shall be deemed to be the required qualifications and training;

"Construction work" means any work in connection with—

(a) The erection, maintenance, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure;

(b) The installation, erection, dismantling or maintenance of a fixed plant where such work includes the risk of a person falling;

(c) 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

(d) the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work;

"construction vehicle" *means a vehicle used for means of conveyance for transporting persons or material or both such persons and material, as the case may be, both on and off the construction site for the purposes of performing construction work;*

"Contractor" *mean an employer, as defined in section 1 of the Act, who performs construction work and includes principal contractors;*

"Design" *in relation to any structure includes drawings, calculations, design details and specifications;*

"Designer" *means any person who—*

(a) prepares a design;

(b) checks and approves a design;

(c) arranges for any person at work under his control (including an employee of his, where he is the employer) to prepare a design, as well as;

(d) Architects and engineers contributing to, or having overall responsibility for the design;

(e) Build services engineers designing details for fixed plant;

(f) Surveyors specifying articles or drawing up specifications;

(g) Contractors carrying out design work as part of a design and build project;

(h) Temporary works engineer designing formwork and false work; and

(i) Interior designers, shop-fitters and landscape architects.

"ergonomics" *means the application of scientific information concerning humans to the design of objects, systems and the environment for human use in order to optimise human well-being and overall system performance;*

"Excavation work" means the making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping;

"**explosive powered tool**" means a tool that is activated by an explosive charge and that is used for driving bolts, nails and similar objects for the purpose of providing fixing**;**

"fall prevention equipment" means equipment used to prevent persons from falling from an elevated position, including personal equipment, body harness, body belts, lanyards, lifelines or physical equipment, guardrails, screens, barricades, anchorages or similar equipment;

"fall arrest equipment" means equipment used to arrest the person in a fall from an elevated position, including personal equipment, body harness, lanyards, deceleration devices, lifelines or similar equipment, but excludes body belts;

"**fall protection plan**" means a documented plan, of all risks relating to working from an elevated position, considering the nature of work undertaken, and setting out the procedures and methods to be applied in order to eliminate the risk;

"Hazard identification" means the identification and documenting of existing or expected hazards to the health and safety of persons, which are normally associated with the type of construction work being executed or to be executed;

"Health and safety file" means a file, or other record in permanent form, containing the information required as contemplated in these regulations;

"Health and safety plan" means a documented plan which addresses hazards identified and includes safe work procedures to mitigate, reduce or control the hazards identified;

"Health and safety specification" means a documented specification of all health and safety requirements pertaining to the associated works on a construction site, so as to ensure the health and safety of persons;

"material hoist" means a hoist used to lower or raise material and equipment, and includes cantilevered platform hoists, mobile hoists, friction drive hoists, scaffold hoists, rack and pinion hoists and combination hoists;

"Medical certificate of fitness" means a certificate valid for one year issued by an occupational health practitioner, issued in terms of these regulations, whom shall be registered with the Health Professions Council of South Africa;

"**Method statement**" means a written document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in any risk assessment;

"Mobile plant" *means machinery, appliances or other similar devices that is able to move independently, for the purpose of performing construction work on the construction site;*

"National Building Regulations" means the National Building Regulations made under section 17(1) of the National Building Regulations and Building Standards Act, 1977 (Act No.103 of 1977), and published under Government Notice No. R.1081 of 10 June 1988, as amended;

"Person day" means one individual carrying out construction work on a construction site for one normal working shift;

"**principal contractor**" means an employer, as defined in section 1 of the Act who performs construction work and is appointed by the client to be in overall control and management of a part of or the whole of a construction site**;**

"professional engineer or professional certificated engineer" means any person holding registration as either a Professional Engineer or Professional Certificated Engineer under the Engineering Profession Act, 2000 (Act No. 46 of 2000);

"Professional technologist" means any person holding registration as a Professional Technologist under the Engineering Profession Act, 2000 (Act No. 46 of 2000);

"Provincial director" means the provincial director as defined in regulation 1 of the General Administrative Regulations under the Act;

"risk assessment" means a programme to determine any risk associated with any hazard at a construction site , in order to identify the steps needed to be taken to remove, reduce or control such hazard;

"Roof apex height" means the dimensional height in metres measured from the lowest ground level abutting any part of a building to the highest point of the roof;

"SABS 085" means the South African Bureau of Standards' Code of Practice entitled "The Design, Erection, Use and Inspection of Access Scaffolding";

"SABS 0400" means the South African Bureau of Standards, Code of Practice for the application of the National Building Regulations;

"SABS EN 1808" means the South African Bureau of Standards' Standard Specification entitled: "Safety requirements on suspended access equipment – Design calculations, stability criteria, construction-tests";

"SABS 1903" means the South African Bureau of Standards' Standard Front-end Specification entitled: "Safety requirements on suspended access equipment – Design calculations, stability criteria, construction-tests";

"Scaffold" means any temporary elevated platform and supporting structure used for providing access to and supporting workmen or materials or both;

"shoring" means a structure such as a hydraulic, mechanical or timber/steel shoring system that supports the sides of an excavation and which is intended to prevent the cave-in or the collapse of the sides of an excavation, and "shoring system" has a corresponding meaning;

"Structure" means—

(a) any building, steel or reinforced concrete structure (not being a building), railway line or siding, bridge, waterworks, reservoir, pipe or pipeline, cable, sewer, sewage works, fixed vessels, road, drainage works, earthworks, dam, wall, mast, tower, tower crane, batching plants, pylon, surface and underground tanks, earth retaining structure or any structure designed to preserve or alter any natural feature, and any other similar structure;

(b) any formwork, false work, scaffold or other structure designed or used to provide support or means of access during construction work; or

(c) any fixed plant in respect of work which includes the installation, commissioning, decommissioning or dismantling and where any such work involves a risk of a person falling two metres or more;

"Suspended platform" means a working platform suspended from supports by means of one or more separate ropes from each support;

"The Act" means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);

"Tunnelling" means the construction of any tunnel beneath the natural surface of the earth for a purpose other than the searching for or winning of a mineral

HEALTH AND SAFETY SPECIFICATION

THE OCCUPATIONAL HEALTH AND SAFETY ACT 1993
CONSTRUCTION REGULATIONS 2003

SECTION 2: DESIGNERS

1. All wording shall have the meaning as defined by the H&S Regulations 2003.

2. This specification is in terms of the H&S act 1993 and the regulations of 2003.

3. All work performed and procedures followed by designers shall be done according to the H&S regulations of 2003.

4. The client is aware of the fact that the appointment of a designer does not implicate that the designer becomes the agent of the client for the particular project. The appointment of an agent is done separately in writing and should be accepted by the designer as such.

5. The client is ultimately responsible for all safety issues regarding the project for which a designer is appointed and cannot contract out of his obligations in terms of the law.

6. The client shall not employ a designer should he have reasonable doubts that the designer is not able to execute work in a safe manner.

7. All designers shall have adequate insurance cover to indemnify the client for their acts and omissions in terms of professional conduct the H&S act in particular to indemnify the client against penalties imposed for acts or omissions. The client is aware of the fact that additional insurance over and above PI insurance is necessary to have himself indemnified by the designers for acts and omissions in terms of the H&S regulations. The professional indemnity insurance has a “negligent acts and omissions” wording only and therefore additional insurance is necessary to cover the client against penalties imposed in terms of the regulations.

8. Designers shall not accept work from the client if they are not capable of executing such work professionally and if such work cannot be executed in a safe manner, according to the provisions of the H&S regulations.

9. Designers shall execute all designs in terms of the relevant SABS and other acceptable codes and procedures and shall place great emphasis on safety issues including the maintenance procedures after inaugurations of such systems or projects.

10. Ergonomic parameters shall have high priority in all designs.

HEALTH AND SAFETY SPECIFICATION

THE OCCUPATIONAL HEALTH AND SAFETY ACT 1993
CONSTRUCTION REGULATIONS 2003

SECTION 3: PRINCIPAL CONTRACTORS (P C)

1. All work by the P C shall be done in compliance with the provisions of the H&S regulations.

2. The Employer recognises the right of each employee to work safely in a healthy environment under decent human conditions. Each employee has the right to return home safely and healthy to his home and family after each day's work.

3. Work shall not be done at the expense of human safety or health.

4. Work shall be executed under humane conditions, especially with reference to hours and H&S issues in mind.

5. The P C shall appoint a fulltime H&S Manager should he have more than 50 employees on site.

6. The PC shall conduct monthly safety meetings on site. All foremen, gang leaders and other employees shall participate and all incidents with relation to unsafe practices shall be discussed. Minutes of such meetings shall be kept in the H&S file.

7. Foremen and gang leaders shall, under the supervision of the H&S manager, conduct meetings with all staff and people under their direct supervision on a frequent basis. Minutes of such meetings shall be kept in the H&S file.

8. New personnel (temporary or full time employees) shall attend safety induction courses under the supervision of the H&S manager.

9. The P C shall install and maintain a box in which proposals for improvement of H&S procedures could be placed. All such proposals shall be considered, recorded and placed in the H&S file.

10. An adequate first aid facility shall be placed maintained on site and shall be adequately indicated by means of signs. All personnel shall be made aware of its existence and only trained first aid assistants shall be authorized to treat injuries.

11. The P C shall see that work is only executed by people trained for the particular task.

12. All safety equipment shall be SABS approved and under no circumstance shall any safety equipment be non-certified homemade equipment. Specifications and order details shall be kept in the H&S file.

13. Workers and personnel shall be attending safety courses on a regular basis and all information regarding such training shall be kept in the H&S file.

14. All employees shall be trained in safe working procedures and shall be trained on safety consciousness in particular. Employees in position of leadership shall be trained through accredited training processes in H&S matters.

15. The contractor shall prepare and maintain a safety plan for the particular project and shall train his personnel to work according to such plan.

16. Personnel and workers will be made aware of any natural hazards existing on site. They will also be made aware of items defined by the designer in his risk assessment.

17. No horseplay between employees will be tolerated on site. Neither will aggressive or threatening behaviour by anybody be allowed.

18. Workers shall wear appropriate protective clothing for the applicable task which shall include special safety equipment like protective eyewear, gloves, boots, ear protection, etc. Workers shall be issued with these items and copy of such issuing shall be kept in the H&S file.

19. Workers shall not be allowed to wear loose clothes and footwear.

20. Workers shall have the opportunity and right to prescribed rest, eating and toilet breaks.

21. Workers on nightshift shall be protected against inclement weather and shall have access to adequate food and drinks.

22. In cases where work is executed in remote or in security restricted areas, the P C will make provision for food to be supplied to his employees.

23. Potable water shall be made available free of charge to all workers on site.

24. Adequate toilet and washing facilities shall be made available to workers.

25. In the event of chemicals being present or used on site, the P C will allow for adequate shower facilities on site. All chemicals shall be stored according to specification and shall be clearly identified and marked in prescribed containers.

26. Workers under instruction to execute inherently unsafe procedures shall report such incidences to the H&S manager, designer of client immediately.

27. Unauthorised or unlawful instructions from foremen, gang leaders or colleagues shall be reported by the H&S manager immediately.

28. The P C shall stop his contractors if they work unsafely.

29. All specialist work shall be executed by registered artisans only.

30. Workers shall not be required to lift equipment or material heavier than 25kg or carry a load of more than 50 kg for more than 10 metres.

31. Workers shall not be exposed to conditions of heat where the temperature is above 40° Celsius and the humidity more than 75%. Likewise will personnel not be exposed to temperatures lower than –5° Celsius? Should the designer and the P C decide that the work is urgent; workers will be issued with proper protective clothing.

32. All workers shall have access to a shaded eating and resting place on site.

33. Workers executing tasks in rivers, trenches and other natural or artificial water ways shall be made aware of the hazard of flash floods and special precautions shall be made by the P C to implement an effective flood warning system.

34. Workers executing tasks in manholes for sewer or stormwater systems, shall be made aware of the existence of hazardous gasses in closed areas and shall be issued with gas masks in any event, even after tests conducted by the H&S manager has proven that no gasses are existent. Only specialists shall work in gas filled chambers.

35. Personnel executing work during rainy weather or under other wet conditions shall be equipped with proper gumboots and proper rain suits.

36. No personnel will be allowed to work in water unless gumboots are worn. Should the water be deeper than 300mm watertight suits shall be worn.

37. All ladders shall be fixed against scaffolding or other permanent structures.

38. Welding on site shall only be done by trained personnel behind adequate eye protecting shields and all welders shall wear proper protective gear.

39. Personnel operating grinders, saws or any other hand tools of similar description shall be equipped with the necessary eyewear and ear protection.

40. All personnel working under potentially dusty conditions shall wear nose and mouth filters.

41. Workers operating rock drilling equipment shall wear ear, nose and eye protection.

42. All scaffolding will comply with the H&S regulations.

43. Blasting will be done by specialists under the regulations of the Explosives Act.

44. Workers shall wear protective clothing when exposed to chemicals like cement, lime, detergents, tar, fumes, etc. Should work be executed in the presence of such material, adequate protective clothing and equipment shall be issued after permission is granted by the H&S manager.

45. Workers will not be allowed to make open fires on any part of the site unless it is made in designated areas approved by the H&S manager.

46. Fuel storage will only be allowed on certified areas on site.

47. Workers and other personnel will be trained for fire procedures and will practise such fire drill on a regular basis.

48. Assembly areas for emergency evacuations will be indicated by adequate signage.

49. The P C will have an attendance register for the purposes of identifying people before, during and after potential hazardous situations.

50. All transport supplied by the P C shall be on road worthy vehicles only and all transport shall be conducted in terms of the transport act.

51. Drivers of vehicles shall be responsible for the roadworthiness of vehicles and will report any dysfunctional vehicles to the P C.

52. All drivers will be responsible to handle vehicles in such a way to comply with the transport act.

53. Passengers of vehicles shall report any unsafe conduct to the P C immediately. Such report shall be forwarded to the H&S manager and shall be investigated. Copy of such procedure shall be entered into the H&S file.

54. Only trained personnel shall be permitted and required to operate construction machinery. All such machinery shall be maintained in a safe working condition.

55. All vehicles operating on site shall have audible warning signals if driven backwards.

56. No vehicle shall be kept on site if it is leaking oil or other substances.

57. No vehicle or equipment shall be operated on site if it produces noise above 90 decibel measured within a distance of 10,0 m from the unit.

58. Equipment producing serious dusty conditions shall only be operated under the supervision of the P C and the H&S manager with the necessary protection to workers.

59. All excavations on site shall be adequately protected and not only indicated.

60. Exploratory excavation to reveal services shall be done in a specific way.

- All areas to be explored shall first be inspected by the landowner or local authority.
- Position of services identified shall then be verified by opening by hand, not by machine.
- Particular care shall be taken not to damage these services.
- Electrical services are inherently dangerous and shall be opened by skilled people only.
- These excavations shall not be left open without supervision. If necessary the excavation shall be backfilled temporarily with approved material until the specified modifications to the services can be made.

61. Access to excavations shall only be by means of ladders or stairs with handrails.

62. All refuse, unsafe material, potential hazardous material and rubbish shall be placed in designated areas to be removed on a regular basis.

63. Rainwater shall be contained in trenches or pipes in such a way that it will not cause contamination of material in these refuse areas.

64. All electrical sources or cables or overhead power lines should be regarded as live at all times and all workers on site shall be made aware of its existence during H&S meetings and as many times as necessary.

65. Adequate signage shall be used on site to indicate

- Non smoking areas on site
- Safety exits / Emergency exits from buildings under construction
- Stairs (temporary and permanent works)
- Toilets

- Fire fighting equipment
- Workmen busy with equipment overhead
- Fire assembly points
- Fire escapes
- Areas where members of the public are not allowed.
- First aid room

66. All visitors to the site shall be granted permission to the site only upon application through a predetermined procedure and records of these visitors shall be kept in the H&S file. Visitors shall attend safety induction training before entering the site. Areas out of bounds to all visitors shall be indicated clearly by means of adequate signs.

67. Work performed in public servitudes like the construction of streets or roads shall be done according to the specifications of the local or national authority and adequate signage shall be implemented.

68. People complaining about their health or people displaying symptoms of illness or disease, shall be allowed to go to the first aid facility or to visit a doctor or a clinic. Permission shall not be withheld unreasonably. In remote areas the P C is required to have reasonable ways of transporting people to a doctor or clinic whether the person is ill or injured on site.

69. Personnel must be informed about the location of the nearest doctor or clinic for casualty purposes and the P C shall provide such transport for injured workers and injured members of the public (within the limits of the site) free of charge.

70 A principal contractor who intends to carry out any construction work shall—

(a) before carrying out that work, notify the provincial director in writing of the construction work if it includes—

(i) The demolition of a structure exceeding a height of 3 metres; or

(ii) The use of explosives to perform construction work; or

(iii) The dismantling of fixed plant at a height greater than 3m.

(b) before carrying out that work, notify the provincial director in writing when the construction work—

(i) Exceeds 30 days or will involve more than 300 person days of construction work; and

(ii) Includes excavation work deeper than 1m; or

(iii) Includes working at a height greater than 3 metres above ground or a landing.

(2) The notification to the provincial director must be done on the form similar to Annexure A to this Policy.

(3) A principal contractor shall ensure that a copy of the completed form is kept on site for inspection by an inspector, client, client's agent or employee.

O. R. TAMBO DISTRICT MUNICIPALITY

HEALTH AND SAFETY SPECIFICATION
THE OCCUPATIONAL HEALTH AND SAFETY ACT 1993
CONSTRUCTION REGULATIONS 2003

SECTION 4: CLIENT

(1) A client shall be responsible for the following in order to ensure compliance with the provisions of the Act:

(a) to prepare a documented health and safety specification for the construction work, and provide any principal contractor who is making a bid or appointed to perform construction work for the client with the same;

(b) To promptly provide the principal contractor and his or her agent with any information which might affect the health and safety of any person at work carrying out construction work;

(c) To appoint each principal contractor in writing for the project or part thereof on a construction site;

(d) To take reasonable steps to ensure that each principal contractor's health and safety plan is implemented and maintained on the construction site: Provided that the steps taken, shall include periodic audits at intervals mutually agreed upon between the client and principal contractor, but at least once every month;

(e) to stop any contractor from executing construction work which is not in accordance with the principal contractor's health and safety plan for the site or which poses to be a threat to thehealth and safety of persons;

(f) to ensure that where changes are brought about, sufficient health and safety information and appropriate resources are made available to the principal contractor to execute the work safely;

(g) to ensure that every principal contractor is registered and in good standing with the compensation fund or with a licensed compensation insurer prior to work commencing on site; and

(h) To ensure that potential principal contractors submitting tenders, have made provision for the cost of health and safety measures during the construction process.

(2) A client shall discuss and negotiate with the principal contractor the contents of the health and safety plan and thereafter finally approve the health and safety plan for implementation.

(3) A client shall ensure that a copy of the principal contractor's health and safety plan is available on request to an employee, inspector or contractor.

(4) (4) O. R. Tambo District Municipality shall not appoint a principal contractor to perform construction work, unless O. R. Tambo District Municipality is reasonably satisfied that the principal contractor that he or she intends to appoint has the necessary competencies and resources to carry out the work safely.

(5) A client may appoint an agent in writing to act as his or her representative and where such an appointment is made, the responsibilities as are imposed by these regulations upon a client, shall as far as reasonably practicable apply to the person so appointed.

(6) No client shall appoint any person as his agent, unless the client is reasonably satisfied that the person he or she intends to appoint has the necessary competencies and resources to perform the duties imposed on a client by these regulations.

ANNEXURE A

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993
Regulation 3 of the Construction Regulations, 2003

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 termsof regulation 6.(1).

_____

6. Name/s of principal contractor's sub-ordinate supervisors on site appointed in terms of regulation 6.(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.

_____

12. Planned number of contractors on the construction site accountable to principal contractor:

    _____

13. Name(s) of contractors already chosen.

    _____

    _____

    _____

_____ _____
Principal Contractor 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.**

GUIDELINES FOR CONTRACT ADMINISTRATION

O.R. TAMBO
DISTRICT MUNICIPALITY

O. R. TAMBO DISTRICT MUNICIPALITY

GUIDELINES FOR CONTRACT ADMINISTRATION
IN TERMS OF THE CONSTRUCTION REGULATIONS 2003
HEALTH & SAFETY ACT 1993

SECTION 1 AND 2

1. PURPOSE OF THIS DOCUMENT

This document describes the procedures to be followed in the execution of Engineering Projects for O. R. Tambo District Municipality.

The role of all parties to the development project is described.

The document is in terms of the Construction Regulation 2003 of the Health and Safety Act 1993.

2. BACKGROUND

The Minister of Labour has on 18 July 2003 under section 43 of the Occupational Health and Safety Act 1993 (Act No. 85 of 1993) published new regulations in the Government Gazette 7721, Vol. 456. They have immediate effect and are applicable to the Construction Environment.

These regulations inter alia identify the different role players and their responsibilities, particularly the role of the client, the contractor and that of the designer.

The Construction Regulations endeavour to ensure that:

i) Hazards or potential hazards to a healthy working environment are identified.

ii) These hazards or potential hazards are removed or minimised.

iii) Employers and Workers are made aware of the value of safe working procedures and train themselves to work safely in potential hazardous environments or under potentially unsafe conditions.

GUIDELINES FOR CONTRACT ADMINISTRATION
IN TERMS OF THE CONSTRUCTION REGULATIONS 2003
HEALTH & SAFETY ACT 1993
SECTION 3

3. THE CLIENT

In terms of the law the client is ultimately responsible for all acts and omissions as far as health and safety is concerned on site. It should be noted that the client will be held legally responsible for every trespass of the regulations, not the designer or the contractor. The law makes provision for fines to be levied and unless the client has been indemnified by the designer or the contractor, such fines will have to be paid by the client.

Clients cannot contract out of their statutory obligations except where the law allows for it. Therefore any liability imposed upon them for statutory non-compliance, cannot be passed on to designers (consultants) or contractors.

In particular the client's responsibilities are defined as follows:

.1	To prepare a health and safety (H&S) specification for the work. This should cover the spectrum of activities handled by the client as part of his normal duties.	Clause 4(1)(a)
.2	To provide a risk assessment to the principal contractor.	Clause 4(1)(b)
.3	To appoint the principal contractor in writing.	Clause 4(1)(c)
.4	To ensure that the H&S plan is implemented.	Clause 4(1)(d)
.5	To stop any contractor executing work in an unsafe manner.	Clause 4(1)(e)
.6	To provide additional H&S information to the contractor should changes be made to the work?	Clause 4(1)(f)
.7	To ensure that the principal contractor is registered and in good standing with the workmen's compensation fund.	Clause 4(1)(h)
.8	To make sure tenderers have made provision in their offers for H&S measures.	Clause 4(1)(h)
.9	To discuss and approve the H&S plan with the principal contractor.	Clause 4(2)
.10	To keep a copy of the H&S plan of the principal contractor.	Clause 4(3)
.11	To <u>not</u> employ a contractor unless the client is reasonably satisfied that the principal contractor who is earmarked for an appointment has the necessary skills, competencies and resources to carry out the work safely.	Clause 4(4)
.12	The client can appoint an agent to handle his duties. The client can obviously also delegate some of his duties but this does not make the person responsible for such particular responsibilities as agent. The client should make sure whether such responsibilities are not already part of the designer in terms of the regulations clause 9(2).	Clause 4(5)
.13	The client shall only appoint someone as his agent if he is reasonably satisfied that such person can handle such responsibilities.	Clause 4(6)

GUIDELINES FOR CONTRACT ADMINISTRATION
IN TERMS OF THE CONSTRUCTION REGULATIONS 2003
HEALTH & SAFETY ACT 1993

SECTION 4

4. THE DESIGNER

The regulations do not use names like engineer, architect, etc. Instead the term designer has been introduced. The responsibilities of the designer are given in a sub-paragraph under the obligations of the Principal Contractor.

4.1	The regulations has a comprehensive definition of the designer and this includes:	Definitions "designer"
a)	A person preparing a design.	Definitions "structure"
b)	A person checking a design.	
c)	A firm preparing a design.	
d)	An architect or engineer contributing to or having responsibility for a design.	
e)	A building services engineer designing details of fixed plant (scaffolding or cranes).	
f)	A surveyor specifying articles or drawing up specification (Quantity Surveyor).	
g)	A contractor in design & build contract.	
h)	A contractor designing temporary work.	
i)	A interior designer, shop fitter and landscape architect.	
	The regulation also talks of "an engineer designing a structure". "Structure" is a wide concept and is given in paragraph 3.2.5.1(a) underneath.	
4.2	The designer does not automatically through an appointment become the agent of the client in terms of the regulations unless he is appointed in writing to that effect and he accepts such appointment in writing.	Clause 4(5)
4.3	The SAACE model agreement between the client and Engineer has a different meaning of the word "agent". According to the model agreement of SAACE the Engineer acts as the "agent" of the client in a conventional contractual context. "Agent" in terms of the Health & Safety regulations has a totally different meaning.	
4.4	It can be derived from the regulations that the client can appoint a designer to perform certain tasks of the client on his behalf. This still does not mean that these designers become his agent in terms of clause 4(5).	Clause 4(5)
4.5	The regulations are fairly quiet regarding the functions and responsibilities of the designer except when designing of a structure. It is again assumed that the client will identify certain functions to be done by the designer on his behalf.	

4.5.1	"Structure" in terms of the regulations means:	Definitions
(a)	• any building • steel or reinforced concrete structure • railway line • railway siding • bridge • waterworks • reservoir • pipe or pipeline • cable • sewer • sewage works • fixed vessels • road • drainage works • earthworks • dam • wall • mast • tower • tower crane • batching plants • pylon • surface and underground tanks • earth retaining structure or any structure designed to preserve or alter any natural feature and any other similar structure.	
(b)	Any formwork, false work, scaffold or other structure designed or used to provide support or access during construction (structural engineering sector).	
(c)	Fixed plant to prevent people from falling 2 meters or more.	
4.5.2	The designer is in fact regarded as a person delivering designs only and unless his role is defined by the client, his role is quite limited.	Clause 9(2)
4.5.3	The designer should inform the client and the principal contractor about anticipated dangers relating to the construction work. <u>This is in fact a Risk Assessment.</u>	Clause 9(2)(b)
4.5.4	The designer (in the structural engineering context) shall further furnish to the contractor in writing:	Clause 9(2)
i)	A geo-technical report.	
ii)	The loading of the structure.	
iii)	The method and sequence of the construction process.	
iv)	He should exclude inherently dangerous methods of construction in his design.	
v)	The maintenance of the structure shall be through safe procedures.	
vi)	He should carry out inspections.	
vii)	And stop the contractor from executing work dangerously.	
viii)	A final inspection is necessary to ensure safety of the structure.	
ix)	Great emphasis should be given to the ergonomic design of the structure.	
x)	The engineer should also give input in the design of temporary work e.g. scaffolding.	Clause 10(c)

GUIDELINES FOR CONTRACT ADMINISTRATION
IN TERMS OF THE CONSTRUCTION REGULATIONS 2003
HEALTH & SAFETY ACT 1993

SECTION 5

5. THE PRINCIPAL CONTRACTOR (P C) AND CONTRACTOR

The responsibilities of these parties are comprehensively stipulated in the regulations.

5.1	In general it can be seen that the responsibilities of the PC (Principal Contractor) towards his contractors is Mutatis Mutandis to the responsibilities of the Client towards the PC.	
5.2	The PC is responsible for the collecting of these contractors' safety plans and to hold them to it.	Clause 5(1) and (2)
i)	He should also stop his contractors should they work unsafely.	Clause 5(3)(d)
ii)	He should appoint safety officers should the size of the work warrant it.	Clause 6(6)
iii)	He should cause a risk assessment to be executed by a competent person.	Clause 7(1)
iv)	Visitors to his site should undergo induction pertaining to H&S issues.	Clause 7(8)
v)	He shall see to his employees induction and H&S training.	Clause 7(7)
vi)	The employees of the PC and his contractors shall wear visible proof of their induction training.	Clause 7(9)(a)
5.3	The regulations also covers the detail of:	
	• Fall protection	Clause 8
	• Structures (under this heading the responsibilities of the designer of a structure is found)	Clause 9
	• Formwork and support work	Clause 10
	• Excavation work	Clause 11
	• Demolition work	Clause 12
	• Tunnelling	Clause 13
	• Scaffolding	Clause 14
	• Suspended platforms	Clause 15
	• Boatswain's chairs	Clause 16
	• Material hoists	Clause 17
	• Batch plants	Clause 18
	• Explosive powered tools	Clause 19
	• Cranes	Clause 20
	• Construction vehicles and mobile plant	Clause 21
	• Electrical installation and machinery on construction sites	
	• Use and storage of flammable liquids on construction sites	
	• Water environment	Clause 22
	• Housekeeping on construction sites	
	• Stacking and storage on construction sites	Clause 23
	• Fire precautions on construction sites	Clause 24
	• Construction welfare facilities	Clause 25
		Clause 26
		Clause 27

GUIDELINES FOR CONTRACT ADMINISTRATION
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HEALTH & SAFETY ACT 1993

SECTION 6

6. APPOINTMENT OF THE DESIGNER

Clause 4(5)

6.1 The client appoints the consultant or designer as agent only for the particular project and also for the duration of the project.

6.2 It is further important to distinguish between "agent" in terms of the SAACE model agreement between client and engineer and "agent" in terms of the H&S regulations.

6.3 The responsibilities and duties of a designer in the H&S context are those that are dictated by law and/or those respectively given to him by the client, except when he is a structural engineer and designs a "structure" in which case clause 9(2) applies automatically.

6.4 The client should only add to the responsibilities of the designer those which is not automatically in his hand in terms of clause 9(1) of the regulations.

6.5 The following duties are not regarded as normal work of the designer of a "structure" and will therefore require an additional appointment.

.1	To ensure the H&S plan of the PC is implemented on site.	Clause 4(1)(d)
.2	To ensure that changes to the design are also incorporated in the H&S plan.	Clause 4(1)(e)
.3	To ensure that the principal contractor is registered and in good standing with the workmens' compensation fund.	Clause 4(1)(f)
.4	To see that the contractor registers the site as a construction site at the Department of Labour.	Clause 4(1)(g)
.5	To discuss with the contractor the H&S plan and then recommend to the client the approval thereof.	Clause 4(2)
.6	To keep a copy of the H&S plan of the contractor in his possession and see that a copy is forwarded to the client.	Clause 4(4)
.7	Control the following on site:	
	a) To see that the principal contractor keeps the H&S file up to date and that it is given to the client upon completion of the contract.	Clause 5(7)
	b) To see that the principal contractor keeps a data base of all contractors involved with the project.	Clause 5(9)
	c) To see that the principal contractor appoints one or more construction supervisors.	
	d) To see that this person is dedicated to the particular project only.	Clause 6(4)
	e) To receive from the contractor his risk assessment and keep a copy of that for his and the clients records.	Clause 7(1)

GUIDELINES FOR CONTRACT ADMINISTRATION
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SECTION 7

7. THE ROLE OF THE CLIENT

7.1	The client shall still prepare the H&S specification in terms of clause 4(1)(a) for its global activities. The H&S specification for the particular project is assigned to the designer.	Clause 4(1)(a)
7.2	The client shall approve of the H&S plan of the contractor, but on the recommendation of the consultant/ designer.	Clause 4(2)
7.3	The client employs the Principal Contractor.	Clause 4(1)(c)
7.4	The client can appoint an agent in which case all the responsibilities of the agent in the regulations are transferred to the agent.	Clause 4(5)
7.5	The client should only appoint an agent should he have made reasonably sure that the agent can handle the responsibility.	Clause 4(6)
7.6	The client shall not appoint a contractor if he is not reasonably sure that the contractor can execute such work in a safe manner.	Clause 4(4)

GUIDELINES FOR CONTRACT ADMINISTRATION
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SECTION 8

8. THE ROLE OF THE PRINCIPAL CONTRACTOR

The principal contractor should execute the following duties:

.1	Provide a health and safety plan.	5(1)
.2	See that his contractors comply with the regulations.	5(2)
.3	He should discuss the particular H&S plan.	5(5)
.4	He should have his H&S plan available.	5(6)
.5	He should have an H&S file available on site and hand it over to the client upon completion.	5(7)
.6	He should not employ contractors who are not capable.	5(10)
.7	He should have full time supervision on site.	6(1) to 6(8)
.8	He should produce a risk assessment of the work.	7(1)
.9	He should train his employees.	7(4)
.10	He should introduce induction training on site.	7(7)/ 7(8)
.11	All physical aspects of the regulations as in terms of the regulations.	

GUIDELINES FOR CONTRACT ADMINISTRATION
IN TERMS OF THE CONSTRUCTION REGULATIONS 2003
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SECTION 9

9. THE PROCEDURE

9.1	The Client decides to execute work and appoints a designer to administer the work.	
9.2	The scope of works and the exact duties of the designer are identified and given to him in writing. The designer should affect insurance by which the client is indemnified (by the designer) for acts and omissions of the designer. This type of insurance does not form part of the normal PI insurance provided by the designer. The designer prepares a contract document and ensures that this document states clearly the following:	
.1	A risk assessment of the project and the H&S specification of the client.	
.2	All relevant information to enable the pricing of the contract.	9(2)(a)
.3	Items in the bill to enable the tenderer to price for the risk including insurance indemnifying the client. The document should state whether a full time safety officer is required on site.	9(2)(b)
.4	(i) Geotechnical information (ii) Loading of the structure – in other words all relevant technical data taking the definition of "structure" into account. (iii) The method and sequence of the process. This should identify the priorities of the client.	9(2)(c)(i) to (iii)
.5	Inherently dangerous procedures should be avoided in the design.	9(2)(d)
.6	The maintenance of the structure should be considered also so that this aspect would be safe and ergonomic too.	9(2)(e)
9.3	The tenderers then respond by each giving a H&S plan based on the risk assessment of the designer.	
9.4	The client then chooses the contractor according to his procurement policy (taking into account his ability to do the work safely) and appoints him in writing via the designer.	
9.5	The chosen principal contractor then affects a detailed risk assessment and a risk management plan, based on the H&S specification.	

9.7	Once on site the principal contractor should register the site by means of the prescribed form and have it approved by the client/designer.	
9.8	He should open and then maintain his H&S file through the duration of the contract.	
9.9	He should then further adhere to the provisions of the H&S regulations.	
9.10	He should hand over the H&S file (recommend to do that with the designer's as-built drawings).	
9.11	The designer should stop the work if he has reason to belief that the contractor is executing work in an unsafe manner.	
9.12	Likewise should the principal contractor stop the work of his contractor(s) should he have reason to belief that such contractor is not working safely.	

O. R. TAMBO DISTRICT MUNICIPALITY

GUIDELINES FOR CONTRACT ADMINISTRATION
IN TERMS OF THE CONSTRUCTION REGULATIONS 2003
HEALTH & SAFETY ACT 1993

SECTION 10

10. CONTRACT DOCUMENTATION

The contract documentation needs to emphasize the following points in order to comply with the Health and Safety Act 1993 and the Construction Regulations 2003.

A. In the Specification section

1. Health and Safety Specification

The Client shall issue the Designer with his Health and Safety specification and it shall be included as such in the document.

Should the Designer be of the opinion that variations and additions be made to the specification, due to the nature of the particular project, he shall forward the proposed variation or addition to the NDM who will authorize this in writing.

2. Risk Assessment

This can form part of the contract specifications.

It is necessary to identify to the contractor:

i) The situation on site as it is with all the potential hazards and dangers involved.

ii) The nature of the work and the situations that the average contractor would encounter during the execution of the work. The nature of the work and the expected risks should be described in particular as well as the method and the sequence of the work.

iii) The basic safety precautions that he should take.

iv) The Safety and Health specification of the client.

v) To allow sufficient items in the bill of quantities for the tenderer to price for the specified H&S precautions.

3. Insurance

The contractor shall affect insurance indemnifying the client against penalties levied upon the client due to the acts or omissions of the contractor in failing to comply with the provisions of the H&S regulations 2003.

The contractor shall prove to the Engineer that such insurance has been affected and maintained during the construction.

B. The Tender Rules

The tender rules shall contain a clause requiring the contractor to submit a H&S plan based on the risk assessment given in the contract document. It should also state that the client is bound by law not to appoint a contractor should he be reasonably sure that the contractor would not be able to execute the work safely should he be appointed.

The following example is recommended.

Compliance with the Regulations of the H&S Act 2003

Tenderers are required to study the published risk assessment and provide Annexure Y his Health and Safety Plan. Generic document will be disregarded. Such H&S plan should give details regarding the tenderers intention of dealing with the risks.

Failure to submit such H&S plan will result in disqualification of the tender.

Tenderers are informed that the client is bound by law not to accept a tender should he be reasonable sure that the tenderer will not be able to execute the work safely.

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GUIDELINES FOR CONTRACT ADMINISTRATION
IN TERMS OF THE CONSTRUCTION REGULATIONS 2003
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SECTION 11

11. CONCLUSION

The Construction Regulations 2003 was long overdue in the South African Civil Engineering Construction Industry. Role players will now be forced to implement them and an awareness of safe working environments will be cultivated.

Clients might initially detect a contemptuous attitude particularly from contractors and even designers or consultants. This should not deter clients since acts and omissions from these parties will bring clients in confrontation with the law.

Contract cost will certainly escalate due to the additional specifications but this should be weighed against the value of human lives improved and saved.

The construction industry, particularly the Civil Engineering Sector, will have to accept and embrace these regulations and then seriously look at its productivity to kerb the cost of the implementation process.

1.0 SCOPE

This part of the specification has the objective to assist principal contractors entering into contracts with The Employer that they comply with the Occupational Health and Safety (OH&S) Act, No 85 of 1993.Compliance with this document does not absolve the principal contractor from complying with minimum legal requirements, and the principal contractor remains responsible for the health and safety of his employees and those of his Mandataries. Principal and other contractors should therefore insist that this part of the specification from part of any contract that he may have with other contractors and/or suppliers.

This section covers the development of a health and safety specification that addresses all aspects of occupational health and safety as affected by this contract. It provides the requirements that the principal contractors and other contractors shall comply with in order to reduce the risks associated with this contract that may lead to incidents causing injury and/or ill health.

2.0 GENERAL OCCUPATIONAL HEALTH AND SAFETY PROVISIONS

2.1 Hazard Identification and Risk Assessment (Construction Regulation 7)

2.1.1 Risk Assessments

Paragraph 4 contains a generic list of risk assessment headings that have been identified by The Employer as possibly applicable to this contract. It is, by no means, exhaustive and is offered as assistance to contractors intending to bid.

2.1.2 Development of Risk Assessment

Every principal contractor performing construction work shall, before the commencement of any construction work or work associated with the aforesaid construction work and during such work, cause a risk assessment to be performed by a competent person, appointed in writing, and the risk assessment shall form part of the OH&S plan and be implemented and maintained as contemplated in Construction Regulation 5(1).

The risk assessment shall include at least:

- *the identification of the risks and hazards to which persons may be exposed*
- *the analysis and evaluation of the risks and hazards identifies*
- *a documented plan of safe work procedures to mitigate, reduce or control the risks and hazards that have been identified.*
- *a monitoring plan and*
- *a review plan*

Based on the risk assessment, the principal contractor shall develop set site-specific OH&S rules that shall be applied to regulate the OH&S aspects of the construction. The risk assessment, together with the site-specific OH&S rules shall be submitted to The Employer before construction on site commences.

Despite the risk assessment listed in paragraph4, the principal contractor shall conduct a baseline risk assessment and the aforesaid listed risk assessment shall be incorporated into the baseline risk assessment. The baseline assessment shall further include the standard working procedures and the applicable method statements based on the risk assessments.

All variations to the scope of work shall similarly be subjected to a risk assessment process.

2.1.3 Review of Risk Assessment

The principal contractor shall review the hazard identification, risk assessments and standard working procedures at each production planning and progress report meetings as the contract work develops and progresses and each time changes are made to the designs, plans and construction methods and processes. The principal contractor shall provide The Employer, other contractors and all other concerned parties with copies of any changes, alterations oramendments as contemplated in paragraph 2.1.3.

2.2 Legal Requirements

A principal contractor shall, as minimum, comply with:

The Occupational Health and Safety Act and Regulations (Act 85 of 1993), an up to date copy of which shall be available on site at all times.

The Compensation or Occupational Injuries and Diseases Act (Act 130 of 1993), an up to date copy of which shall be available on site at all times.

Where work is being carried out on a "mine", the contractor shall comply with the Mines Health and Safety Act and Regulations (Act 29 of 1960) and any other OH&S requirements that the mine may specify. An up-to-date copy ofthe Mine's Health and Safety Act and Regulations shall be available on site at all times.

2.3 Structure and Responsibilities

It is a requirement that the principal contractor, when he appoints contractors (Sub-contractors) in terms of Construction Regulations 5(3), 5(5), 5(10), and 5(12) includes in his agreement with such contractors the following:

- *OH& S Act (85 of 1993), Section 37(2) agreement: "Agreement with Mandatory"*
- *OH&S Act (85 of 1993), Section 16(2) appointee/s as detailed in his / her/ their respective appointment forms.*

2.2.3 Further (Specific) Supervision Responsibilities for OH & S

The contractor shall appoint designated competent employees and/or other competent persons as required by the Act and Regulations. Below is a generic list of identified appointments and may be used to select the appropriate appointments for this contract. The contractor shall note it is a generic list only and is intended for use as a guideline.

Ref. Section/ Regulation in OHS Act	
Batch Plant Supervisor	*(Construction Regulation 6(1)*
Construction Vehicles/ Mobile Plant/ Machinery Supervisor	*(Construction Regulation 21)*
Demolition Supervisor	*(Construction Regulation 12)*
Drivers/Operators of Construction Vehicles/ Plant	*(Construction Regulation 21)*
Electrical Installation and Appliances Inspector	*(Construction Regulation 22)*
Emergency/Security/Fire Control	*(Construction Regulation 27)*
Excavation Supervisor	*(Construction Regulation 11)*
Explosive powered Tool Supervisor	*(Construction Regulation 19)*
Fall Protection Supervisor	*(Construction Regulation 8)*
First Aider	*(Construction Regulation 3)*
Fire Equipment Inspector	*(Construction Regulation 27)*
Formwork & Support work Supervisor	*(Construction Regulation 10)*
Hazardous Chemical Substances Supervisor	*(HCS Regulations)*
Incident Investigator	*(General Admin Regulation 29)*
Ladder Inspector	*(General Safety Regulation 13A)*
Lifting Equipment Inspector	*(Construction Regulation 20)*
Material Hoist Inspector	*(Construction Regulation 17)*
OH&S Committee	*(OH&S Section 19)*
OH&S Officer	*(Construction Regulation 6(6)*
OH&S Representatives	*(OHS Act Section 17)*
Person Responsible for Machinery	*(General Machinery Regulation 2)*
Scaffolding Supervisor	*(Construction Regulation 14)*
Stacking & Storage Supervisor	*(Construction Regulation 26)*
Structures Supervisor	*(Construction Regulation 9)*
Suspended Platform Supervisor	*(Construction Regulation 15)*
Tunneling under Pressure Supervisor	*(Construction Regulation 13)*
Vessel under Pressure Supervisor	*(Vessel under Pressure Regulations)*
Working on/next to Water Supervisor	*(Construction Regulation 24)*
Welding Supervisor	*(General Safety Regulation 9)*

In addition, The Employer requires that a Traffic Safety Officer be appointed (see COLTO Section 1500). The above appointments shall be in writing and the responsibilities clearly stated together with the period for which the appointment is made. This information shall be communicated and agreed with the appointees. Notice of appointments shall be submitted to The Employer. All changes shall also be communicated to the Employer.

The principal contractor or shall, furthermore, provide The Employer with an organogram of all contractors that he/she has appointed or intends to appoint and keep this list updated and prominently displayed on site.
Where necessary, or when instructed by an inspector of the Department of Labour, the principal contractor shall appoint a component safety officer.

2.3.3 Designation of OH&S Representatives (Section 17 of the OH&S Act)

Where the principal contractor employs more than 20 persons (including the employees of other contractors (sub-contractors) he has to appoint one OH&S representatives for every 5 employees or part thereof. General Administrative Regulation 6 requires that the appointment or election and subsequent designation of the OH&S representatives be conducted in consultation with employee representatives or employees. (Section 17 of the Act and General Administrative Regulation 6 & 7). OH&S representatives shall be designated in writing and the designation shall include the area of responsibility of the person and term of the designation.

2.3.4 Duties and Functions of the OH&S representatives (Section 18 of the OH&S Act)

The principal contractor shall ensure that the designated OH&S representatives conduct continuous monitoring and regular inspections of their respective areas of responsibility using a checklist and report thereon to the principal contractor. OH&S representatives shall be included in accident or incident investigations. OH&S representatives shall attend all OH&S committee meetings.

2.3.5 Appointment: of OH&S Committee (Section 19 and 20 of the OH&S Act)

The principal contractor shall establish an OH&S committee, which shall meet as specified in the Regulations.

2.4 *Administrative Controls and the Occupational Health & Safety File*

2.4.1 *The OH&S File (Construction Regulation 5(7)*

As required by the Construction Regulation 5(7), the principal contractor and other contractors shall each keep an OH&S file on site. The following list is not exhaustive and shall only be used as a guide:

- *Notification of construction work (Construction Regulation 3)*
- *Latest copy of OH&S Act (General Administrative Regulation 4)*
- *Proof of registration and good standing with COID Insurer (Construction Regulation 4(g)*
- *OH&S plan agreed with the client including the underpinning risk assessment/s and method statements(Construction Regulation 5(1)*
- *Copies of OH&S committee and other relevant minutes*
- *Designs/Drawings (Construction Regulation 5(8)*
- *A list of contractors (sub-contractors) including copies of the agreements between the parties and the type of work being done by each contractor (Construction Regulation 9)*
- *Appointment/designation forms as per paragraphs 2.1.1 and 2.1.2*
- *Registered as follows:*
    - *Accident/incident register (Annexure 1 of the General Administrative Regulations)*
    - *OH&S representatives' inspection register*
    - *Asbestos demolition and stripping register*
    - *Batch plant inspections*
    - *Construction vehicles and mobile plant inspections by controller*
    - *Daily inspection of vehicles, plant and other equipment by the operator/driver/user*
    - *Demolition inspection register*
    - *Designer's inspection of structures record*
    - *Electrical installations, equipment and appliances including portable electrical tools)*
    - *Excavations inspector*
    - *Explosive powered tool inspection, maintenance, issue and returns register (incl. Cartridges and nails*
    - *Fall protection inspection register*
    - *First aid box contents*
    - *Fine equipment inspection and maintenance*
    - *Formwork and support work inspections*
    - *Hazardous chemical substances record*
    - *Ladder inspections*
    - *Lifting equipment register*
    - *Materials hoist inspection register*
    - *Machinery safety inspection register (incl. Machine guards, lock-outs etc.)*
    - *Scaffolding inspections*
    - *Stacking and storage inspection*
    - *Inspection of structures*
    - *Inspection of suspended platforms*
    - *Inspection of tunnelling operations*
    - *Inspection of vessels under pressure*
    - *Welding equipment inspections*
    - *Inspection of work conducted near water*
    - *All other applicable records including traffic safety officer reports.*

The Employer will conduct an audit on the OH&S file of the principal constructor from time-to time.

2.5 Notification of Construction Work (Construction Regulation 3)

The principal constructor shall, where the contract meets the requirements laid down in Construction work and use the form (Annexure A in the Construction Regulations) for the purpose. A copy shall be kept on the OH&S file and a copy shall be forwarded to The Employer for record keeping purposes.

2.6 Training and Competence

The contents of all training required by the Act and Regulations shall be included in the principal contractor's OH&S plan. The principal contractor shall be responsible for ensuring that all relevant training is undertaken.

Only accredited service providers shall be used for OH&S training. The principal contractor shall ensure that his and other contractor's personnel appointed are competent and that all training required to do the work safely and without risk to health, has been completed before work commences. The principal contractor shall ensure that follow-up and refresher training is conducted as the contract progresses and the work situation changes. Records of all training must be kept on the OH&D file for auditing purposes.

2.7 Consultations, Communication and Liaison

OH&S liaison between the client, the principal contractor, the other contractors, the designer and other concerned parties will be through the OH&S committee as contemplated in paragraph 2.3.5.In addition to the above, communication may be directly to the client or his appointed agent, verbally or in writing, as and when the need arises.

Consultation with the workforce on OH&S matters will be through their supervisions, OH&S representatives and the OH&S committee. The principal contractor shall be responsible for the dissemination of all relevant OH&S information to the other contractors e.g. design changes agreed with the client and the designer, instructions by the client and/or/his/her agent, exchange of information between contractors, the reporting of hazardous/dangerous conditions/situations etc. The principal contractor's most senior manager on site shall be required to attend all OH&S meetings.

2.8 Checking Reporting and Corrective Actions

2.8.1 Monthly Audit by Client (Construction Regulation 4(1) (d)

The Employer will conduct monthly audits to comply with Construction Regulation 4(1)(d) to ensure that the principal contractor has implemented and is maintaining the agreed and approved OH&S plan.

2.8.2 Other Audits and Inspections by The Employer

The Employer reserves the right to conduct other hoc audits and inspections as deemed necessary. This will include site safety walks.

2.8.3 Contractor's Audits and Inspections

The principal contractor is to conduct his own monthly internal audits to verify compliances with his own OH&S management system as well as this specification.

2.8.4 Inspections by OH&S Representatives and other Appointees

OH&S representatives shall conduct weekly inspections of their areas of responsibility and report thereon to their foreman or supervisor whilst other appointees shall conduct inspections and report thereon as specified in their appointments e.g. vehicle and machinery drivers, operators and users must conduct daily inspections before start-up.

2.8.5 Recording and Review of Inspection Results

All the results of the above mentioned inspections shall be in writing at OH&S committee meetings, endorsed by the chairman of the meeting and placed on the OH&S File.

2.9 Accidents and Incident Investigation (General Administrative Regulation 9)

The principal contractor shall be responsible for the investigation of all accidents/incidents where employees and non-employees were injured to the extent that he/she/they had to be referred for medical treatment by a doctor, hospital or clinic. The results of the investigations shall be entered into an accident/incident register listed in paragraph2.4.1

The principal contractor shall be responsible for the investigation of all minor and non-injury incidents as described in Section24 (1) (b) & (c) of the Act and keeping a record of the results of such investigations including the steps taken to prevent similar accidents in future.

2.10 Reporting

The principal contractor shall provide the Employer with copies of all statutory reports required in terms of the Act within 7 days of the incident occurring.

3.0 OPERATIONAL CONTROL

3.1 Operational Procedures

Each construction activity shall be assessed by the principal contractor so as to identify operational procedures that will mitigate against the occurrence of an incident during the execution of each activity. This specification requires the principal contractor:

- *to be conversant with Regulations 8 to 29 (inclusive)*
- *to comply with their provisions*
- *to include them in his OH&S plan where relevant*

3.2 Emergency Procedure

Simultaneous with the identification of operational procedures (per paragraph 3.1 above), the principal contractor shall similarly identify and formulate emergency procedures in the event an incident does occur. The emergency procedures thus identified shall also be included in the principal contractor's OH&S plan.

3.3 Personal & Other Protective Equipment (Section 8/ 15/ 23 of the OH&S Act)

The contractor shall identify the hazards in the workplace and deal with them. He must either remove them or, where impracticable, take steps to protect workers and make it possible for them to work safely and without risk to health under the hazardous conditions.

Personal protective equipment (PPE) should, however, be the last resort and there should always first be an attempt to apply engineering and other solutions to mitigating hazardous situations before the issuing of PPE is considered.

Where it is not possible to create an absolutely safe and healthy workplace the contractor shall inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in the hazardous environment.

It is a further requirement that the contractor maintain the said equipment, that he instructs and trains the employeesin the use of the equipment and ensures that the prescribed equipment is used by the employee/s.

Employees do not have the right to refuse to use/wear the equipment prescribed by the employer and, if it is impossible for an employee to use or wear prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition/s for which the equipment was prescribed but an alternative solution has to be found that may include relocating or discharging the employee.

The principal contractor shall include in his OH&S plan the PPE he intends issuing to his employees for use during construction and the sanctions he intends to apply in cases of non-conformance by his employees. Conformance to the wearing of PPE shall be discussed at the weekly inspection meetings.

3.4 Other Regulations

Wherever in the Construction Regulations or this specification there is reference to other regulations (e.g. Construction Regulation 22: Electrical and Machinery on Construction Sites) the principal contractor shall be conversant with and shall comply with these regulations.

3.5 Public Health and Safety (Section 9 of the OH&S Act)

The principal contractor shall be responsible for ensuring that non-employees affected by the construction work are aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimize those dangers. This includes:

- *Non-employees entering the site for whatever reason*
- *The surrounding community*
- *Passers by to the site*

4.0 PROJECT/S SPECIC REQUIREMENTS

4.1 List of Risk Assessments

- *Clearing and Grubbing of the areas/site*
- *Site establishment including:*
  - Offices
  - Secure/safe storage foe materials and equipment
  - Ablutions
  - Sheltered eating area
  - Maintenance workshop
  - Vehicle access to the site
- *Dealing with existing structures*
- *Location of existing services*
- *Installation and maintenance of temporary construction electrical supply, lightning and equipment*
- *Adjacent land uses/surrounding property exposures*
- *Boundary and access control/public liability exposures (NB: the employer is also responsible for the OH&S of the non-employees affected by his/her work activities)*
- *Health risks arising from neighbouring as well as own activities and from the environment e.g. threats by dogs, bees, snakes and lightning etc.*
- *Exposure to noise*
- *Exposure to vibration*
- *Protection against dehydration and heat exhaustion*
- *Protection from wet and cold conditions*
- *Dealing with HIV/AIDS and other diseases*
- *Use of portable electrical equipment including*
  - Angle grinder
  - Electrical drilling machine
  - Still saw
- *Excavation including*
  - Ground/soil conditions
  - Trenching
  - Shoring
  - Drainage of trench
- *Welding including*
  - Arc welding
  - Gas welding
  - Flame cutting
  - Flame cutting
  - Use of LP gas torches and appliances

- *Loading and offloading of truck*
- *Aggregate/sand and other materials delivery*
- *Manual and mechanical handling*
- *Lifting and powering operators*
- *Driving and operation of construction vehicles and mobile plant including.*
  - Trenching machine
- Use and storage of flammable liquids and other hazardous substances
- Layering and bedding
- Installation of pipes in pipelines
- Backfilling trenches
- Protection against flooding
- Gabion work
- Use of explosive
- Protection form overhead power lines
- As discovered by the principal contractor's hazard identification exercise
- As discovered from any inspection and audits conducted by the client of by the principal contractor or any other contractor on site
- As discovered from any accident/incident investigation

FORM C1.5 SUPPLY CHAIN MANAGEMENT POLICY

Please refer to O. R. Tambo District Municipality's Procurement Policy.

C2 PRICING DATA

C2.1 Pricing Instructions

C2.2 Bill of Quantities

FORM C2.1 PRICING INSTRUCTIONS

1. Measurement and payment for Bill A (Preliminary & General) & Bill B (Civil Works) shall be in accordance with the relevant provisions of Clause 8 of each of the SANS 1200 Specifications for Civil Engineering Construction referred to in the Scope of Work.

2. Measurement and payment for Bill C (Building Works) & Bill D (Electrical Installation Works) shall be in accordance with the relevant Particular Specifications for building works and electrical installation work respectively.

3. The units of measurement described in the Bill of Quantities are metric units. Abbreviations used in the Bill of Quantities are as follows:

%	=	percent	m^2.pass	=	square metre-pass
h	=	hour	m^3	=	cubic metre
ha	=	hectare	m^3.km	=	cubic metre-kilometre
kg	=	kilogram	MN	=	meganewton
kl	=	kilolitre	MN.m	=	meganewton-metre
km	=	kilometre	MPa	=	megapascal
km-pass	=	kilometre-pass	No.	=	number
kPa	=	kilopascal	Prov sum	=	Provisional sum
kW	=	kilowatt	P C sum	=	Prime Cost sum
l	=	litre	sum	=	lump sum
m	=	metre	t	=	ton (1 000 kg)
mm	=	millimetre	W/day	=	Work day
m^2	=	square metre			

4. Unless otherwise stated, items are measured net in accordance with the drawings with no allowance for waste.

5. The prices and rates to be inserted in the Bill of Quantities are to be the full inclusive prices for the work described under the items. Such prices and rates shall cover all costs and expenses that may be required in accordance with the provisions of the Scope of Work, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the Contract Data, as well as overhead charges and profit. These prices shall be used as a basis for assessment of payment for additional work that may have to be carried out.

6. It will be assumed that prices included in the Bill of Quantities are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for tenders. (Refer to **www.sabs.co.za** or **www.iso.org** for information on standards).

7. Where the Scope of Work requires detailed drawings and designs or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amount tendered for such items.

8. An item against which no price is entered will be considered to be covered by the other prices or rates in the Bill of Quantities. A single lump sum will apply should a number of items be grouped together for pricing purposes.

9. The quantities set out in the Bill of Quantities are approximate and do not necessarily represent the actual amount of work to be done. The quantities of work accepted and certified for payment will be used for determining payments due and not the quantities given in the Bills of Quantities.

10. Reasonable compensation will be received where no pay item appears in respect of work required in the Bills of Quantities in terms of the Contract and which is not covered in any other pay item.

11. The short descriptions of the items of payment given in the Bill of Quantities are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.

12. Descriptions in the Bill of Quantities are abbreviated and comply generally with those in the SANS 1200 Standardised Specifications.

13. If there is a discrepancy in description of items between the Bill of Quantities and the Drawings, the Bill of Quantities Description shall be used.

FORM C2.2 BILL OF QUANTITIES

SCHEDULE DESCRIPTION PAGE

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 1 PRELIMINARY & GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
1.1	SANS 1200A 8.3	FIXED - CHARGE ITEMS				
1.1.1	8.3.1	Contractual Requirements	Sum	1		
	8.3.2	**Establishment of Facilities on Site:**				
	8.3.2.1	1) Facilities for Engineer (SANS 1200 AB)				
1.1.2	PSAB 3.2/ PSAB 5.2	a) Furnished office	Sum	1		
1.1.3	PSAB 3.2	b) Meeting room	Sum	1		
1.1.4	PSAB 3.1	c) Nameboards (2 No.)	Sum	1		
1.1.5	PSAB 5.5	d) Survey assistant	Sum	1		
1.1.6	PSAB 5.6	e) Survey equipment	Sum	1		
1.1.7	PSAB 3.2	f) Covered Parking Bays (2 No.)	Sum	1		
1.1.8		g) All other specified facilities (incl wifi internet connection and printer)	Sum	1		
	8.3.2.2	2) Facilities for Contractors				
1.1.9		a) Office and storage sheds	Sum	1		
1.1.10		b) Workshops	Sum	1		
1.1.11		c) Laboratories	Sum	1		
1.1.12		d) Living accommodation	Sum	1		
1.1.13		e) Ablution and latrine facilities	Sum	1		
1.1.14		f) Tools and equipment	Sum	1		
1.1.15		g) Water supplied, electric power and communications.	Sum	1		
1.1.16		h) Dealing with water (Sub-clause 5.5)	Sum	1		
1.1.17		i) Access (Sub-clause 5.8)	Sum	1		
1.1.18		j) Plant	Sum	1		
1.1.19		General Responsibilities and other fixed charge obligations (including making allowance for effects of payments taking up to 60 days from date of invoice)	Sum	1		
1.1.20	8.3.4	Removal of Engineer's and Contractor's site establishment on completion of works	Sum	1		
	PSA 8.9 PS - OHS	Fixed charges associated with complying with Health and Safety Requirements:				
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 1 PRELIMINARY & GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
1.1.21		a) Preparation of risk assessments, safe work procedures, the project H&S File, the H&S Plan, medicals for all workers, the provision of PPE and protective clothing, and all other fixed charge H&S matters that fulfil OHS Act 85 of 1993 and construction regulation 2014 requirements	Sum	1		
1.1.22		b) Completing and checking the Project H&S File and handing over the Client on completion of the works and exit medicals for all workers	Sum	1		
1.1.23		c) Provision of HIV/Aids Awareness plan and all necessary fixed charge items to achieve compliance with SANS 1921 Part 6 HIV/Aids Awareness	Sum	1		
1.1.24	PSA 8.9	Fixed charges associated with complying with the Environmental Management Plan	Sum	1		
1.2	**8.4 PSAB 8.2.1**	**TIME-RELATED ITEMS**				
1.2.1	8.4.1	Contractual Requirements	Sum	1		
	8.4.2	**Operate and maintain of Facilities on Site for the duration of the construction, except where otherwise stated:**				
	8.4.2.1	1) Facilities for Engineer as per PSAB clause				
1.2.2	PSAB 3.2/ PSAB 5.2	a) Furnished office	Sum	1		
1.2.3	PSAB 3.2	b) Meeting room	Sum	1		
1.2.4	PSAB 3.1	c) Nameboards (2 No.)	Sum	1		
1.2.5	PSAB 5.5	d) Survey assistant	Sum	1		
1.2.6	PSAB 5.6	e) Survey equipment	Sum	1		
1.2.7	PSAB 3.2	f) Covered Parking Bays (2 No.)	Sum	1		
1.2.8		g) All other specified facilities (incl wifi internet connection and printer)	Sum	1		
	8.4.2.2	2) Facilities for Contractor				
1.2.9		a) Office and storage sheds	Sum	1		
1.2.10		b) Workshops	Sum	1		
1.2.11		c) Laboratories	Sum	1		
1.2.12		d) Living accommodation	Sum	1		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 1 PRELIMINARY & GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
1.2.13		e) Ablution and latrine facilities	Sum	1		
1.2.14		f) Tools and equipment	Sum	1		
1.2.15		g) Water supplied, electric power and communications.	Sum	1		
1.2.16		h) Dealing with water (Sub-clause 5.5)	Sum	1		
1.2.17		i) Access (Sub-clause 5.8)	Sum	1		
1.2.18		j) Plant	Sum	1		
1.2.19	8.4.3	Supervision for duration of construction	Sum	1		
1.2.20	8.4.4	Company and head office overhead costs for the duration of the contract	Sum	1		
1.2.21	8.4.5 PSA 8.10	General Responsibilities and other time-related obligations (including making allowance for effects of payments taking up to 60 days from date of invoice)	Sum	1		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 1 PRELIMINARY & GENERAL

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	PSA 8.9 PS - OHS	Time-related charges associated with complying with Health and Safety Requirements:				
1.2.22		a) Updating and amending the risk assessments, safe work procedures, the project H&S File, the H&S Plan,medicals for all workers, the provision of PPE and protective clothing and all other H&S matters that fulfill OHS Act 85 of 1993 and construction regulation	Sum	1		
1.2.23		b) Full compliance with all H&S matters during the construction of the works under the Contract	Sum	1		
1.2.24		c) Compliance with SANS 1921 Part 6 HIV/Aids Awareness plan during the contract	Sum	1		
1.2.25	PSA 8.9	Time-related charges associated with complying with the Environmental Management Plan	Sum	1		
1.3	**8.8**	**TEMPORARY WORKS**				
1.3.1	8.8.1	Construct and maintain access to works	Sum	1		
1.3.2	8.8.2	Accommodation of traffic	Sum	1		
	8.8.4	EXISTING SERVICES				
1.3.3		(c) Excavate by hand in soft material to expose services. (Provisional)	m^3	20		
TOTAL FOR SECTION 1 CARRIED FORWARD TO SUMMARY						

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 2 DAYWORKS, PROVISIONAL SUMS AND PRIME COST ITEMS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
2.1	SANS 1200A	DAYWORKS				
	8.7	LABOUR				
2.1.1		a) Team leader / charge hand	hr	50		
2.1.2		b) Artisan	hr	50		
2.1.3		c) Skilled	hr	100		
2.1.4		d) Semi-skilled	hr	200		
2.1.5		e) Unskilled	hr	200		
	8.7	PLANT				
		For plant used in execution of dayworks				
2.1.6		As agreed with engineer	PC Sum	1	34500	34500
2.1.7		Mark up on item 2.1.6 above	%	34 500.00		
	8.7	MATERIALS				
2.1.8		For materials used in execution of dayworks as agreed with engineer	PC Sum	1	34500	34500
2.1.9		Mark up on item 2.1.8 above	%	34 500.00		
2.2	8.5	SUM STATED PROVISIONALLY BY THE ENGINEER				
		ENGINEER				
2.2.1		Cellphone allowance for the Engineer for the duration of the contract (R1000 pm).	Prov.Sum	1	8000	8000
2.2.2		Overheads, Charges and Profit on item 2.2.1 above	%	8 000.00		
2.2.3		Transportation for the Engineer for the duration of the contract (R25000 pm).	Prov.Sum	1	200000	200000
2.2.4		Overheads, Charges and Profit on item 2.2.3 above	%	200 000.00		
2.2.5		Accomodation for the Engineer for the duration of the contract (R12000 pm).	Prov.Sum	1	96000	96000
2.2.6		Overheads, Charges and Profit on item 2.2.5 above	%	96 000.00		
2.2.7	PS 2.9.3	Removal and re-establishment of existing mains.	Prov. Sum	1	11500	11500
2.2.8		Overheads, Charges and Profit on item 2.2.7 above	%	11 500.00		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 2 DAYWORKS, PROVISIONAL SUMS AND PRIME COST ITEMS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		TOPOGRAPHICAL SURVEY				
2.2.9		Ad-hoc survey as requested by the Engineeer.	Prov Sum	1	34500	34500
2.2.10		Overheads, Charges and profit on item 2.2.9	%	34 500.00		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 2 DAYWORKS, PROVISIONAL SUMS AND PRIME COST ITEMS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		COMMUNITY LIASON OFFICER				
2.2.11		Employment of CLO for the duration of the contract (R7000 pm plus R300 pm cellphone allowance)	Prov. Sum	1	58400	58400
2.2.12		Overheads, Charges and Profit on item 2.2.11 above	%	58 400.00		
2.2.13		Employment of PSC for duration of contract (6 No. at R500 pm each)	Prov. Sum	1	24000	24000
2.2.14		Overheads, Charges and Profit on item 2.2.13 above	%	24 000.00		
		ENVIRONMENTAL COMPLIANCE OFFICER				
2.2.15		Cost of Environmental Compliance Officer (R20000 pm)	Prov. Sum	1	160000	160000
2.2.16		Overheads, Charges and Profit on item 2.2.15 above	%	160 000.00		
		TRAINING				
2.2.17		Allowance for accredited training of local unskilled labour	Prov.Sum	1	100000	100000
2.2.18		Overheads, Charges and profit on item 2.2.17 above	%	100 000.00		
2.2.19		Training allowance paid to targeted labour in terms of formal training	Prov. Sum	1	80000	80000
2.2.20		Overheads, Charges and profit on item 2.2.19 above	%	80 000.00		
2.2.21		Extra over for the administration of payment of training allowances to targeted labour	Prov.Sum	1	8000	8000
2.2.22		Overheads, Charges and profit on item 2.2.21 above	%	8 000.00		
2.2.23		Transport and accommodation of workers for training where it is not possible to undertake the training in close proximity to the site	Prov. Sum	1	28000	28000
2.2.24		Overheads, Charges and profit on item 2.2.23 above	%	28 000.00		
		STUDENT				
2.2.25		Student monthly allowance for the for the duration of the contract (R10000 pm).	Prov. Sum	1	80000	80000
2.2.26		Overheads, Charges and Profit on item 2.2.25 above	%	80 000.00		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 2 DAYWORKS, PROVISIONAL SUMS AND PRIME COST ITEMS

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
2.2.27		Transportation for the Student for the duration of the contract (R1000 pm)	Prov. Sum	1	8000	8000
2.2.28		Overheads, Charges and Profit on item 2.2.27 above	%	8 000.00		
2.2.29		Accomodation for the Student for the duration of the contract (R3500 pm).	Prov. Sum	1	28000	28000
2.2.30		Overheads, Charges and Profit on item 2.2.29 above	%	28 000.00		
2.3	8.6	PRIME COST ITEMS				
2.3.1		Additional Acceptance control testing as may be required by the Engineer (Note that the Contractor's tendered rates are to include for all Quality Control testing required to achieve compliance with the specifications and that this scheduled item is to cover only the Engineer's additional testing that the Engineer may require)	PC Sum	1	57500	57500
2.3.2		Overheads, Charges and Profit on item 2.3.1 above	%	57 500.00		
2.3.3		3No.Water level indicator (roof-mounted) as per Drawing J31204/010	No.	3		
		TESTING OF STEEL FITTINGS				
2.3.4		Testing at the Fabricator before being dispacthed to site. Quality control for NDT and coating for steel pipework and pipe specials for all three reservoirs.	Prov.Sum	1	50000	50000
TOTAL FOR SECTION 2 CARRIED FORWARD TO SUMMARY						

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 3 1 ML MAMFENGWINI RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
3.1	SANS 1200D	EXCAVATION				
3.1.1	8.3.4	IMPORTING OF MATERIALS				
3.1.1.1	PSDA 8.3.4.2	Import approved 25 mm stone chips (reflective quatzite) from commercial source, stockpile and place by hand on reservoir roof	m³	30		
3.1.1.2		Import backfill material for Reservoir (backfilled and compacted in 300mm layers) from natural ground level up to Reservoir walls.	m³	5		
3.1.2	SANS 1200DA	RESTRICTED EXCAVATIONS				
3.1.2.1		Excavate in all materials by hand to expose existing services	m³	20		
	8.3.2(a)	Excavate for restricted foundations, footings and trenches in all materials and use for backfill or embankment or dispose				
3.1.2.2	PSDA4.4	Restricted excavation for chambers etc	m³	100		
	8.3.3(b)	Extra over items 3.1.2.2 for restricted excavation in:				
3.1.2.3		1) Intermediate material	m³	5		
3.1.2.4		2) Hard rock material	m³	5		
3.1.2.5		Excavate unsuitable material from below founding level as ordered by Engineer and dispose of to an approved spoil site.	m³	5		
3.1.3	SANS 1200DB	EXCAVATIONS				
3.1.3.1	8.3.2 PSDB 8.1.4 PSDB 8.3.3.4	(a) Excavate in all material for trenches backfill and dispose of surplus and unsuitable material. Rate to include for all temporary works including trimming, shoring and dewatering where necessary.	m³	157		
	8.3.2	(b) Extra over item 3.1.3.1 for excavation in:				
3.1.3.2		1) Intermediate material	m³	5		
3.1.3.3		2) Hard rock (Prov)	m³	5		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 3 1 ML MAMFENGWINI RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.2	SANS 1200G	REINFORCED CONCRETE RESERVOIR				
3.2.1	8.1.1 8.2	FORMWORK				
	8.2.1	Rough vertical to degree of accuracy III				
3.2.1.1		Chamber	m²	120		
	8.2.2	Smooth vertical to degree of accuracy II				
3.2.1.2		Column bases	m²	30		
3.2.1.3		Footing at expansion joint	m²	20		
3.2.1.4		Circular Columns	m²	60		
3.2.1.5		Roof slab & upstand	m²	60		
3.2.1.6		Sump	m²	20		
3.2.1.7		Chamber cover slab	m²	10		
3.2.1.8		Chambers	m²	100		
	8.2.2	Smooth horizontal to degree of accuracy II				
3.2.1.9		Roof soffit	m²	325		
3.2.1.10		Chambers	m²	50		
	8.2.6	Box-outs for pipe specials to be installed then grouted in place:				
		1) Box-out in chamber wall to accommodate:				
3.2.1.11		a) DN150 scour pipe	No.	1		
3.2.1.12		b) DN300 outlet pipe	No.	1		
3.2.1.13		c) DN300 overflow pipe	No.	1		
		2) Box-out in reservoir roof to accommodate:				
3.2.1.14		a) DN50 holes for level control and telemetry equipment	No.	4		
3.2.1.15		b) DN100 holes for sampling equipment	No.	2		
3.2.1.16		c) DN150 air vents	No.	8		
3.2.1.17		d) DN150 roof drainage outlets	No.	18		
3.2.2	8.3	REINFORCEMENT				
	8.3.1	Mild steel bars				
		CARRIED FORWARD				

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CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 3 1 ML MAMFENGWINI RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.2.2.1		R8 Basic Price	t	0.13		
	8.3.1	Extra-over item 3.2.2.1 for bars of diameter				
3.2.2.2		R10	t	0.34		
	8.3.1	High-tensile steel bars				
3.2.2.3		Y25 Basic price	t	16.96		
	8.3.1	Extra-over item 3.2.2.3 for bars of diameter				
3.2.2.4		Y10	t	5.71		
3.2.2.5		Y12	t	10.2		
3.2.2.6		Y16	t	1.03		
3.2.2.7		Y20	t	0.02		
	8.3.2	High-Tensile Welded Mesh				
3.2.2.8		Type reference #245	m²	70		
3.2.2.9		Type reference #193	m²	20		
3.2.3	**8.4 PSG 8.1.3**	CONCRETE				
	8.4.3	Strength concrete: 35MPa/19 mm watertight concrete with an approved crystalline waterproofing concrete additive				
3.2.3.1		Floor slabs	m³	65		
3.2.3.2		Roof slab & upstand	m³	90		
3.2.3.3		Columns with bases	m³	15		
3.2.3.4		Reservoir Inlet & Outlet chambers (as per Drawing J31204/102)	m³	30		
	8.4.3	Strength concrete: 15 MPa/19 mm				
3.2.3.5	PSG 8.2.8	Minimum thickness 50 mm blinding layer to chambers and encasements	m³	7		
3.2.3.6		Mass concrete including splash aprons from roof overflow and filling under reservoir footings (where ordered by the Engineer)	m³	50		
	8.4.3	Strength 25MPa/19mm concrete				
3.2.3.7		25MPa/19mm concrete to benching	m³	5		
		CARRIED FORWARD				

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SCHEDULE:
SECTION: 3 1 ML MAMFENGWINI RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.2.3.8		Water meter, Off-take and Isolation valve chambers (as per Drawing J31204/008)	m³	30		
3.2.3.9		Remedial works to concrete (Application of SIKA approved products to repair honeycombing, chipping back to 20mm	m²	240		
3.2.4	**8.4.4 PSG 8.4.4**	**UNFORMED SURFACE FINISHES**				
		(a) Wood-floated finish (to degree of accuracy II)				
3.2.4.1		Top of reservoir wall footing (outside)	m²	12		
3.2.4.2		Reservoir roof	m²	170		
3.2.4.3		Invert to reservoir sump	m²	4		
3.2.4.4		Top of upstand	m²	7		
		(b) Steel-floated (to degree of accuracy II)				
3.2.4.5		Top of reservoir Wall	m²	8		
3.2.4.6		Top Reservoir Floor Slab & Footing inside	m²	180		
3.2.4.7		Top of column Bases	m²	5		
3.2.5	**8.5 PSG 8.5.1**	**JOINTS**				
3.2.5.1		1) Expansion Joints in reservoir floor against wall footing (as per drawings J31204/103) measured by the total lengths of expansion joints complete with:	m	70		
		a) 250 mm wide x 2mm thick hypalon bandage				
		b) 2mm aluminium strip with 50mm wide backing bondage breaker				
	PSG 3.11.2	c) 250mm rearguard waterstop as per detail on drawings				
		d) Closed cell Polyethylene 100kg/m or 30mm closed cell high density void former				
3.2.5.2		2) Contraction joints in reservoir floor (as per drawing J31204/103) measured by the total lengths of contraction joints complete with:	m	35		
		a) 200mm wide x 2 mm thick hypalon bandage or similar approved				
		CARRIED FORWARD				

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SECTION: 3 1 ML MAMFENGWINI RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	PSG 3.11.2	b) 250mm rearguard waterstop with centre bulb				
3.2.5.3		3) Construction joints in reservoir walls (as per drawing J31204/103) measured by the total lengths of construction joints complete with 150mm wide Lanko Bandage or similar approved applied to construction joints and reservoir walls: a) 150mm wide Lanko Bandage or similar approved	m	140		
3.2.5.4		4) Isolation Joints in reservoir (as per drawing J31204/103)) measured by the total lengths of isolation joints complete with: a) 10mm Jointex or softboard	m	75		
	PSG 3.11.4	b) 10x10mm polysulphide sealant to SABS 1077				
3.2.6		MISCELLANEOUS CONCRETE ITEMS				
3.2.6.1	PSG 3.11.4	500 micron plastic bond breaker over no-fines concrete under reservoir floor	m²	190		
3.2.6.2	PSG 8.18	Neoprene (Kilcher or similar approved) Teflon sliding bearing type 3T50/75	m	48		
3.2.6.3	PSG 8.19	Polyurethane seal between reservoir roof and walls	m	49		
3.2.6.4		Precast 220x70 deep x790 long saddleback Deranco coping (or similar approved) to reservoir roof complete installation including casting shuttering and placing on mortar.	m	48		
3.2.6.5		Concrete planks to reservoir over outlet manhole to reservoir.	No	4		
3.2.6.6		Cast in situ standard 1000mm wide v-channelling around reservoir perimeter on 200gm/m2 needle punched geotextile around resevoir perimeter (see standard detail Drawing J31204/104)	m	70		
3.2.6.7		200gm/m2 needle punched geotextile (1m width)	m²	70		
3.2.6.8	PGW5.28	Cleaning and sterilizing reservoir and associated pipework	Sum	1		
3.2.6.9		Filling reservoir with water. Rate to include carting of water from nearest river source identified by Contractor.	Sum	1		
3.2.6.10	PSG8.15	Reservoir Watertightness test including reservoir roof	Sum	1		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.2.6.11		Supply and install "Pultrude" type fibreglass 25 deep 36x36 grating panel 650x1000mm	No	1		
3.2.6.12		150mm dia galvanised outlets, cut from a 150mm dia pipe with metal guaze vermin proof (GALVANISED AFTER FABRICATION) as per detail on the drawings (300mm long)	No	14		
		Manhole items				
3.2.6.13		Concrete cover slab without manhole,including lifting hooks and air vents.	No	1		
3.2.6.14		Concrete cover slab complete with manhole frame cast in, including lifting hooks and air vents. Note payment of GMS manhole frame and cover paid seperately.	No	1		
3.2.6.15	PSG 8.16 (c)	"Calcimite" or similar approved step irons general purpose to BS1247:1975	No	10		
3.2.6.16	PSG 8.16 (a)	900x600 GMS hinged manhole cover (lockable) and frame to suit as per detail drawing J31204/103 complete.	No	2		
3.3	**SANS 1200 HA**	**RESERVOIR STRUCTURAL WORK**				
3.3.1		**STRUCTURAL STEELWORK**				
	8.3.1	Supply, fabricate, deliver and install steelwork,to the finishes/coatings specified in the specification and on the drawings				
		Access ladders with Cage				
3.3.1.1		Internal 3.5m high ladder to reservoir as per drawing J31204/101. Stainless steel grade 316L	No	1		
3.3.1.2		External 3.2m high GMS ladder to outer wall of reservoir as per drawing J31204/101 (HD Galvanised)	No	1		
3.3.1.3		2m high GMS ladder to inlet & outlet chambers as per drawing J31204/105.	No	2		
		Reservoir and Chambers' roof elements				
3.3.1.4		50mm diameter sleeved holes in reservoir roof for level control equipment as shown on the drawing.	No	4		
3.3.1.5		100mm diameter sleeved holes in reservoir roof for sampling equipment (As required).	No	2		
3.3.1.6		Supply and install GMS 900x600 lockable cover (reservoir roof) as per drawing J31204/103.	No	2		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.3.1.7	PSG 8.16 (a)	Supply and install 900x600 GMS hinged chamber cover and frame to outlet, meter and off-take chambers as per standard detail drawing J31204/103 complete.	No	3		
	PSG 8.16 (b)	Air Vents				
3.3.1.8		GMS DN150 reservoir ventilators as per detail on drawing J31204/103.	No	4		
		Wall-Brackets for inlet pipe as per drawing J31204/103.				
3.3.1.9		100x100x10mm thick end plate welded to 50mm dia pipe fixed to concrete with 4 No. M12 s/s bolts	No.	2		
3.3.1.10		1 No. M20 stainless steel bolt grade 8.8	No.	4		
3.3.1.11		1 No. M16 s/s bolt	No.	4		
3.3.1.12		50mm dia pipe 4mm wall thickness	No.	2		
3.4	**SANS 1200L**	**RESERVOIR PIPEWORK**				
3.4.1	**8.2.5**	**INLET, OUTLET, SCOUR & OVERFLOW SPECIALS AND FITTINGS**				
		All pipework to be epoxy coated and lined galavanised mild steel, 4mm wall thickness.				
		OUTLET				
3.4.1.1		P2: DN300 PN16 flanged double off-set butterfly valve with gearbox and handle wheel	No.	1		
3.4.1.2		P3: DN300 dismantling joint	No.	1		
3.4.1.3		P4: DN300 epoxy coated and lined mild steel pipe flanged PN16 one end and plain-ended the other, with DN100 flanged PN10 branch. Pipe barrel to be 1800mm f/plain end. Branch to be located 500mm C/Plain-end and extending 350 mm C/F	No.	1		
3.4.1.4		P5: DN100 RS gate valve flanged PN10 with non-rising spindle and handwheel	No.	1		
3.4.1.5		P6: DN100 multi-orifice anti-shock air valve as specified	No.	1		
3.4.1.6		P8: DN300 uPVC PN16 flange adaptor to suit spigot & socket uPVC pipe	No.	1		
		OVERFLOW				
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.4.1.7		P9: DN300 epoxy coated and lined mild steel pipe,buttressed flanged PN16 one end and DN450 bellmouth with 4 no. anti-vortex baffles the other end. 2850mm f/bellmouth. SCOUR	No.	1		
3.4.1.8		P12: DN150 clockwise closing non-rising spindle flanged wedge gate valve to SANS 664.	No.	1		
3.4.1.9		P13: DN150 Epoxy coated and lined mild steel short radius 90° bend. Flanged PN10 one end and plain ended the other end with standard c/f dimensions. INLET	No.	1		
3.4.1.10		P14: DN150 epoxy coated and lined mild steel puddle pipe, flanged PN16 both ends. Pipe barrel to be 600mm f/f with puddle flange 300mm from plain end.	No.	1		
3.4.1.11		P15: DN150 epoxy coated and lined mild steel 90° short radius bend, flanged PN16 both ends, 150mm c/f and 1000mm c/f.	No.	1		
3.4.1.12		P16: DN150 epoxy coated and lined mild steel pipe with 45° short radius bends each end, flanged PN16 both ends, length to suit.	No.	1		
3.4.1.13		P17: DN150 x DN200 epoxy coated and lined mild steel concentric reducer flanged each end 600mm long, PN16.	No.	1		
3.4.1.14		P17A: DN200 PN16 uPVC flange adaptor.	No.	1		
3.4.1.15		P18: DN150 Amanziflow Projects design diaphragm valve.	No.	1		
3.4.1.16		P19: DN150 Maric flow control valve.	No.	1		
3.4.1.17		P20: DN150 Epoxy coated and lined mild steel straight pipe flanged PN16 both ends 1730F/F.	No.	1		
3.5	SANS 1200L	VALVE ASSEMBLIES: STEEL FITTING Off-take and Isolation valve chamber assembly (all fittings, specials and flange drillings PN 16), ref drawing J31204/008				
3.5.1		IV1: DN200 flange adaptor to suit uPVC pipe.	No	2		
3.5.2		IV2: Supply and install DN200 flanged Resilient seal gate valve with hand wheel.	No	1		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.5.3		IV3: Supply and install DN200 VJ flange adaptor.	No	1		
3.5.4		IV4: Supply and install epoxy coated and lined mild steel DN200 pipe, flanged one end and plain ended the other.	No	1		
3.5.5		IV5: Supply and install DN200 X DN200 epoxy coated & lined gusseted equal tee Piece, Flanged PN16 all round. Complete with Temporary PN16 uncoated blank flange (drilled to suit). Water meter chamber assembly (all fittings, specials and flange drillings PN 16), ref drawing J31204/008	No	1		
3.5.6		WM1: DN200 flange adaptor to suit uPVC pipe.	No	2		
3.5.7		WM2: Supply and install DN200 x DN100, epoxy coated and lined mild steel mild steel, flanged eccentric reducer.	No	2		
3.5.8		WM3: Supply and install epoxy coated and lined mild steel, 950mm long DN100 pipe, flanged one end and plain ended the other.	No	1		
3.5.9		WM4: DN100 flanged coupling adaptor	No	1		
3.5.10		WM5: Epoxy coated WOLTMANN-TYPE flanged mechanical flow meter.	No	1		
3.5.11		WM6: Supply and install epoxy coated and lined mild steel, 950mm long DN100 pipe, flanged both ends.	No	1		
3.6	**SANS 1200L**	**VALVE CHAMBERS**				
	SABS 1200DA	RESTRICTED EXCAVATION IN ALL MATERIALS FOR WATER METER, OFF-TAKE AND ISOLATION VALVE CHAMBER				
3.6.1		Site clearance	m²	20		
3.7		Excavation	m³	44		
3.8	8.2.13	1) Water meter chamber complete with formwork, concrete, blinding, screed, reinforcement and all items as shown on the drawing (excluding pipework and pipe fittings), ref Drawing J31204/008.	No.	1		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.9	8.2.13	2) Off-take and Isolation valve chamber complete with formwork, concrete, blinding, screed, reinforcement and all items shown as on the drawing (excluding pipework and pipe fittings), ref Drawing J31204/008.	No.	1		
3.9.1	PSL 8.2.6	SUBSOIL DRAINAGE (Reservoir)				
		Supply and lay (as detailed on drawing J31204/103):				
3.9.1.1		Sand compacted to 100% Mod AASHTO	m³	30		
3.9.1.2		19mm crushed stone to reservoir perimeter	m³	45		
3.9.1.3		200gr/m² needle punched geofabric to subsurface drains (bidim)	m²	150		
3.9.1.4		110mm diameter class 4 slotted drainage pipe complete with all fittings. i.e. elbows, endcaps and tee connections to suit details on the drawings	m	75		
3.9.1.5		25mm proprietary drainage void former using premoulded HDPE or Similar Approved	m²	200		
3.10		RESERVOIR ACCESS ROAD				
3.10.1	SANS 1200DM	EARTHWORKS (ROADS, SUBGRADE)				
	8.3.3a)	Road-bed preparation and compaction of material				
3.10.1.1		Scarify and compact in-situ material and compact to 93% Mod AASHTO density in 150 mm layer (4m road width).	m³	175		
		Extra over item 3.10.1.1 :				
3.10.1.2		Process in-situ material with Lime stabiliser	m³	300		
3.10.2	SANS 1200MF	WEARING COURSE				
3.10.2.1	8.3.3a)	Import G5 wearing course material,place and compact to 95% Mod AASHTO in a 150mm layer	m³	300		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.11		MISCELLANEOUS				
3.11.1	1200DK	GABIONS AND PITCHING				
3.11.2	8.2.1a	Surface preparation for bedding of gabions with approved excavated material	m²	10		
3.11.3	8.2.2	1mx1mx2m Gabions	m³	6		
3.11.4	8.2.2	230mm thick reno mattress	m²	10		
3.11.5	8.2.4	200grm/m2 needlepunched geofabric	m²	20		
	SANS 1200ME	STABILISING AGENT				
3.11.6	8.3.8	Ordinary Portland cement (CEM 1) 3% by weight.	50kg Bags	50		
3.11.7		Lime Stabiliser	t	1		
		CUTTING INTO EXISTING PIPELINES				
		CUTTING INTO EXISTING PIPELINES Allow for everything necessary to carry out the removal of existing pipes and installation of new connections and/or closures. Rates are to include for all excavation, carefully exposing the existing pipelines, making arrangements with the Employer's staff to temporarily shut off the existing pipelines to facilitate making the connections, cleaning and preparing the pipes for cutting, cutting, dealing with all water (including that from leaking valves), preparing the pipe ends for jointing, jointing, and connecting the new pipework, making good internal linings, and external coatings, re-commissioning the pipeline, and including all temporary supports, bedding and backfill, and loading and transporting of removed sections to the pipe yard. The whole installation is to be completed within a maximum of 8 hours. (All new pipes, valves and fittings that are required are measured elsewhere) Connection to secondary bulk existing pipework at (The work shall include all material, installations and all other costs necessary for				
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 3 1 ML MAMFENGWINI RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
3.11.8		Connection to existing secondary bulk pipework at the Mamfengweni Reservoir adjacent to road (The work shall include all material, installations and all other costs necessary for complete installation as directed by the Engineer). See connection detail on drawing No.J31204/008	Sum	1		
TOTAL FOR SECTION 3 CARRIED FORWARD TO SUMMARY						

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
4.1	SANS 1200D	EXCAVATION				
4.1.1	8.3.4	IMPORTING OF MATERIALS				
4.1.1.1	PSDA 8.3.4.2	Import approved 25 mm stone chips (reflective quatzite) from commercial source, stockpile and place by hand on reservoir roof	m³	30		
4.1.1.2		Import backfill material for Reservoir (backfilled and compacted in 300mm layers) from natural ground level up to Reservoir walls.	m³	5		
4.1.2	SANS 1200DA	RESTRICTED EXCAVATIONS				
4.1.2.1		Excavate in all materials by hand to expose existing services	m³	20		
	8.3.2(a)	Excavate for restricted foundations, footings and trenches in all materials and use for backfill or embankment or dispose				
4.1.2.2	PSDA4.4	Restricted excavation for chambers etc	m³	100		
	8.3.3(b)	Extra over items 4.1.2.2 for restricted excavation in:				
4.1.2.3		1) Intermediate material	m³	5		
4.1.2.4		2) Hard rock material	m³	5		
4.1.2.5		Excavate unsuitable material from below founding level as ordered by Engineer and dispose of to approved spoil site	m³	5		
4.1.3	SANS 1200DB	EXCAVATIONS				
4.1.3.1	8.3.2 PSDB 8.1.4 PSDB 8.3.3.4	(a) Excavate in all material for trenches backfill and dispose of surplus and unsuitable material. Rate to include for all temporary works including trimming, shoring and dewatering where necessary.	m³	152		
	8.3.2	(b) Extra over item 4.1.3.1 for excavation in:				
4.1.3.2		1) Intermediate material	m³	5		
4.1.3.3		2) Hard rock (Prov)	m³	5		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.2	**SANS 1200G**	**REINFORCED CONCRETE RESERVOIR**				
4.2.1	**8.1.1 8.2**	**FORMWORK**				
	8.2.1	Rough vertical to degree of accuracy III				
4.2.1.1		Chamber	m²	120		
	8.2.2	Smooth vertical to degree of accuracy II				
4.2.1.2		Column bases	m²	10		
4.2.1.3		Footing at expansion joint	m²	20		
4.2.1.4		Circular Columns	m²	60		
4.2.1.5		Roof slab & upstand	m²	60		
4.2.1.6		Sump	m²	20		
4.2.1.7		Chamber cover slab	m²	10		
4.2.1.8		Chambers	m²	100		
	8.2.2	Smooth horizontal to degree of accuracy II				
4.2.1.9		Roof soffit	m²	325		
4.2.1.10		Chambers	m²	50		
	8.2.6	Box-outs for pipe specials to be installed then grouted in place:				
		1) Box-out in chamber wall to accommodate:				
4.2.1.11		a) DN150 scour pipe	No.	1		
4.2.1.12		b) DN300 outlet pipe	No.	1		
4.2.1.13		c) DN300 overflow pipe	No.	1		
		3) Box-out in reservoir roof to accommodate:				
4.2.1.14		a) DN50 holes for level control equipment	No.	4		
4.2.1.15		b) DN100 holes for sampling equipment	No.	2		
4.2.1.16		c) DN150 air vents	No.	8		
4.2.1.17		d) DN150 roof drainage outlets	No.	18		
4.2.2	**8.3**	**REINFORCEMENT**				
	8.3.1	Mild steel bars				
4.2.2.1		R8 Basic Price	t	0.04		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	8.3.1	Extra-over item 4.2.2.1 for bars of diameter				
4.2.2.2		R10	t	0.33		
	8.3.1	High-tensile steel bars				
4.2.2.3		Y25 Basic price	t	9.41		
	8.3.1	Extra-over item 4.2.2.3 for bars of diameter				
4.2.2.4		Y10	t	5.63		
4.2.2.5		Y12	t	3.34		
4.2.2.6		Y16	t	0.42		
4.2.2.7		Y20	t	0.02		
	8.3.2	High-Tensile Welded Mesh				
4.2.2.8		Type reference #245	m²	70		
4.2.2.9		Type reference #193	m²	20		
4.2.3	**8.4 PSG 8.1.3**	CONCRETE				
4.2.3.1	PSG 5.5.1.6	No-fines concrete under floor & to fill voids	m³	45		
	8.4.3	Strength concrete: 35MPa/19 mm watertight concrete with an approved crystalline waterproofing concrete additive				
4.2.3.2		Floor slabs	m³	16.25		
4.2.3.3		Roof slab & upstand	m³	90		
4.2.3.4		Columns with bases	m³	3.75		
4.2.3.5		Reservoir Inlet & Outlet chambers (as per Drawing J31204/202)	m³	30		
	8.4.3	Strength concrete: 15 MPa/19mm				
4.2.3.6	PSG 8.2.8	Minimum thickness 50 mm blinding layer to chambers and encasements	m³	7		
4.2.3.7		Mass concrete including splash aprons from roof overflow and filling under reservoir footings (where ordered by the Engineer)	m³	50		
	8.4.3	Strength 25MPa/19mm concrete				
4.2.3.8		25MPa/19mm concrete to benching	m³	5		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.2.3.9		Water meter, Off-take and Isolation valve chambers (as per Drawing J31204/008)	m³	30		
4.2.3.10		Remedial works to concrete (Application of SIKA approved products to repair honeycombing, chipping back to 20mm	m²	240		
4.2.4	**8.4.4 PSG 8.4.4**	**UNFORMED SURFACE FINISHES**				
		(a) Wood-floated finish (to degree of accuracy II)				
4.2.4.1		Reservoir roof	m²	170		
4.2.4.2		Invert to reservoir sump	m²	4		
4.2.4.3		Top of upstand	m²	7		
		(b) Steel-floated (to degree of accuracy II)				
4.2.4.4		Top Reservoir Floor Slab & Footing inside	m²	45		
4.2.4.5		Top of column Bases	m²	2		
4.2.5	**8.5 PSG 8.5.1**	**JOINTS**				
4.2.5.1		1) Expansion Joints in reservoir floor against wall footing (as per drawings J31204/203) measured by the total lengths of expansion joints complete with:	m	70		
		a) 250 mm wide x 2mm thick hypalon bandage				
		b) 2mm aluminium strip with 50mm wide backing bondage breaker				
	PSG 3.11.2	c) 250mm rearguard waterstop as per detail on drawings				
		d) Closed cell Polyethylene 100kg/m or 30mm closed cell high density void former				
4.2.5.2		2) Contraction joints in reservoir floor (as per drawing J31204/203) measured by the total lengths of contraction joints complete with:	m	40		
		a) 200mm wide x 2 mm thick hypalon bandage or similar approved				
	PSG 3.11.2	b) 250mm rearguard waterstop with centre bulb				
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.2.5.3		3) Construction joints in reservoir walls (as per drawing J31204/203) measured by the total lengths of construction joints complete with 150mm wide Lanko Bandage or similar approved applied to construction joints and reservoir walls(excluding 150mm wide by 1.6mm thick mild steel strips, hot dip galvanized GI waterstop):	m	140		
		a) 150mm wide Lanko Bandage or similar approved				
4.2.5.4		4) Isolation Joints in reservoir (as per drawing J31204/203) measured by the total lengths of isolation joints complete with:	m	70		
		a) 10mm Jointex or softboard				
	PSG 3.11.4	b) 10x10mm polysulphide sealant to SABS 1077				
4.2.6		MISCELLANEOUS CONCRETE ITEMS				
4.2.6.1	PSG 3.11.4	500 micron plastic bond breaker over no-fines concrete under reservoir floor	m²	47.5		
4.2.6.2	PSG 8.18	Neoprene (Kilcher or similar approved) Teflon sliding bearing type 3T50/75	m	48		
4.2.6.3	PSG 8.19	Polyurethane seal between reservoir roof and walls	m	49		
4.2.6.4		Precast 220x70 deep x790 long saddleback Deranco coping (or similar approved) to reservoir roof complete installation including casting shuttering and placing on mortar.	m	48		
4.2.6.5		Concrete planks to reservoir over outlet manhole to reservoir.	No	4		
4.2.6.6		Cast in situ standard 1000mm wide v-channelling around reservoir perimeter on 200gm/m2 needle punched geotextile around resevoir perimeter (see standard detail Drawing J31204/204)	m	70		
4.2.6.7		200gm/m2 needle punched geotextile (1m width)	m²	70		
4.2.6.8	PGW5.28	Cleaning and sterilizing reservoir and associated pipework	Sum	1		
4.2.6.9		Filling reservoir with water. Rate to include carting of water from source identified by Contractor.	sum	1		
4.2.6.10	PSG8.15	Reservoir Watertightnes test including reservoir roof	sum	1		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.2.6.11		Supply and install "Pultrude" type fibreglass 25 deep 36x36 grating panel 650x1000mm	No	1		
4.2.6.12		150mm dia glvanised outlets, cut from a 150mm dia pipe with metal guaze vermin proof (GALVANISED AFTER FABRICATION) as per detail on the drawings (300mm long)	No	14		
		Manhole items				
4.2.6.13		Concrete cover slab without manhole,including lifting hooks and air vents.	No	1		
4.2.6.14		Concrete cover slab complete with chamber frame cast in, including lifting hooks and air vents. Note payment of chamber manhole frame and cover paid seperately.	No	1		
4.2.6.15	PSG 8.16 (c)	"Calcimite" or similar approved step irons general purpose to BS1247:1975	No	10		
4.2.6.16	PSG 8.16 (a)	900x600 GMS hinged manhole cover (lockable) and frame to suit as per detail drawing J31204/203 complete.	No	2		
4.3	**SANS 1200 HA**	**RESERVOIR STRUCTURAL WORK**				
4.3.1		**STRUCTURAL STEELWORK**				
	8.3.1	Supply, fabricate, deliver and install steelwork,to the finishes/coatings specified in the specification and on the drawings				
		Access ladders with Cage				
4.3.1.1		Internal 3.5m high ladder to reservoir as per drawing J31204/201. Stainless steel grade 316L	No	1		
4.3.1.2		External 3.2m high GMS ladder to outer wall of reservoir as per drawing J31204/201 (HD Galvanised)	No	1		
4.3.1.3		2m high GMS ladder to inlet & outlet chambers as per drawing J31204/205.	No	2		
		Reservoir and Chambers' roof elements				
4.3.1.4		50mm diameter sleeved holes in reservoir roof for level control equipment as shown on the drawing.	No	4		
4.3.1.5		100mm diameter sleeved holes in reservoir roof for sampling equipment (As required).	No	2		
4.3.1.6		Supply and install GMS 900x600 lockable cover (reservoir roof) as per drawing J31204/203.	No	2		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.3.1.7	PSG 8.16 (a)	Supply and install 900x600 GMS hinged chamber cover and frame to outlet, meter and off-take chambers as per standard detail drawing J31204/203 complete.	No	3		
	PSG 8.16 (b)	*Air Vents*				
4.3.1.8		GMS DN150 reservoir ventilators as per detail on drawing J31204/203.	No	4		
		Wall-Brackets for inlet pipe as per drawings				
4.3.1.9		100x100x10mm thick end plate welded to 50mm dia pipe fixed to concrete with 4 No. M12 s/s bolts	No.	2		
4.3.1.10		1 No. M20 stainless steel bolt grade 8.8	No.	4		
4.3.1.11		1 No. M16 s/s bolt	No.	4		
4.3.1.12		50mm dia pipe 4mm wall thickness	No.	2		
4.4	**SANS 1200L**	**RESERVOIR PIPEWORK**				
4.4.1	**8.2.5**	**INLET, OUTLET, SCOUR & OVERFLOW SPECIALS AND FITTINGS**				
		All pipework to be epoxy coated and lined galavanised mild steel, 4mm wall thickness.				
		OUTLET				
4.4.1.1		P2: DN300 PN16 flanged double off-set butterfly valve with gearbox and handle wheel	No.	1		
4.4.1.2		P3: DN300 dismantling joint	No.	1		
4.4.1.3		P4: DN300 epoxy coated and lined mild steel pipe flanged PN16 one end and plain-ended the other, with DN100 flanged PN10 branch. Pipe barrel to be 1800mm f/plain end. Branch to be located 500mm C/Plain-end and extending 350 mm C/F	No.	1		
4.4.1.4		P5: DN100 RS gate valve flanged PN10 with non-rising spindle and handwheel	No.	1		
4.4.1.5		P6: DN100 multi-orifice anti-shock air valve as specified	No.	1		
4.4.1.6		P8: DN300 uPVC PN16 flange adaptor to suit spigot & socket uPVC pipe	No.	1		
		OVERFLOW				
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.4.1.7		P9: DN300 epoxy coated and lined mild steel pipe,buttressed flanged PN16 one end and DN450 bellmouth with 4 no. anti-vortex baffles the other end. 2850mm f/bellmouth. *SCOUR*	No.	1		
4.4.1.8		P12: DN150 clockwise closing non-rising spindle flanged wedge gate valve to SANS 664.	No.	1		
4.4.1.9		P13: DN150 Epoxy coated and lined mild steel short radius 90° bend. Flanged PN10 one end and plain ended the other end with standard c/f dimensions. *INLET*	No.	1		
4.4.1.10		P14: DN150 epoxy coated and lined mild steel puddle pipe, flanged PN16 both ends. Pipe barrel to be 600mm f/f with puddle flange 300mm from plain end.	No.	1		
4.4.1.11		P15: DN150 epoxy coated and lined mild steel 90° short radius bend, flanged PN16 both ends, 150mm c/f and 2800mm c/f.	No.	1		
4.4.1.12		P16: DN150 epoxy coated and lined mild steel pipe with 45° short radius bends each end, flanged PN16 both ends, length to suit.	No.	1		
4.4.1.13		P17: DN150 x DN200 epoxy coated and lined mild steel concentric reducer flanged each end 600mm long, PN16.	No.	1		
4.4.1.14		P17A: DN200 PN16 uPVC flange adaptor.	No.	1		
4.4.1.15		P18: DN150 Amanziflow Projects design diaphragm valve.	No.	1		
4.4.1.16		P19: DN150 Maric flow control valve.	No.	1		
4.4.1.17		P20: DN150 Epoxy coated and lined mild steel straight pipe flanged PN16 both ends 1730F/F.	No.	1		
4.5	SANS 1200L	VALVE ASSEMBLIES: STEEL FITTING Water meter chamber Assembly (all fittings, specials and flange drillings PN 16), ref drawing J31204/009				
4.5.1		IV1: DN200 flange adaptor to suit uPVC pipe.	No	2		
4.5.2		IV2: Supply and install DN200 Resilient seal gate valve with hand wheel	No	1		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.5.3		IV3: Supply and install DN200 VJ flange adaptor	No	1		
4.5.4		IV4: Supply and install epoxy coated and lined mild steel DN200 pipe, flanged one end and plain ended the other.	No	1		
4.5.5		IV5: Supply and install DN200 X DN200 epoxy coated & lined gusseted equal tee Piece, Flanged PN16 all round. Complete with Temporary PN16 uncoated blank flange (drilled to suit). Off-take and Isolation valve chamber Assembly (all fittings, specials and flange drillings PN 16), ref drawing J31204/009	No	1		
4.5.6		WM1: DN200 flange adaptor to suit uPVC pipe.	No	2		
4.5.7		WM2: Supply and install DN200 x DN100, epoxy coated and lined mild steel mild steel, flanged eccentric reducer.	No	2		
4.5.8		WM3: Supply and install epoxy coated and lined mild steel, 950mm long DN100 pipe, flanged one end and plain ended the other.	No	1		
4.5.9		WM4: DN100 flanged coupling adaptor	No	1		
4.5.10		WM5: Epoxy coated WOLTMANN-TYPE flanged mechanical flow meter	No	1		
4.5.11		WM6: Supply and install epoxy coated and lined mild steel, 950mm long DN100 pipe, flanged both ends.	No	1		
4.6	SANS 1200L	VALVE CHAMBERS				
	SABS 1200DA	RESTRICTED EXCAVATION IN ALL MATERIALS FOR WATER METER, OFF-TAKE AND ISOLATION VALVE CHAMBER				
4.6.1		Site clearance	m^2	20		
4.7		Excavation	m^3	44		
4.8	8.2.13	1) Water meter chamber complete with formwork, concrete, blinding, screed, reinforcement and all items as shown on the drawing (excluding pipework and pipe fittings), ref Drawing J31204/008.	No.	1		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.9	8.2.13	2) Off-take and Isolation valve chamber complete with formwork, concrete, blinding, screed, reinforcement and all items shown as on the drawing (excluding pipework and pipe fittings), ref Drawing J31204/008.	No.	1		
4.9.1	PSL 8.2.6	SUBSOIL DRAINAGE (Reservoir)				
		Supply and lay (as detailed on drawing J31204/203):				
4.9.1.1		Sand compacted to 100% Mod AASHTO	m³	30		
4.9.1.2		19mm crushed stone to reservoir perimeter	m³	15		
4.9.1.3		200gr/m² needle punched geofabric to subsurface drains (bidim)	m²	150		
4.9.1.4		110mm diameter class 4 slotted drainage pipe complete with all fittings. i.e. elbows, endcaps and tee connections to suit details on the drawings	m	75		
4.9.1.5		25mm proprietary drainage void former using premoulded HDPE or Similar Approved	m²	200		
4.10		RESERVOIR ACCESS ROAD				
4.10.1	SANS 1200DM	EARTHWORKS (ROADS, SUBGRADE)				
	8.3.3b)	Road-bed preparation and compaction of material				
4.10.1.1		Scarify and compact in-situ material and compact to 93% Mod AASHTO density in 150 mm layer (4m road width).	m³	175		
		Extra over item 4.10.1.1 :				
4.10.1.2		Process in-situ material with Lime stabiliser	m³	300		
4.10.2	SANS 1200MF	WEARING COURSE				
4.10.2.1	8.3.3a)	Import G5 wearing course material, place and compact to 95% Mod AASHTO in a 150mm layer	m³	300		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 4 1 ML MPANGELE RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
4.11		MISCELLANEOUS				
4.11.1	1200DK	GABIONS AND PITCHING				
4.11.2	8.2.1a	Surface preparation for bedding of gabions with approved excavated material	m²	10		
4.11.3	8.2.2	1mx1mx2m Gabions	m³	6		
4.11.4	8.2.2	230mm thick reno mattress	m²	10		
4.11.5	8.2.4	200grm/m2 needlepunched geofabric	m²	20		
		CUTTING INTO EXISTING PIPELINES				
4.11.6		"CUTTING INTO EXISTING PIPELINES Allow for everything necessary to carry out the removal of existing pipes and installation of new connections and/or closures. Rates are to include for all excavation, carefully exposing the existing pipelines, making arrangements with the Employer's staff to temporarily shut off the existing pipelines to facilitate making the connections, cleaning and preparing the pipes for cutting, cutting, dealing with all water (including that from leaking valves), preparing the pipe ends for jointing, jointing, and connecting the new pipework, making good internal linings, and external coatings, re-commissioning the pipeline, and including all temporary supports, bedding and backfill, and loading and transporting of removed sections to the pipe yard. The whole installation is to be completed within a maximum of 8 hours. (All new pipes, valves and fittings that are required are measured elsewhere) Connection to secondary bulk existing pipework at (The work shall include all material, installations and all other costs necessary for Connection to existing secondary bulk pipework at the Mamfengweni Reservoir adjacent to road (The work shall include all material, installations and all other costs necessary for complete installation as directed by the Engineer). See connection detail on drawing No.J31204/008	Sum	1		
TOTAL FOR SECTION 4 CARRIED FORWARD TO SUMMARY						

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 5 1 ML DALAGUBA RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
5.1	SANS 1200D	EXCAVATION				
5.1.1	8.3.4	IMPORTING OF MATERIALS				
5.1.1.1	PSDA 8.3.4.2	Import approved 25 mm stone chips (reflective quatzite) from commercial source, stockpile and place by hand on reservoir roof	m³	30		
5.1.1.2		Import backfill material for Reservoir (backfilled and compacted in 300mm layers) from natural ground level up to Reservoir walls.	m³	5		
5.1.2	SANS 1200DA	RESTRICTED EXCAVATIONS				
5.1.2.1		Excavate in all materials by hand to expose existing services	m³	20		
	8.3.2(a)	Excavate for restricted foundations, footings and trenches in all materials and use for backfill or embankment or dispose				
5.1.2.2	PSDA4.4	Restricted excavation for chambers etc	m³	100		
	8.3.3(b)	Extra over items 5.1.2.2 for restricted excavation in:				
5.1.2.3		1) Intermediate material	m³	5		
5.1.2.4		2) Hard rock material	m³	5		
5.1.2.5		Excavate unsuitable material from below founding level as ordered by Engineer and dispose of to approved spoil site	m³	5		
5.1.3	SANS 1200DB	EXCAVATIONS				
5.1.3.1	8.3.2 PSDB 8.1.4 PSDB 8.3.3.4	(a) Excavate in all material for trenches backfill and dispose of surplus and unsuitable material. Rate to include for all temporary works including trimming, shoring and dewatering where necessary.	m³	151		
	8.3.2	(b) Extra over item 5.1.3.1 for excavation in:				
5.1.3.2		1) Intermediate material	m³	5		
5.1.3.3		2) Hard rock (Prov)	m³	5		
5.2	SANS 1200G	REINFORCED CONCRETE RESERVOIR				
5.2.1	8.1.1 8.2	FORMWORK				
	8.2.1	Rough vertical to degree of accuracy III				
		CARRIED FORWARD				

CONTRACT: SCHEDULE
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SCHEDULE:
SECTION: 5 1 ML DALAGUBA RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
5.2.1.1		Sump & encasement to pipes	m²	40		
5.2.1.2		Chambers	m²	120		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	8.2.2	Smooth vertical to degree of accuracy II				
5.2.1.3		Walls inside & outside above ground level (curved)	m²	475		
5.2.1.4		Column bases	m²	30		
5.2.1.5		Footing at expansion joint	m²	20		
5.2.1.6		Circular Columns	m²	60		
5.2.1.7		Roof slab & upstand	m²	60		
5.2.1.8		Sump	m²	20		
5.2.1.9		Chamber cover slab	m²	10		
5.2.1.10		Chamber	m²	100		
	8.2.2	Smooth horizontal to degree of accuracy II				
5.2.1.11		Roof soffit	m²	325		
5.2.1.12		Manholes	m²	50		
	8.2.6	Box-outs for pipe specials to be installed then grouted in place:				
		1) Box-out in reservoir wall to accommodate:				
5.2.1.13		a) DN200 inlet pipe	No.	1		
5.2.1.14		b) DN150 scour pipe	No.	1		
5.2.1.15		c) DN300 outlet pipe	No.	1		
5.2.1.16		d) DN300 overflow pipe	No.	1		
		2) Box-out in chamber wall to accommodate:				
5.2.1.17		a) DN150 scour pipe	No.	1		
5.2.1.18		b) DN300 outlet pipe	No.	1		
5.2.1.19		c) DN300 overflow pipe	No.	1		
		3) Box-out in reservoir roof to accommodate:				
5.2.1.20		a) DN50 holes for level control equipment	No.	4		
5.2.1.21		b) DN100 holes for sampling equipment	No.	2		
5.2.1.22		c) DN150 air vents	No.	8		
5.2.1.23		d) DN150 roof drainage outlets	No.	18		
5.2.2	8.3	REINFORCEMENT				
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	8.3.1	Mild steel bars				
5.2.2.1		R8 Basic Price	t	0.13		
	8.3.1	Extra-over item 5.2.2.1 for bars of diameter				
5.2.2.2		R10	t	0.39		
	8.3.1	High-tensile steel bars				
5.2.2.3		Y25 Basic price	t	16.02		
	8.3.1	Extra-over item 5.2.2.3 for bars of diameter				
5.2.2.4		Y10	t	5.63		
5.2.2.5		Y12	t	9.53		
5.2.2.6		Y16	t	0.85		
5.2.2.7		Y20	t	0.02		
	8.3.2	High-Tensile Welded Mesh				
5.2.2.8		Type reference #245	m²	70		
5.2.2.9		Type reference #193	m²	20		
5.2.3	**8.4 PSG 8.1.3**	**CONCRETE**				
	8.4.3	Strength concrete: 35MPa/19 mm watertight concrete with an approved crystalline waterproofing concrete additive				
5.2.3.1		Walls above footing	m³	75		
5.2.3.2		Floor slabs	m³	2		
5.2.3.3		Roof slab & upstand	m³	90		
5.2.3.4		Columns with bases	m³	15		
5.2.3.5		Reservoir Inlet & Outlet chambers (as per Drawing J31204/302)	m³	30		
	8.4.3	Strength concrete: 15 MPa/19 mm				
5.2.3.6	PSG 8.2.8	Minimum thickness 50 mm blinding layer to chambers and encasements	m³	7		
	8.4.3	Strength 25MPa/19mm concrete				
5.2.3.7		25MPa/19mm concrete to benching	m³	5		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
5.2.3.8		Water meter, Off-take and Isolation valve chambers (as per Drawing J31204/008)	m³	30		
5.2.4	8.4.4 PSG 8.4.4	UNFORMED SURFACE FINISHES				
		(a) Wood-floated finish (to degree of accuracy II)				
5.2.4.1		Reservoir roof	m²	170		
5.2.4.2		Invert to reservoir sump	m²	4		
5.2.4.3		Top of upstand	m²	7		
		(b) Steel-floated (to degree of accuracy II)				
5.2.4.4		Top of reservoir Wall	m²	18		
5.2.4.5		Top Reservoir Floor Slab & Footing inside	m²	5		
5.2.4.6		Top of column Bases	m²	12		
5.2.5	8.5 PSG 8.5.1	JOINTS				
5.2.5.1		1) Expansion Joints in reservoir floor against wall footing (as per drawings J31204/303) measured by the total lengths of expansion joints complete with 250 mm wide x 2mm thick hypalon bandage but excluding the 2mm aluminium strip with 50mm wide backing bondage breaker, 250mm rearguard waterstop and Closed cell Polyethylene 100kg/m or 30mm	m	70		
		a) 250 mm wide x 2mm thick hypalon bandage				
		b) 2mm aluminium strip with 50mm wide backing bondage breaker				
	PSG 3.11.2	c) 250mm rearguard waterstop as per detail on drawings				
		d) Closed cell Polyethylene 100kg/m or 30mm closed cell high density void former				
5.2.5.2		2) Contraction joints in reservoir floor (as per drawing J31204/303) measured by the total lengths of contraction joints complete with 200mm wide x 2 mm thick hypalon bandage or similar approved. a) 200mm wide x 2 mm thick hypalon bandage or similar approved	m	45		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
	PSG 3.11.2	b) 250mm rearguard waterstop with centre bulb				
5.2.5.3		3) Construction joints in reservoir walls (as per drawing J31204/303) measured by the total lengths of construction joints complete with 150mm wide Lanko Bandage or similar approved applied to construction joints and reservoir walls(excluding150mm wide by 1.6mm thick mild steel strips, hot dip galvanized GI waterstop)	m	70		
	PSG 3.11.2	a) 150mm wide by 1.6mm thick mild steel strips, hot dip galvanized GI waterstop				
		b) 150mm wide Lanko Bandage or similar approved				
5.2.5.4		4) Isolation Joints in reservoir (as per drawing J31204/303) measured by the total lengths of isolation joints complete with:	m	70		
		a) 10mm Jointex or softboard				
	PSG 3.11.4	b) 10x10mm polysulphide sealant to SABS 1077				
5.2.6		MISCELLANEOUS CONCRETE ITEMS				
5.2.6.1	PSG 3.11.4	500 micron plastic bond breaker over no-fines concrete under reservoir floor	m²	47.5		
5.2.6.2	PSG 8.18	Neoprene (Kilcher or similar approved) Teflon sliding bearing type 3T50/75	m	48		
5.2.6.3	PSG 8.19	Polyurethane seal between reservoir roof and walls	m	49		
5.2.6.4		Precast 220x70 deep x790 long saddleback Deranco coping (or similar approved) to reservoir roof complete installation including casting shuttering and placing on mortar.	m	48		
5.2.6.5		Concrete planks to reservoir over outlet manhole to reservoir.	No	4		
5.2.6.6		Cast in situ standard 1000mm wide v-channelling around reservoir perimeter on 200gm/m2 needle punched geotextile around resevoir perimeter (see standard detail drg)	m	70		
5.2.6.7		200gm/m2 needle punched geotextile (1m width)	m²	70		
5.2.6.8	PGW5.28	Cleaning and sterilizing reservoir and associated pipework	Sum	1		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
5.2.6.9		Filling reservoir with water. Rate to include carting of water from source identified by Contractor.	sum	1		
5.2.6.10	PSG8.15	Reservoir Watertightness test including reservoir roof	sum	1		
5.2.6.11		Supply and install "Pultrude" type fibreglass 25 deep 36x36 grating panel 650x1000mm	No	1		
5.2.6.12		150mm dia glvanised outlets, cut from a 150mm dia pipe with metal guaze vermin proof (GALVANISED AFTER FABRICATION) as per detail on the drawings (300mm long)	No	18		
		Manhole items				
5.2.6.13		Concrete cover slab without manhole,including lifting hooks and air vents.	No	1		
5.2.6.14		Concrete cover slab complete with manhole frame cast in, including lifting hooks and air vents. Note payment of cast iron manhole frame and cover paid seperately	No	1		
5.2.6.15	PSG 8.16 (c)	"Calcimite" or similar approved step irons general purpose to BS1247:1975	No	10		
5.2.6.16	PSG 8.16 (a)	900x600 GMS hinged manhole cover (lockable) and frame to suit as per detail drawing J31204/303 complete.	No	2		
5.3	SANS 1200 HA	RESERVOIR STRUCTURAL WORK				
5.3.1		STRUCTURAL STEELWORK				
	8.3.1	Supply, fabricate, deliver and install steelwork,to the finishes/coatings specified in the specification and on the drawings				
		Access ladders with Cage				
5.3.1.1		Internal 3.5m high ladder to reservoir as per drawings. Stainless steel grade 316L	No	1		
5.3.1.2		External 3.2m high GMS ladder to outer wall of reservoir as per drawings (HD Galvanised)	No	1		
5.3.1.3		2m high GMS ladder to inlet & outlet chambers as per drawings	No	2		
		Reservoir and Chambers' roof elements				
5.3.1.4		50mm diameter sleeved holes in reservoir roof for level control equipment as shown on the drawing.	No	4		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
5.3.1.5		100mm diameter sleeved holes in reservoir roof for sampling equipment (As required).	No	2		
5.3.1.6		Supply and install GMS 900x600 lockable cover (reservoir roof) as per drawing J31204/303.	No	2		
5.3.1.7	PSG 8.16 (a)	Supply and install 900x600 GMS hinged chamber cover and frame to outlet, meter and off-take chambers as per standard detail drawing J31204/303 complete.	No	3		
	PSG 8.16 (b)	*Air Vents*				
5.3.1.8		GMS DN150 reservoir ventilators as per detail on drawing J31204/303.	No	4		
		Wall-Brackets for inlet pipe as per drawing J31204/303.				
5.3.1.9		100x100x10mm thick end plate welded to 50mm dia pipe fixed to concrete with 4 No. M12 s/s bolts	No.	4		
5.3.1.10		1 No. M20 stainless steel bolt grade 8.8	No.	4		
5.3.1.11		1 No. M16 s/s bolt	No.	4		
5.3.1.12		50mm dia pipe 4mm wall thickness	No.	2		
5.4	**SANS 1200L**	**RESERVOIR PIPEWORK**				
5.4.1	**8.2.5**	**INLET, OUTLET, SCOUR & OVERFLOW SPECIALS AND FITTINGS**				
		All pipework to be epoxy coated and lined galavanised mild steel, 4mm wall thickness.				
		OUTLET				
5.4.1.1		P2: DN300 PN16 flanged double off-set butterfly valve with gearbox and handle wheel	No.	1		
5.4.1.2		P3: DN300 dismantling joint	No.	1		
5.4.1.3		P4: DN300 epoxy coated and lined mild steel pipe flanged PN16 one end and plain-ended the other, with DN100 flanged PN10 branch. Pipe barrel to be 1800mm f/plain end. Branch to be located 500mm C/Plain-end and extending 350 mm C/F	No.	1		
5.4.1.4		P5: DN100 RS gate valve flanged PN10 with non-rising spindle and handwheel	No.	1		
		CARRIED FORWARD				

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SECTION: 5 1 ML DALAGUBA RESERVOIR

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
5.4.1.5		P6: DN100 multi-orifice anti-shock air valve as specified	No.	1		
5.4.1.6		P8: DN300 uPVC PN16 flange adaptor to suit spigot & socket uPVC pipe	No.	1		
		OVERFLOW				
5.4.1.7		P9: DN300 epoxy coated and lined mild steel pipe,buttressed flanged PN16 one end and DN450 bellmouth with 4 no. anti-vortex baffles the other end. 2850mm f/bellmouth.	No.	1		
		SCOUR				
5.4.1.8		P12: DN150 clockwise closing non-rising spindle flanged wedge gate valve to SANS 664.	No.	1		
5.4.1.9		P13: DN150 Epoxy coated and lined mild steel short radius 90° bend. Flanged PN10 one end and plain ended the other end with standard c/f dimensions.	No.	1		
		INLET				
5.4.1.10		P14: DN150 epoxy coated and lined mild steel puddle pipe, flanged PN16 both ends. Pipe barrel to be 600mm f/f with puddle flange 300mm from plain end.	No.	1		
5.4.1.11		P15: DN150 epoxy coated and lined mild steel 90° short radius bend, flanged PN16 both ends, 150mm c/f and 2800mm c/f.	No.	1		
5.4.1.12		P16: DN150 epoxy coated and lined mild steel pipe with 45° short radius bends each end, flanged PN16 both ends, length to suit.	No.	1		
5.4.1.13		P17: DN150 x DN200 epoxy coated and lined mild steel concentric reducer flanged each end 600mm long, PN16.	No.	1		
5.4.1.14		P17A: DN200 PN16 uPVC flange adaptor.	No.	1		
5.4.1.15		P18: DN150 Amanziflow Projects design diaphragm valve.	No.	1		
5.4.1.16		P19: DN150 Maric flow control valve.	No.	1		
5.4.1.17		P20: DN150 Epoxy coated and lined mild steel straight pipe flanged PN16 both ends 1730F/F.	No.	1		
5.5	SANS 1200L	VALVE ASSEMBLIES: STEEL FITTING				
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
		Off-take and Isolation valve chamber assembly (all fittings, specials and flange drillings PN 16), ref drawing J31204/008				
5.5.1		IV1: DN200 flange adaptor to suit uPVC pipe.	No	2		
5.5.2		IV2: Supply and install DN200 flanged Resilient seal gate valve with hand wheel.	No	1		
5.5.3		IV3: Supply and install DN200 VJ flange adaptor.	No	1		
5.5.4		IV4: Supply and install epoxy coated and lined mild steel DN200 pipe, flanged one end and plain ended the other.	No	1		
5.5.5		IV5: Supply and install DN200 X DN200 epoxy coated & lined gusseted equal tee Piece, Flanged PN16 all round. Complete with Temporary PN16 uncoated blank flange (drilled to suit). Water meter chamber assembly (all fittings, specials and flange drillings PN 16), ref drawing J31204/008	No	1		
5.5.6		WM1: DN200 flange adaptor to suit uPVC pipe.	No	2		
5.5.7		WM2: Supply and install DN200 x DN100, epoxy coated and lined mild steel mild steel, flanged eccentric reducer.	No	2		
5.5.8		WM3: Supply and install epoxy coated and lined mild steel, 950mm long DN100 pipe, flanged one end and plain ended the other.	No	1		
5.5.9		WM4: DN100 flanged coupling adaptor	No	1		
5.5.10		WM5: Epoxy coated WOLTMANN-TYPE flanged mechanical flow meter.	No	1		
5.5.11		WM6: Supply and install epoxy coated and lined mild steel, 950mm long DN100 pipe, flanged both ends.	No	1		
5.6	SANS 1200L	VALVE CHAMBERS				
	SABS 1200DA	RESTRICTED EXCAVATION IN ALL MATERIALS FOR WATER METER, OFF-TAKE AND ISOLATION VALVE CHAMBER				
5.6.1		Site clearance	m²	20		
5.7		Excavation	m³	44		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
5.8	8.2.13	1) Water meter chamber complete with formwork, concrete, blinding, screed, reinforcement and all items as shown on the drawing (excluding pipework and pipe fittings), ref Drawing J31204/008.	No.	1		
5.9		2) Off-take and Isolation valve chamber complete with formwork, concrete, blinding, screed, reinforcement and all items shown as on the drawing (excluding pipework and pipe fittings), ref Drawing J31204/008.	No.	1		
5.9.1	PSL 8.2.6	SUBSOIL DRAINAGE (Reservoir)				
		Supply and lay (as detailed on drawing J31204/303):				
5.9.1.1		Sand compacted to 100% Mod AASHTO	m^3	30		
5.9.1.2		19mm crushed stone to reservoir perimeter	m^3	45		
5.9.1.3		200gr/m^2 needle punched geofabric to subsurface drains (bidim)	m^2	150		
5.9.1.4		110mm diameter class 4 slotted drainage pipe complete with all fittings. i.e. elbows, endcaps and tee connections to suit details on the drawings	m	75		
5.9.1.5		25mm proprietary drainage void former using premoulded HDPE or Similar Approved	m^2	200		
5.10		RESERVOIR ACCESS ROAD				
5.10.1	SANS 1200DM	EARTHWORKS (ROADS, SUBGRADE)				
	8.3.3b)	Road-bed preparation and compaction of material				
5.10.1.1		Scarify and compact in-situ material and compact to 93% Mod AASHTO density in 150 mm layer (4m road width).	m^3	175		
		Extra over item 5.10.1.1 :				
5.10.1.2		Process in-situ material with Lime stabiliser	m^3	300		
5.10.2	SANS 1200MF	WEARING COURSE				
5.10.2.1	8.3.3a)	Import G5 wearing course material,place and compact to 95% Mod AASHTO in a 150mm layer	m^3	300		
		CARRIED FORWARD				

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ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
5.11		MISCELLANEOUS				
5.11.1	1200DK	GABIONS AND PITCHING				
5.11.2	8.2.1a	Surface preparation for bedding of gabions with approved excavated material	m²	10		
5.11.3	8.2.2	1mx1mx2m Gabions	m³	6		
5.11.4	8.2.2	230mm thick reno mattress	m²	10		
5.11.5	8.2.4	200grm/m2 needlepunched geofabric	m²	20		
TOTAL FOR SECTION 5 CARRIED FORWARD TO SUMMARY						

CONTRACT: SCHEDULE
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SCHEDULE:
SECTION: 6 APPOINTED WORK FOR SMME

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		1 ML MAMFENGWENI RESERVOIR				
6.1	SANS 1200X	**RESERVOIR SITE WORKS**				
6.1.1		**RESERVOIR FENCING**				
6.1.1.1		Supply and install fencing around reservoir complete with gates (3 quotes from local contractors to be arranged)	Prov.Sum	1	393750	393750
6.1.2		Overheads, Charges and Profit on item 6.1.1.1 above for Management and Supervision related costs	%	393 750.00		
6.2	PSL 8.2.1	**SCOUR HEADWALLS**				
6.2.1		Construct headwall complete with 2.2m wide by 3m long stone pitched scour apron, see detail drawing J31204/304 and build-in DN600 concrete pipe	Prov.Sum	1	5500	5500
6.2.2		Overheads, Charges and Profit on item 6.2.1 above for Management and Supervision related costs	%	5 500.00		
6.3	SANS 1200L	**SCOUR, INLET & OUTLET PIPEWORK**				
6.3.1	PSL 8.2.1	Rates are to include for all pipe excavation, pipe bedding, backfilling, top soiling, supply, handle, install and commission pipeline complete with couplings and GMS nuts and bolts and corrosion protection (all bolted connections to be coated with Tectile mastic and bandaged with petrolatum saturated textile (Denso or equivalent)). The work shall include all material, installations and all other	Prov.Sum	1	177000	177000
6.3.2		Overheads, Charges and Profit on item 6.2.1 above for Management and Supervision related costs	%	177 000.00		
		1 ML MPANGELE RESERVOIR				
6.4	SANS 1200X	**RESERVOIR SITE WORKS**				
6.4.1		**RESERVOIR FENCING**				
6.4.1.1		Supply and install fencing around reservoir complete with gates (3 quotes from local contractors to be arranged)	Prov.Sum	1	420750	420750
6.4.1.2		Overheads, Charges and Profit on item 6.1.1.1 above for Management and Supervision related costs	%	420 750.00		

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 6 APPOINTED WORK FOR SMME

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
6.5	PSL 8.2.1	SCOUR HEADWALLS				
6.5.1		Construct headwall complete with 2.2m wide by 3m long stone pitched scour apron, see detail drawing J31204/304 and build-in DN600 concrete pipe	Prov.Sum	1	5500	5500
6.5.2		Overheads, Charges and Profit on item 6.2.1 above for Management and Supervision related costs	%	5 500.00		
6.6	SANS 1200L	SCOUR, INLET & OUTLET PIPEWORK				
6.6.1	PSL 8.2.1	Rates are to include for all pipe excavation, pipe bedding, backfilling, top soiling, supply, handle, install and commission pipeline complete with couplings and GMS nuts and bolts and corrosion protection (all bolted connections to be coated with Tectile mastic and bandaged with petrolatum saturated textile (Denso or equivalent)). The work shall include all material, installations and all other	Prov.Sum	1	158000	158000
6.6.2		Overheads, Charges and Profit on item 6.2.1 above for Management and Supervision related costs	%	158 000.00		
		1 ML DALAGUBA RESERVOIR				
6.7	SANS 1200X	RESERVOIR SITE WORKS				
6.7.1		RESERVOIR FENCING				
6.7.1.1		Supply and install fencing around reservoir complete with gates (3 quotes from local contractors to be arranged)	Prov.Sum	1	407250	407250
6.7.1.2		Overheads, Charges and Profit on item 6.1.1.1 above for Management and Supervision related costs	%	407 250.00		
6.8	PSL 8.2.1	SCOUR HEADWALLS				
6.8.1		Construct headwall complete with 2.2m wide by 3m long stone pitched scour apron, see detail drawing J31204/304 and build-in DN600 concrete pipe	Prov.Sum	1	5500	5500
6.8.2		Overheads, Charges and Profit on item 6.2.1 above for Management and Supervision related costs	%	5 500.00		
		CARRIED FORWARD				

CONTRACT: SCHEDULE
CONTRACT TITLE: 3 X 1ML RESERVOIRS AT MPANGELE, MAMFENGWINI AND DALAGUBA
SCHEDULE:
SECTION: 6 APPOINTED WORK FOR SMME

ITEM	PAYMENT REFERS	DESCRIPTION	UNIT	QUANTITY	RATE R	AMOUNT R
		BROUGHT FORWARD				
6.9	SANS 1200L	SCOUR, INLET & OUTLET PIPEWORK				
6.9.1	PSL 8.2.1	Rates are to include for all pipe excavation, pipe bedding, backfilling, top soiling, supply, handle, install and commission pipeline complete with couplings and GMS nuts and bolts and corrosion protection (all bolted connections to be coated with Tectile mastic and bandaged with petrolatum saturated textile (Denso or equivalent)). The work shall include all material, installations and all other	Prov.Sum	1	174000	174000
6.9.2		Overheads, Charges and Profit on item 6.2.1 above for Management and Supervision related costs	%	174 000.00		
TOTAL FOR SECTION 6 CARRIED FORWARD TO SUMMARY						

SUMMARY OF BILL OF QUANTITIES

		AMOUNT
SECTION 1	PRELIMINARY AND GENERAL	R……..…
SECTION 2	DAYWORKS, PROVISIONAL SUMS AND PRIME COST ITEMS	R……...……
SECTION 3	1 ML MAMFENGWINI RESERVOIR	R……...……..……
SECTION 4	1 ML MPANGELE RESERVOIR	R……...……
SECTION 5	1 ML DALAGUBHA RESERVOIR	R……...……

NETT TOTAL OF TENDER **R……**

ALLOWANCE FOR CONTINGENCIES (10% of Nett Total above) R……
(to be spent as the Engineer may direct and to be deducted in whole or in part it not required) ***(Note: Do not change %).***

TOTAL INCLUDING CONTINGENCIES **R……**

ALLOWANCE FOR VAT 15% R……..

GROSS TOTAL CARRIED TO PART C1.1 FORM OF OFFER & ACCEPTANCE

R……..

TIME FOR COMPLETION OF CONTRACT ***(not to exceed 32 weeks)*** **…… weeks**

SIGNED BY/ON BEHALF OF TENDERER

NAME	**SIGNATURE**	**DATE**

COMPANY STAMP

Declaration

(In respect of completeness of Tender)

O. R. TAMBO DISTRICT MUNICIPALITY
NELSON MANDELA DRIVE
MYEZO PARK
MTHATHA

I/we, the undersigned, do hereby declare that these are the properly priced Bill of Quantities forming Part C2 of this Contract Document in consecutive order upon which my/our tender for the **CONTRACT: ORTDM SCMU 36-22/23– ROSEDALE TO LIBODE REGIONAL WATER SUPPLY: COMPLETION OF CONSTRUCTION OF 3 X 1ML RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA** has been based.

C3 SCOPE OF WORKS

Status

Should any requirement or provision in the parts of the Scope of Work conflict with any requirement of any Specification(s) forming part of this contract or any drawings, the order of precedence, unless otherwise specified, is:

- Drawings
- Project Specifications (including amendments to standard and particular specifications)
- BoQ
- Particular Specifications
- Standard Specifications.

The above notwithstanding, any discrepancy shall be brought to the attention of the Engineer for clarification.

C3.1 Project Specifications

PS 1 PROJECT DESCRIPTION

PS1.1 PROJECT OVERVIEW

O. R. Tambo District Municipality is implementing Phase 3B of the Rosedale to Libode Water Supply Scheme. This phase focuses on village local reservoirs and reticulation networks to villages North and East of Libode Town along the R61 and outskirts.

The previous implementation phases had focused on construction of the Primary bulk water infrastructure from the planned Highbury WTW in Mthatha to command reservoirs in the Libode corridor and further pipelines and reservoirs to regional command reservoirs and local reservoirs.

PS 1.2 EMPLOYER'S OBJECTIVES

The employer's objectives are to deliver public infrastructure using labour intensive methods in accordance with the EPWP Guidelines.

PS 1.3 OVERVIEW OF THE CONTRACT

The Scope of Works for this Contract can be summarised as follows:

- Construction of 3x1Ml Reinforced concrete reservoirs at Mamfengwini, Mpangele and Dalagubha villages.

The Scope of Works can be summarised as follows:

- Establishment, clearing of the reservoir sites and re-establishing the platforms.
- Completion of the construction of one 1ML Mamfengwini, one 1ML Mpangele and one 1ML Dalagubha reinforced reservoirs.
  - Reservoir floors, bases, columns, walls and roofs to be cast in 35MPa/19 mm watertight concrete with an approved crystalline waterproofing concrete additive'
  - Concrete to be reinforced with High Tensile reinforcement ranging Y8 to Y25
- Construction of the inlet and outlet chambers
- Sealing of all reservoir floor and walls joints
- Manufacture of fittings, specials and bends using pipes supplied by the Contractor.
- Fencing of the Sites.
- Connecting the new reservoirs to the existing water services on-site.
- Training programs for local residents by approved Accredited Service Providers.
- Liaison with local community
- OH&S compliance.
- Environmental compliance and management including site rehabilitation.

PS2 THE SITE

PS 2.1 LOCATION

There are 3 locations for the 3 reservoirs planned. Their details are as follows

- Mamfengwini Reservoir (31^{O}30'50.87" S 29004'27.96" E)
- Mpangele Reservoir (31^{O}29'30.33" S 29003'06.12" E)
- Dalagubha Reservoir (31^{O}28'48.44" S 28058 '49.42" E)

PS 2.2 ACCESS

Mamfengwini

Mamfengwini can be accessed via R61 at Misty Mount West of Libode town. It 11 Km from the R61 on gravel road.

Mpangele

Mpangele can be accessed through the same roads as Mamfengwini but travel a further 8 km on the gravel road

Dalagubha

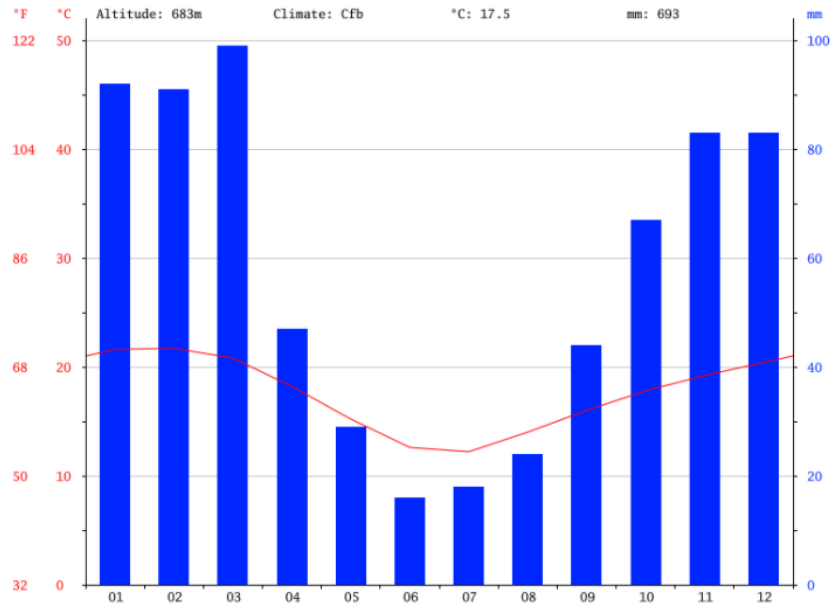
Dalagubha can be accessed via R61 East of Libode Town. It is located 5km from the R61 turn on a gravel road.

PS2.3 GENERAL CLIMATIC CONDITIONS

The general climatic conditions for Mthatha are as follows:

Altitude above sea level	: ~970 masl
Maximum temperature	: 40 ºC
Minimum temperature	: -2 ºC
Annual Average Temperature	: 17,5ºC
Annual Average Rainfall	: 693mm
Rainfall season	: Summer

CLIMOGRAPH MTHATHA



Precipitation is the lowest in June, with an average of 16 mm. With an average of 99 mm, the most precipitation falls in March.

PS 2.4 NATURE OF THE GROUND AND SUBSOIL CONDITIONS

All Geotechnical information is included in Annexure C3.5.1. X

The Tenderer is at liberty to excavate extra trial holes on site provided that he has made prior arrangement with the Employer's Agent and the community, and provided that he accepts responsibility for any damage that may result there from.

PS 2.5 LOCATION OF CONTRACTORS CAMP AND DEPOT

The Contractor will find a suitable location for site camp with the help of local community and Authorities.

PS 2.6 SITE FACILITIES EXISTING AND/OR PROVIDED BY THE EMPLOYER

PS 2.6.1 Water supply

The O. R. Tambo District Municipality is the Water Supply Authority. The Contractor shall therefore make his own arrangements for ensuring an adequate supply of water for construction; including provision of on-site storage of sufficient capacity to allow uninterrupted construction.

Any water required for water testing shall be provided by the Contractor and the costs will be deemed to be included in the scheduled rates.

PS 2.6.2 Power supply

ESKOM is the Electrical Supply Authority. The Contractor shall make his own arrangements for a metered offtake for the supply of electricity for construction purposes.

PS 2.6.4 Ablution facilities

There are no existing ablution facilities for the Contractors use on site. The construction and use of temporary septic tanks and soak-aways (or the like) will not be permitted.

PS 2.6.5 Accommodation

No accommodation for the Contractor's employees will be permitted on site. The Contractor shall make his own arrangements to house his employees and transport them to and from Site.

No informal housing or squatting will be allowed.

PS 2.7 SITE FACILITIES REQUIRED

PS 2.7.1 Facilities for the Employer's Agent

The Contractor shall provide two offices for the exclusive use of the Employer's Agent and his staff plus a third office for exclusive use of the Employer's inspectors (to be consistent with PSAB 3.2, which specifies a separate second office for the use of the Employer's inspectors) and a toilet (refer to section PSAB). The Contractor shall also provide a desk for the CLO in one of his/her offices.

Survey equipment according to clause PSAB6 shall be supplied and maintained for the Employer's Agent's use.

Four covered parking bays will be made available for exclusive use of the Employer's Agent and the Employers Inspectors.

PS 2.7.2 Nameboards

The Contractor shall supply and erect at approved sites two nameboards (as per Figure 1 included in Volume 2) at the commencement of the contract and shall maintain them for the duration of the construction period. The Contractor is to remove the nameboards at the end of the contract.

The location of the nameboards will be confirmed by the Employer's Agent.

PS 2.7.3 Facilities for Construction Waste

The Contractor shall make his own provisions for the collection, storage and disposal of all construction waste (i.e. whether it be in the camp or on the construction site); all in conformance with the Environmental Management Plan and with approval of the Employer's Agent, the Local Authority and the Environmental Officer. Payment for the clearing, loading, transport, dumping fees and any other requirement or costs incurred shall be included in the scheduled rates.

PS 2.7.4 Sanitary Facilities

The Contractor shall provide suitable and adequate portable chemical latrines for his employees and his sub-contractors. Latrines shall be provided at suitable positions throughout the site and shall be maintained by the Contractor in a clean and sanitary

condition to the Employer's Agent's satisfaction. The use of latrines shall be enforced and fouling of the site will not be tolerated.

PS 2.8 SECURITY

The Contractor may be exposed to criminal actions, including theft and vandalism, and shall make all his own necessary security arrangements for the duration of the Contract.

The Contractor shall be responsible for taking all reasonable measures to ensure that effective access control and integrity of the waterworks site perimeter fence is maintained for the full duration of construction.

PS 2.9 EXISTING SERVICES

PS 2.9.1 General

The proposed water treatment works is located on a 'greenfields' site and there are no existing services within the waterworks site perimeter. There may be small-bore water reticulation pipes crossing the external access road that is to be upgraded under this Contract.

PS 2.9.2 Known services

The positions of all existing pipelines and electrical supply cables will be pointed out to the Contractor on site.

PS 2.9.3 Treatment of existing services

The Contractor shall ensure that none of the existing services are damaged during the implementation of this Contract.

PS 2.9.4 Damage to services

The Contractor shall be responsible for any damage to (known and unknown) services.

PS 2.9.5 Proving Underground Services

The Contractor shall take all reasonable steps to ensure that overhead LV powerlines and buried local water reticulation pipelines are identified and protected before construction of the external access road commences.

Where services can reasonably be expected to exist where excavations for road and associated stormwater infrastructure are to take place, the Contractor shall, without instructions from the Employer's Agent, carefully excavate by hand to expose and prove their positions.

Should any service be damaged by the Contractor in carrying out the works and should it be found that the procedure as laid down in this clause has not been followed then all costs in connection with the repair of the service will be to the Contractor's account.

PS 2.P.6 Reinstatement of services and structures damaged during construction

The Contractor shall reinstate all damaged structures and services to their original state.

PS 2.9.7 Temporary Works

All excavations shall be demarcated in conformance with the requirements of the OH&S specification.

As this Contract involves the construction of large structures, each inside its own deep excavation, it is a particular requirement of this Contract that any such excavation that is

to remain open for longer than 1 month and involves temporary embankments steeper than 1:2 and is deeper than 1,5m shall be barricaded with a 1m high barrier fence comprising, at least, 75mm wooden fencing posts at 2,5m centres and buried at least 500mm deep and with 3 strands of 1,6mm high-tensile fencing wire and stayed straining posts at all changes of direction and at 20m intervals along straight runs. The costs of such barriers will be deemed to be included in the tendered rate for working space (see PSD 8.1.4: Restricted excavation: Provision for working space and access ramps).

PS 2.10 DEALING WITH WATER

The Contractor shall manage and dispose of water, whatever its origin, on the site so that the works are kept sufficiently dry for their proper execution.

The Contractor shall ensure that:

a) All earth platforms are kept free-draining

b) Where it is not practically possible to make deep excavations free-draining, diversion berms are constructed to divert stormwater runoff from entering the excavations and all standing water will be removed as soon as possible after each rain event. This also applies to the scour and sludge ponds

c) Keep all completed works properly drained

d) Not inhibit surface drainage

e) Protect all parts of the Works against damage and erosion caused by rain and surface water.

It should be noted that the soft material soil overlaying the whole site readily reduces to soft mud in wet weather and, if working areas are not temporarily covered with a layer of less-weathered mudstone from on-site excavations, it is impassable to non 4-wheel-drive vehicles in its wet state. The Contractor is at liberty to make use of excavated material classified as 'intermediate' (which otherwise is to be disposed of) for his own use to stabilise working areas. No separate payment, nor overhaul to spoil, will be measured for payment for 'own use' of intermediate material.

PS 2.12 ACCOMMODATION OF TRAFFIC

The Contractor will be required to make provision for the accommodation of traffic whilst upgrading the external access road.

PS 2.13 DISPOSAL OF NON-NATURAL WASTE MATERIAL

The Contractor shall remove all non-naturally occurring waste material generated by his construction activities from Site and dispose of same in a manner approved of by the Employer's Agent, the Local Authority and the Environmental Officer. Payment for the clearing, loading, transport, dumping fees and any other requirement or costs incurred shall be included in the scheduled rates.

All natural excavated material to be disposed of shall be transported to the designated spoil site (see PSC 3.1: 'Disposal of material' and PSD 5.2.2.3: 'Disposal').

PS 3 COMMUNITY LIAISON

PS 3.1 TERMS OF REFERENCE FOR THE COMMUNITY LIAISON OFFICER (CLO)

The Contractor shall make allowance for the employment of a CLO in accordance with the following Terms of Reference (ToR):

a) The Community Liaison Officer (CLO) will be responsible to the Project Steering Committee (PSC), who will be involved in the appointment of the CLO.

b) The CLO should be the person with a good standing and respect in the local community and would be selected according to the set criteria by the District Municipality.

c) Inputs from ISD Consultant, PSC, Ward Councillor and selected local leadership will be instrumental in the appointment of the CLO.

d) The CLO is appointed for the period of physical construction, plus a period of 14 days prior to this period. The period will include times where small team works are busy in the area e.g. chambers, standpipes and reservoirs. The period will end when no further work is required.

e) The contractor will provide office space and stationery for the CLO to carry out his / her duties.

f) Remuneration for the CLO will be R 5 000 wages plus R300 cell phone allowance per month for the period of employment.

g) Where the CLO is engaged for part of the month, they shall be paid an equivalent daily amount. The unit for measurement shall be the man-month of CLO employment.

h) A CLO who fails in their responsibilities may be replaced in consultation with the PSC and ISD consultants.

PS 3.2 CLO ROLE AND RESPONSIBILITIES

a) The CLO will liaise with the Contractor in performing the following activities:

- Organise and assist the contractor in explaining to all workers the labour-based construction model
- Ensure labourers understand their task and the principles behind task work
- Ensure labourers are informed of their conditions of temporal employment
- Attend all site meetings and briefing for work procedures
- Keep written record of interviews and community liaison which should be summarised and included in the monthly progress reports
- Collect monthly welfare reports and submit to social facilitators
- Ensure that contractor’s workers are paid what is due to them and in time
- Assist in the recruitment of labour
- Promote and maintain sound relations with community stakeholders and other role players
- Screen the supplied labour by the community through Project Steering Committees to ensure compliance with the agreed upon recruitment policy and the government’s labour employment targets
- Inform local labour about their conditions of temporary employment, to ensure their timeous availability and inform them timeously when they would be relieved, where the rotation of labour is applicable
- Keep the labour register of labour and manage records of project local labourers and be able to provide reports on employment statistics
- Consult on all decisions regarding local problems and any matters of importance that, in any way will be of relevance to the Contract.
- To be on site on a daily basis

- To register concerns / perceptions and raise them in the PSC meetings
- Attend site and PSC meetings to present monthly report on the local community labour involvement and site matters
- Identify possible labour dispute and any disciplinary matter and advise the site agent / foreman and assist in the resolution, where necessary must call for the assistance of the Social Consultant for the resolution of the conflicts
- Assist the contractor in preparing records of project employees. Assist the contractor in making task measurements and the records thereof
- Monitor the production of individual task workers and arrange replacement of those workers who fail to produce a reasonable task output
- Attend disciplinary proceedings to ensure that hearings are fair and reasonable
- Communicate daily with the contractor to determine additional labour requirements with regard to numbers and skills and pass this to the PSC
- Attend weekly meetings with the contractor and make a weekly written report which shall be a prerequisite to being paid.

b) The CLO will liaise with the Social Facilitators in performing the following activities:

- Assist in convening of workshops
- Disseminate information to PSC members
- Articulate implementing agency policies to PSC members
- Communicate labour requirements
- Attend induction training programmes for workers and induct labourers
- Submit monthly welfare reports to the social facilitators PSC
- Communicate labour and skills requirements to the PSC
- Assist in the recruitment and engagement of work force
- Verify labour records and ensure all engaged qualify as per the Contract requirements
- Investigate and report all labour dispute matters to the PSC, advise site agent on resolution.

PS 3.3 CONTRACTOR - COMMUNITY ENGAGEMENT

The residents of each village being served by the scheme are represented by a PSC. All liaisons with the community and the committees are the responsibility of the Social Facilitator in conjunction with the O. R. Tambo District Municipality, the Employer and the Project Steering Committee. The Contractor will be required to liaise through them for any matters to do with the community.

PSPS 4 CONTRACT PARTICIPATION GOALS (CPG) & THE LOCAL COMMUNITY

PS 4.1 GENERAL

The human resources of the local community are generally underdeveloped, underutilised and underemployed. The Contract Participation Goals set for Targeted (local) Labour and Targeted (local) Enterprises are to encourage both skills and economic development by requiring a minimum level of local resources participation on all construction work in the O. R. Tambo District Municipal (ORTDM) area of jurisdiction. Details are given in Part C1: Contract Data and the CPG Returnable Schedules.

It is therefore a condition of Contract that the Contract Participation Goals set for Targeted Labour and Targeted Enterprises (minimum percentages of the value of work executed) are achieved. The measure of Targeted Labour Participation comprises the sum of wages and salaries paid to all locally-based (ORTDM) South African Citizen residents for any work done on this Contract (irrespective of level of skills, race, gender or who they are employed by). The measure of Targeted Enterprise Participation comprises the sum of monies paid by the Main Contractor to all locally-based (ORTDM) enterprises irrespective of race or gender of the enterprise ownership).

Ps 4.2 LABOUR-INTENSIVE WORKS

Labour-intensive works shall be constructed using local workers who are temporarily employed in terms of the Scope of Work.

Labour Intensive Competencies of Supervisory And Management Staff

Table 1: Skills programme for supervisory and management staff

Personnel	**NQF level**	**Unit standard titles**	**Skills programme description**
Foreman / Supervisor	**4**	Implement Labour-Intensive Construction Systems and Techniques.	This unit standard must be completed, **and**
		Use Labour-Intensive Construction Methods to Construct and Maintain Roads and Stormwater Drainage	any one of these 3 unit standards
		Use Labour-Intensive Construction Methods to Construct and Maintain Water and Sanitation Services	
		Use Labour-Intensive Construction Methods to Construct, Repair and Maintain Structures	
Site Agent / Manager (i.e. the contractor's most senior representative that is resident on the site)	**5**	Manage Labour-Intensive Construction Processes	Skills Programme against this single unit standard

- Identified subcontracting scope should be included in the Scope of Work including the minimum number of SMMEs that comply with PPPFA Treasury Regulation 17.
- Estimated number of work opportunities to be included in the tender document.

PS 4.3 EMPLOYMENT OF THE LOCAL COMMUNITY

It is a requirement that, at least, all unskilled labour taken-on by the Main Contractor and his sub-Contractors are sourced from the local community and that such employment is arranged through the CLO and PSC.

PS 4.4 CONDITIONS OF TEMPORARY EMPLOYMENT

Employment of all temporary labour, whether employed directly or through a Subcontractor, shall comply in all respects with the National Government Department of Labour's regulations; including the minimum wage applicable to construction work in the Eastern Cape.

PS 4.5 CERTIFICATE OF SERVICE

An employee shall, upon termination of his services, be entitled to a Certificate of Service showing the full names of his employer (ie. the Contractor) and the employee, the type of work done by the employee, the date of commencement, a record of training received and the date of termination of his services.

PS 5 DESIGN OF THE WORKS

PS 5.1 DESIGN SERVICES AND ACTIVITY MATRIX

The design responsibility for the Works is as per Clause 4.2 of SANS 1921-1 and GCC 4.1.1. Where conflict arises, the Project Specifications take precedence.

The Design responsibilities are as follows:

Design Process	Responsibility
Concept, feasibility and overall process	Employer Responsible
Basic engineering and detail layout to tender stage	Employer/ Employer's Agent Responsible
Final design to approved for construction stage	Employer/ Employer's Agent Responsible
Temporary works	Contractor Responsible
Preparation of as-built drawings	Contractor Responsible

The extent of the Employer's Agent's design is shown on the layout plans.

PS 5.2 CONTACTOR'S DESIGNS

The Contractor will be responsible for the design of all temporary works and all construction methods, all shoring and lateral support that may be required. The Contractor will also be responsible for the preparation of method statements before commencing with construction.

PS 5.3 DRAWINGS

The drawings issued to Tenderers as part of the Tender Document shall NOT be used for construction.

The work shall be carried out in accordance with the latest available revision of the drawings to be issued by the Employer's Agent for construction. At commencement of the Contract, the Employer's Agent shall deliver to the Contractor three sets 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's Agent may issue further drawings or revisions for construction purposes as may be necessary for adequate construction and completion of the works and defects correction.

The drawings issued separately for tender purposes are listed in Part C3.5: Annexures.

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

PS 6 MANAGEMENT OF THE WORKS

PS 6.1 RIGHT OF ACCESS TO SITE

The Contractor will be given uninterrupted access to the site for the duration of the Contract.

PS 6.2 OTHER CONTRACTORS ON SITE

It must be noted that, at the latter stages of the Contract, the site may be shared with the Stage 2 Civils Contractor. The intention is that the interlinking pipework (in and around the Stage 1 structures) and associated minor structures are only started once Certificate of Completion for Stage 1 is issued. If the Stage 2 Civils contractor is on-site before this date, their activities will be confined to the clear water reservoirs and pumpstation etc. such that there is minimal disturbance to the Stage 1 Contractor.

A payment item has been included in the Schedule of Quantities for any costs arising from shared access and cooperation.

PS 6.3 MEETINGS

The Contractor shall attend the following meetings during the Contract:

a) An inaugural site meeting at the GIBB offices or as called by the Employer's Agent

b) Monthly site meetings, at GIBB offices and on Site or as called by the Employer's Agent, from the commencement of the Works until the issue of the Practical Completion Certificate

c) Monthly technical meetings called by the Employer's Agent

d) Meetings during the Defects Notification Period called by the Employer's Agent (only if warranted)

e) The following reports shall be submitted by the Contractor before the monthly Site Meetings:

- Progress Report
- Plant & Labour returns
- Updated Programme vs Baseline Programme
- Updated cashflow projection.

PS 6.4 MONTHLY REPORTING TO ACCOMPANY PAYMENT CLAIMS

It is a specific requirement of this Contract that the Contractor shall collect and record all relevant information for the completion of end-of-month documentation to be submitted with each payment claim. The Payment Certificate (prepared by the Employer's Agent) will not be accepted by the Employer unless accompanied by the following:

- Local Labour Schedule (in EPWP format; ie giving employee names, IDs, gender, age group and disability status if applicable)

- Contract Participation Goal expenditure to date vs target (details of labour wages and salaries paid and payments to Targeted Enterprises vs value of work certified to date)

- Monthly Progress Report (from Site Meeting).

PS 6.5 WORK OUTSIDE NORMAL WORKING HOURS

Should the Contractor wish to work outside normal working hours (as defined in the Contract Data) for any reason, he shall first seek permission to do so from the Employer's Agent. Attending to emergency situations or making-safe the Works are exempt from requiring prior approval, but notification shall still be sent to the Employer's Agent.

PS 6.7 PLANNING, PROGRAMMING AND REPORTING

PS 6.6.1 Progress Reporting

The Contractor shall review his progress each month and should progress lag behind the latest accepted programme, by more than 2 weeks, he shall submit a revised programme and method statement of how he proposes to make up the lost time. If, in the opinion of

the Employer's Agent, such revised programme will not make up the lost time, the Employer's Agent shall have the right to request the Contractor to reorganize his work in a manner which will ensure an acceptable programme. Claims for additional payment to meet any costs incurred due to such reorganisation will not be accepted.

PS 6.6.3 Programming Restrictions

The Contractor shall take cognisance of the following when programming his activities:

a) Site handover will only take place once all the necessary documentation (details given in Contract Data) has been submitted and approved and an introductory meeting with the local community has been held. The latter is arranged by the Employer's Agents.

b) As specified in the Contract Data, the Time for Completion is limited to a maximum of 18 months (extensions of time granted for whatever reason notwithstanding).

PS 6.6.3 Programme Format

Programmes shall be submitted in Microsoft Project format in hardcopy and softcopy.

PS 6.6.4 Programme Content

The Contractor's programme shall show:

a) the various activities, related to a time scale, for each element of the Works, including those of Nominated and/or Subcontractors, in sufficient detail to be able to assess construction progress,

b) critical path activities and their dependencies,

c) Key dates in respect of work to be carried out by others,

d) Key dates in respect of information to be provided by the Employer's Agent and/or others.

PS 6.6.5 Revised Programme

If during the course of the contract, the execution of the work deviates in any manner from the programme, the Contractor shall, on instruction by the Employer's Agent, within one week of such instruction submit a revised programme.

Should such a revision be as a result of the Contractor falling behind with his work, the programme shall clearly show the steps to be taken in order to rectify the situation so as to enable the contract to be completed within the accepted contract period. Such a programme shall be accompanied by positive steps to increase production through increased resources, or the more efficient usage of existing resources.

PS 6.7 DAILY RECORDS

The Contractor shall keep daily records of their staff, equipment, weather conditions, activities in progress, any delays, requests for information, day works, plant breakdowns, etc. These daily records shall be signed by the Contractor and Employer's Agent Representatives.

PS 6.8 RECORDING OF WEATHER

For the purposes of this Contract, a standard rain gauge shall be installed and maintained on Site for the duration of construction. Readings shall be taken at the commencement of construction each day and submitted to the Employer's Agent at the end of each week.

PS 6.9 EXTENSION OF TIME RESULTING FROM ABNORMAL WEATHER (GCC 2015-CLAUSE 5.12.2.2)

Extension of time will not be considered for normal adverse weather conditions. For abnormal rainfall or saturated conditions will be calculated as follows:

a) The Contractor shall, in his programme, allow for the expected number of working days on which work on critical path activities could be delayed – as given in the Schedule below.

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

- A delay caused by abnormal weather conditions will only be accepted for extension of time if, in the opinion of the Employer's Agent, it delays an item or items which lie on the critical path determined by the Contractor's approved programme (irrespective of actual rainfall).
- An extension of time will be granted for the number of days, as approved, on which adverse weather conditions delay critical path activities, less the anticipated number of days given in the Schedule below.
- The net extension of time determined for each month, which may be negative, shall accumulate algebraically to determine the net number days for extension of time due to abnormal weather conditions, but a negative total at the end of the Completion Period will not be taken into account.
- Where a portion of a month is involved, a pro rata number of days shall be calculated.

The anticipated number of working days on which work on critical path activities will be delayed as a result of adverse weather conditions are as follows:

Month	Days	Month	Days
January	3	July	0
February	3	August	1
March	4	September	2
April	2	October	2
May	1	November	3
June	0	December	3

PS 6.10 WAYLEAVES, PERMISSIONS AND PERMITS

Notwithstanding that the Employer's Agent may have obtained all the necessary wayleaves, permissions and permits applicable to working near any existing services or other infrastructure on Site, the Contractor is responsible for abiding by the safety and other conditions imposed by such wayleaves, permissions and permits.

The Contractor shall ensure that all wayleaves, permissions and permits (furnished by the Employer's Agent) are kept on site and are available for inspection by the relevant services authorities on demand.

The Contractor shall also ensure that any wayleaves in respect of electricity services are renewed timeously every three months.

PS 7 CONSTRUCTION OF THE WORKS

PS 7.1 METHODS AND PROCEDURES

PS 7.1.1 Method Statements

Where requested in writing by the Employer's Agent, the Contractor shall submit Method Statements for constructing specific aspects of the Works. Such work shall not be started until the Contractor receives approval of the Method Statement in writing from the Employer's Agent.

PS 7.1.2 Quality Assurance System: Quality Management Plan and Quality Control Plan

The Contractor is required to have in place, and follow, an approved Quality Assurance System for the execution of this Contract. To this end, the Contractor shall submit his proposed Quality Management Plan (QMP) to the Employer's Agent for approval along with his up-front documentation required before the commencement of the Works. The QMP shall include the Contractor's proposed Quality Control Plan (QCP) which shows how conformance to the QMP is to be documented.

In addition to this, the Contractor is required to follow the Employer's Agent's Site Quality Control procedures which entails the following:

- Contractor's submission of Request for Inspection of Work;
- Employer's Agent's signing-off of 'hold points' at each stage of the work (thereby authorising the Contractor to proceed with the next stage of the work). This may take several iterations should the Employer's Agent require further work before signing-off. Work may not proceed on the next stage until the previous stage has been signed-off.

Claims for particular items of completed work for each interim Payment Certificate will not be certified for payment where the required sign-offs have not been obtained.

No claims for extension of time, nor any other form of compensation, will be entertained for delays in receiving the Employer's Agent sign-offs on 'hold points' where, in the opinion of the Employer's Agent, insufficient notice has been given to inspect and approve the Works. The default notice required is 48 hours.

The Contractor shall submit copies of all his conformance documentation to the Employer's Agent on a monthly basis and proof of recent calibration of all measuring devices that are to be used.

PS 7.2 FINISHING AND TIDYING

The Contractor is required to progressively and systematically finish and tidy the work as it proceeds. This will be monitored against the latest approved programme. The Employer's Agent shall have the right to not certify full payment of particular scheduled items where such items are largely complete, but finishing and tidying is deemed still outstanding.

Under no circumstances shall spoil, rubble, materials or equipment be allowed to unnecessarily accumulate on Site. If, in the opinion of the Employer's Agent, this is occurring, the Employer's Agent shall have the right to make an allowance for the estimated cost of rectifying the above by reducing particular measured quantities from claims being processed for payment.

PS 8 PREFERENTIAL PROCUREMENT PROCEDURES

PS 8.1.1 Resource Standard Pertaining to Targeted Procurement

- SANS 1914-1:2002 Targeted Construction Procurement Part 1 – Participation of Targeted Enterprises
- SANS 1914-2:2002 Targeted Construction Procurement Part 1 – Participation of Targeted Partners in Joint Ventures
- SANS 1914-3:2002 Targeted Construction Procurement Part 1 – Participation of Targeted Enterprises and Targeted Partners in Joint Ventures
- SANS 1914-4:2002 Targeted Construction Procurement Part 1 – Participation of Targeted Enterprises and Targeted Labour (local resources)
- SANS 1914-5:2002 Targeted Construction Procurement Part 1 – Participation of Targeted Labour
- SANS 1914-6:2002 Targeted Construction Procurement Part 1 – Participation of Targeted Enterprises in Concession Contracts

PS 9 SAFETY ON SITE

PS 9.1 OCCUPATIONAL, HEALTH AND SAFETY ACT 85 OF 1993 AS AMENDED BY THE OCCUPATIONAL HEALTH AND SAFETY AMENDMENT ACT OF 2014.

Contractors shall comply in all respects with the provisions of the Employer's OH&S Particular Specification given in Part C3.4. This is based on the above-mentioned Act and other applicable legislation.

It is specifically noted that the person officially appointed as the Contractor's Health and Safety Officer shall be properly qualified and experienced, be based full-time on Site and be dedicated solely to this Contract for the full duration of construction.

PS 9.2 SPECIFIC RISKS AND HAZARDS

Please refer to the Baseline Risk Assessment given in the Employer's OH&S Particular Specification. This highlights in particular the hazards associated with deep excavations for structures that need to remain open for an extended period. The Baseline Risk Assessment provided is not necessarily fully comprehensive and the Contractor is responsible for carrying out his own Baseline Risk Assessment.

PS 9.3 CONTRACTOR'S HEALTH AND SAFETY PLAN

The Contractor's Health and Safety Plan, prepared in accordance with the Employer's OH&S Particular Specification, shall be submitted to the Employer for approval. The Contractor shall not commence work before the Employer has approved the Health and Safety Plan in writing. Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to submit the safety plan timeously, shall not be used as a reason to claim for extension of time or standing time and related costs.

PS 10 ENVIRONMENTAL MANAGEMENT

The Contractor shall comply with the requirements of the Environmental Management Plan (given in Part C3.4: Particular Specifications) and the Environmental Authorisation (given in Part C3.5: Annexures).

C3.2 National Standard Specifications

C3.2.1 CONSTRUCTION

The Contractor is expected to provide for him/herself the necessary standards referred to in the Particular Specification bound in this document. The latest publication shall apply.

The following specifications apply to this project but are not included in this document.

These specifications may be obtained or viewed at SA National Standards (SANS)

The latest published issue of each standard at tender closing date shall apply.

South African National Standard Specifications – Civil

- SANS 1200 A - 1986 General
- SANS 1200 AB - 1986 Engineer's Office
- SANS 1200 C - 1980 Site Clearance (As amended 1982)
- SANS 1200 D - 1988 Earthworks (As amended 1990)
- SANS 1200 DB - 1989 Earthworks (Pipe Trenches)
- SANS 1200 DK - 1996 Gabions and pitching (First Revision)
- SANS 1200 DM - 1981 Earthworks (Roads, Subgrade)
- SANS 1200 G - 1982 Concrete (Structural)
- SANS 1200 HA - 1990 Structural Steelwork (Sundry items)
- SANS 1200 HC - 1988 Corrosion Protection of Structural Steelwork
- SANS 1200 L - 1983 Medium-Pressure Pipelines
- SANS 1200 LB - 1983 Bedding (Pipes)
- SANS 1200 LC - 1981 Cable ducts
- SANS 1200 LE - 1982 Stormwater Drainage
- SANS 1200 M - 1996 Roads (General)
- SANS 1200 ME - 1981 Sub base
- SANS 1200 MF - 1981 Base
- SANS 1200 MJ - 1984 Segmented paving
- SANS 1200 MK - 1983 Kerbing and Channelling

South African National Standard Specifications – Construction and Management

SANS 1921-1 (2015): Construction and Management Requirements for Works Contracts Part 1: General Engineering and Construction Works

SANS 1921-2 (2015): Construction and Management Requirements for Works Contracts Part 2: Accommodation of traffic on public roads occupied by the contractor

SANS 1921-6 (2015): Construction and Management Requirements for Works Contracts Part 6: HIV / AIDS Awareness

SANS 10400 National Building Regulations

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 Engineer with certificates of tests showing that the materials do so conform.

Resource standard pertaining to targeted procurement
SANS 1914-4:2002 Targeted Construction Procurement Part 1 – Participation of Targeted Enterprises and Targeted Labour (local resources)

C3.3 Amendments To Standard Specifications: SANS : General, Civil And Structural Works

SECTION PSA: GENERAL (APPLICABLE TO SABS 1200 A - 1986)

PSA 2 INTERPRETATIONS

PSA 2.2 Applicable edition of standards

Add at the beginning of the first sentence of Sub-clause 2.2:

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

PSA2.3 Definitions

"Site"	-	the three reservoir sites and the routes of the related connecting pipework to the existing supply lines and local reticulation
"Task"	-	a quantified activity or operation
"Daily task"	-	a task that is required to be completed within a given time
"Task work"	-	work paid by the completed task or job
"Daily rate"	-	the remuneration of a day's work regardless of output
"Daily wage"	-	see Daily rate
"Task rate"	-	the remuneration for a completed Task
"Daily task rate"	-	the remuneration for a completed daily Task
“GCC2015”		General Conditions of Contract (2015)
“General Conditions of Contract Works, 2015”		means General Conditions of Contract for Construction
“Engineer”		means the person named as the Employer’s Agent in the Contract Data
“Engineer’s Representative”		means the person appointed from time to time by the Employer’s Agent

“ESCOM", "ESC" and "Electricity Supply Commission" shall mean "Eskom"

"Labour intensive construction" - the economically efficient employment of as great a portion of labour as is technically feasible to produce as high a standard of construction as demanded by the specifications and allowed by the funding available, thus the effective substitution of labour for equipment

"Labour based construction" see labour intensive construction.

PSA 2.4b Abbreviations

Add to Sub-clause 2.4(b):

"MAMDD: Modified AASHTO maximum dry density".

PSA 2.8.1 Principal

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

Add the following to this clause:

Items which are designated as provisional quantities or provisional sums in the Schedule of Quantities are intended to provide for works, the need or extent of which shall be established by the Engineer during construction. Work scheduled as such shall only be undertaken on the written instruction of the Engineer and, where applicable, shall be paid for at the tendered rate or in the absence of rates shall be valued in accordance with Clause 6.6 of the General Conditions of Contract.

The Schedule of Quantities shall not be used for ordering purposes and no liability or responsibility shall be admitted by the Engineer in respect of materials ordered or procured by the Contractor on the basis of the Schedule of Quantities.

PSA 3 MATERIALS

PSA 3.1 Quality

Add to the Sub-Clause:

No used or recycled material may be used in the Works unless expressly authorised by the Engineer.

Samples of concrete aggregates and pipe bedding material are to be delivered to an approved laboratory.

Unless otherwise specified, all proprietary material shall be used and placed in strict accordance with the published instructions of the relevant manufacturer

Add the following to this clause:

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

The Contractor shall submit in good time, before any construction commences, to the Engineer on site samples of all materials intended to be incorporated into the works. The samples shall be accompanied by results of tests undertaken by an approved independent laboratory on the samples in question on behalf of the Contractor and at his cost, before consideration by the Engineer.

The Engineer, during construction, may take independent samples from stockpiles of proposed construction materials on site and from the completed works. Approval will not be granted for samples delivered by the Contractor directly to the Engineer's office. The Contractor shall be responsible for the cost of all failures on test samples, control testing and retesting.

All pipes, fittings and materials used in the Works, must bear the official standardisation mark of Standards South Africa where applicable. The mark on a pipe shall be visible from above after the pipe is laid.

Rubber articles, including pipe insertion or joint rings shall be stored in a suitable shed and kept away from sunlight, oil or grease.

Large items not normally stored in a building shall be neatly stacked or laid out on suitable cleared areas on the Site. Grass or vegetation shall not be allowed to grow long in the storage areas and the material shall be kept free of dust and mud and be protected from stormwater. Pipes shall be handled and stacked in accordance with the manufacturer's recommendations, special care being taken to avoid stacking to excessive heights and placing over hard objects. uPVC pipes and other pipes vulnerable to degradation from ultra-violet light shall be protected from direct sunlight by suitable covers.

Every precaution shall be taken to keep cement dry and prevent access of moisture to it from the time it leaves the place of manufacture until it is required for use on the Site. Cement is to be used on a first in/first out basis. Bags of cement which show any degree of hydration and setting shall be removed from the site of the Works and replaced at the Contractor's own expense. Any cement older than six weeks is to be removed from site

Materials shall be handled with proper care at all times. Under no circumstances may materials be dropped from vehicles. Large pipes or large plant shall be lifted or lowered only by means of suitable hoisting equipment.

Where proprietary materials are specified, it is to indicate the quality or type of materials or articles required, and where the terms "or other approved" or "or approved equivalent" are used in connection

with proprietary materials or articles, the Contractor is to supply with their tender the name of the manufacturer and supporting documentation that show that the materials or articles comply with the relevant specifications. It is understood that the approval shall be at the sole discretion of the Client and the Engineer.

Irrespective of any approval granted/used by the Engineer or the Employer, the Contractor shall be deemed responsible for all material quality use for construction and their specified performance.

PSA 4 PLANT

PSA 4.2 Contractor's Office and Stores and Services (Refer SANS 1921-1 Clause 4.14)

After the second paragraph add the following:

The suitable first aid services required in terms of Sub-clause 4.2 of SANS 1200 A shall include, inter alia, a First Aid cabinet fully equipped and maintained with at least the minimum contents as listed in Regulations of the General Safety Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), to deal with accidents and ailments which are likely to occur during the construction period.

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 place an area of ground at the disposal of the Contractor at construction site to enable him to erect his site offices, workshops and stores. 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 in the Environmental Plan.

PSA 5 CONSTRUCTION

PSA 5.1.1 Setting Out Of the Works

Add the following to this clause:

The Contractor shall be fully responsible for the setting out of the works, and where labour intensive work is specified, for the setting out of the daily construction tasks.

The Contractor, within two (2) weeks after the site has been handed over to him, is to ascertain the correctness of all pegs and bench marks. Any discrepancy shall immediately be reported in writing to the Engineer. Any costs or subsequent costs arising from discrepancies which had not been reported to the Engineer, within the aforementioned period, shall be the sole responsibility of the Contractor.

PSA 5.2 Watching, Barricading, Lighting

Add the following to this clause:

The Contractor shall employ competent watchmen to guard the Works both by day and night.

From the time any portion of the Works commences, until the Completion of the Works and the issue of the Certificate of Completion of the Works, the Contractor shall be responsible for protecting the property of the Employer and all persons having business on the Site from anything dangerous or likely to cause damage or injury. The Contractor shall take all practical precautions to avoid nuisance or inconvenience to the owners or occupier of properties near to the Site and to the public generally whilst carrying out the Works and shall at all times keep the Site clean and in a safety and satisfactory condition.

Temporary traffic signs shall be erected when work is being done within and adjacent to roadways. The number and layout of the traffic signs shall comply with the Site Manual entitled "Safety at Roadworks in Urban Areas", as published by the Department of Transport. Traffic signs shall have a yellow background with either a red or black border.

The Contractor shall control all access to the site, for authorised persons only, and to ensure that the approved conditions of the Health and Safety Management Plan is adhered to.

PSA 5.4 Protection of Overhead and Underground Services

Add the following to this clause;

Before construction of the Works, or any phase of the Works, the Contractor shall contact all relevant parties and authority officials to establish the existence of existing services on site.

PSA 5.7 Safety (Refer SANS 1921-1 Clause 4.18)

Add the following to this clause:

Compliance with 1) OHS Act and Regulations and 2) Construction Environmental Management Plan and all relevant Environmental Authorisations.

Lump sums are provided in the Bill of Quantities to cover the contractor's cost for compliance with the requirements of the Construction Environmental Management Plan, all relevant Environmental Authorisations and the Occupational Health and Safety Act, 1993, the latest Construction Regulations and the Client's Occupational Health and Safety requirements respectively.

In addition, Sums are included under Time Related Items in the Preliminary and General Section of the Bills of Quantities. The lump sums shall include full compensation for the provision of the necessary site official, the training, PPE's, plans, audits, assessments, administration, etc. and all other costs required for compliance. Fines issued for non-compliance will be deducted from these Provisional Sums, but are not limited to the value of the Provisional Sum stated.

Add the following clauses:

PSA 5.9 Existing Services

The tendered rate shall further cover the cost of backfilling the excavation with selected material compacted to the required density, keeping the excavation safe and taking care that the services are not damaged in any way. The rate shall include for all negotiations with the authorities, notification to all affected parties and any other requirement to protect and complete the work. No additional direct payment will be made for the protection of such services.

PSA 5.10 Record Drawing Information

As the Works are progressing, the Contractor shall mark on a special set of drawings, all as-built details and submit them to the Engineer's Representative for approval on a monthly basis. No extra payment shall be made for preparation of these as-built plans.

All service household ends, manholes, valves, hydrants and the like shall be co-ordinated together with their invert and cover/ground levels on the as-built drawings.

The Certificate of Completion shall only be issued once all the as-built information has been received and verified by the Engineer.

PSA 5.11 Community Liaison Officer (CLO)

A provisional sum is included to allow for the salary of a person working full time as the Community Liaison Officer for the duration of the construction on this Contract. The sum also includes for costs such as transport, an, office space, communication and any other requirement necessary. The Contractor shall ensure that the salary and other expenses such as payment to the Community Liaison Officer members are paid timeously in accordance with the payment dates of his own staff.

A separate item for overheads, charges and profit on the above item is applicable.

PSA 6 TOLERANCES

PSA 6.2 Degrees of Accuracy

Add to the Sub-Clauses:
Generally, Degree of Accuracy II shall be applicable to the whole of the Works (except smooth formwork), unless specified otherwise in the Project Specifications or drawings. Smooth formwork which shall be Degree I. Tolerances specified on the drawings shall take precedence over tolerances specified elsewhere.

Areas requiring a special level of tolerance (refer to drawings) include:

a) Tops of clariflocculator walls (to accommodate wheels of rotating bridge to be installed by others later).
b) Inner diameter of clariflocculator tanks and sloping floor (to accommodate sludge scraper mechanism of rotating bridge to be installed by others later).
c) Inner walls of filter beds (to accommodate false floor to be installed by others later).
d) Top of backwash channel walls inside filter beds (to ensure uniform overflow).
e) All weir crests (to ensure uniform overflow).

PSA 7 TESTING

PSA 7.1 Principles

Add the following to this clause:

Every completed layer of fill shall be subject to check testing by the Contractor. Once the Contractor is satisfied with the standard of the constructed layer, the Engineer will be requested to perform acceptance testing for the particular section. When giving notice, the Contractor shall provide the Engineer with the results of the check testing indicating that the work is to specification. The Engineer shall be given 48 hours noticed of when testing or inspections are required.

The Engineer may from time to time carry out his own check tests on the work performed by the Contractor. Should such check tests show that the Contractor's control testing is such that the quality of the Contractor's work could be called into question, then the Engineer may order further check tests to be carried out on work already completed. All costs associated with such check tests shall be for the Contractor's account, as also the costs of any other check test whose results to not comply with the specification.

Failure by the Contractor to notify the Engineer or to provide the required information or, where specified, to perform the required test, will be grounds to exempt the Employer from payment for the associated work and for all subsequent work which would be affected by the failure of the Work to be tested.

Nothing contained in this clause will relieve the Contractor of any responsibilities under the specification or in any way limit the tests, which the Engineer may call for or perform in terms of the specification.

Where the Engineer is called to witness certain control tests, such as the pressure testing of a pipeline, and the results of such tests do not comply with the specifications, then the Client reserves the right to recover costs for the Engineer's attendance at the unsuccessful test by the Contractor.

PSA 7.1.1 Checking

Amend this Sub-Clause as follows:

"The Contractor shall carry out sufficient checks to satisfy himself that the materials used and the workmanship (i.e the quality of construction, adherence to tolerances and, when applicable, the strength attained) comply consistently with the specified requirements and the results of those checks shall, if so ordered, be made available to the Engineer.

Nothing contained in this Sub-Clause will relieve the Contractor of his responsibilities under the Contract or in any way limit the inspections and/or tests that the Engineer may call for or perform in terms of the Specification. The Contractor shall make due allowance for testing procedures in his construction programme.

PSA 7.2 Approved Laboratories

Add the following to this clause:

Acceptance testing shall be done by a laboratory selected by the Engineer. The Engineer requires twenty-four hours' notice from the Contractor in order to perform the relevant acceptance test.

The Contractor shall make due allowance for testing procedures in the construction programme.

The procedure for payment of the Engineer's acceptance testing will be as follows:

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.2.2 Time-related Items

Reword 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 Engineer) will be"

PSA 8.3.1 Contractual Requirements

Add the following to the clause:

"The Contractor shall assess the status of construction of each reservoir and what is needed to complete them and shall allow in Items 1.1.1.1 of the BoQ for any costs involved in making this assessment".

PSA 8.3.2.1 Facilities for the Engineer

Delete the following from this Clause:

b) Telephone

Add the following to this Clause:

b) Meeting room
d) Covered Parking Bays (4 No.)
e) All other specified facilities (including wifi internet connection, printer, laptop, photocopier and camera)

PSA 8.3.2.2 Facilities for the Contractor

Add the following to this Clause:

"The Tendered rate shall cover the site establishment for all temporary facilities required to undertake the work, as per PSA 4.2. The cost Security to the site will be deemed as inclusive in the rates, and will not be measured separately."

PSA 8.3.4 Removal of Site Establishment

Add the following to this Clause:

"The Tendered rate shall cover the cost of site removal of all temporary facilities required to undertake the work, as per PSA 4.2."

PSA 8.4.1 Contractual Requirements

Add the following to this clause:

The Contractor shall tender rates in the Schedule of Quantities to cover his time-related establishment costs. The amount tendered and paid shall be full compensation to the Contractor for:

i) The maintenance of his whole organization as established for this Contract.

ii) The maintenance of all insurances, indemnities and guarantees required in terms of the Conditions of Contract or Tender where applicable.

iii) Compliance with all general conditions and requirements which are not specifically measured elsewhere for payment in these Contract Documents.

Payment of the lump sum shall be made monthly in compliance with the method laid down in Sub-clause 8.2.2 of SANS 1200:A.

The Contractor will not be paid Time-Related Preliminary and General Charges for any Special Non-Working Days, which shall be deemed to have been allowed for in his rates.

PSA 8.4.2.1 Facilities for the Engineer

Delete the following from this Clause:

b) Telephone

Add the following to this Clause:

b) Meeting room
e) Survey equipment
f) Covered Parking Bays (4 No.)
g) Air time and data for cell phones for site staff at R1000 per month for each cellphone
h) All other specified facilities (including access to wifi internet connection and photocopier)
i) Laptops, printers and cameras (a separate Provisional Sum item is included for the purchase of these items)

PSA 8.4.2.2 Facilities for the Contractor

Add the following to this clause:

Facilities for the Contractor shall include all the costs of providing water for construction other than the water required for water tightness testing of water retaining structures. Water for such tests will be measured according to PSG 8.15 Water tightness test.

The Contractor shall apply to the relevant Water Service Provider for a water connection. All costs attached thereto shall be to the Contractor's account.

PSA 8.5 Sums stated provisionally by Engineer

Replace the second last sentence of Sub-clause 8.5 to read:

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

PSA 8.6 Prime Cost Items

Replace the second last sentence of Sub-clause 8.6 to read:

"The percentage rate for (b) shall cover the Contractor's overheads, charges for taking delivery and profit on the supply of materials or goods covered by the sums stated in (a) above. Payment will be made on the basis of the sums actually paid for such materials or goods, exclusive of VAT."

PSA 8.7 Daywork

Add the following to this clause:

The rates submitted by the Tenderer in the relevant schedule of the Contract shall be applicable.

If a work item exists in the main tender the Engineer may decide to use it instead of resorting to Dayworks.

Provisional items for Daywork are scheduled as follows:

a) Labour at hourly rates for skilled, semi-skilled and unskilled labourers.

b) Material as a Provisional Sum and an additional percentage allowance on the net cost which is deemed to cover the Contractor's own overhead costs and profit.

c) The Contractor's own plant as a Provisional Sum and an additional percentage allowance on the net cost which is deemed to cover the Contractor's own overhead costs and profit.

Tendered unit rates or unit rates that are agreed in terms of Sub-clause 6.5.1.3 of the General Conditions of Contract for the Contractor's own plant used for Daywork shall cover the full cost of the use of such plant and shall, in addition, cover the cost of plant operators, consumable stores, fuel and maintenance.

The Contractor will be paid the actual net cost of plant hired by him for Daywork and in addition will be paid the tendered percentage allowance on the net cost of such hire, which allowance will be deemed to cover the Contractor's own overhead costs and profit.

PSA 8.8 Temporary Works

Add the following to this clause:

No separate payment will be made for the cost of constructing and maintaining the temporary access roads, the removal of the roads and the reinstatement of the areas, on completion. The sums tendered in items 1.1.17 and 1.1.20 of the Schedule of Quantities shall include all such costs.

PSA 8.8.2 Accommodation of Traffic

No separate item shall be allowed for in the Schedule of Quantities for the accommodation of the contractor's traffic. The Contractor's movement of construction activities is mainly between the site camp and the construction site which does not cross any municipal roads. In the event that the Contractor need to cross any municipal roads, he will ensure that he takes all necessary precautions for safety which will be deemed included in his rates.

Add the following clauses:

PSA 8.11 Miscellaneous items

An item which, is included in the payment clause column of the Schedule of Quantities, referring to this clause will be measured under the unit scheduled.

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

PSA 8.12 Compliance with the OHS Act and Regulations

The tendered sums shall include full compensation to the Contractor for compliance with all the requirements of the Occupational Health and Safety Act, 1993, and the latest Construction Regulations, the Client's Health and Safety requirements. The Health and Safety Officer/s, accommodation, transport, communication implements, consultations, meetings and any other thing necessary for the completion of the aspect, at all times for the full duration of the Contract. The successful tenderer shall provide the Engineer with a complete breakdown of the tendered sums.

The time related sums will be paid to the Contractor, in equal monthly amounts, subject to proper compliance as accepted by the Engineer.

PSA 8.13 Compliance with the Environmental Management Plan and all relevant Environmental Authorisation Requirements

The tendered sums shall include full compensation to the Contractor for compliance with all the requirements of the Environmental Management Plan and all relevant Environmental Authorisation Requirements), for the full duration of the Contract. The successful tenderer shall provide the Engineer with a complete breakdown of the tendered sums.

The time related sums will be paid to the Contractor, in equal monthly amounts, subject to proper compliance as accepted by the Engineer.

PSA 8.14 Community Liaison Officer (CLO)

A provisional sum is included to allow for the salary of a person working full time as the Community Liaison Officer for the duration of the construction on this Contract. The Contractor shall ensure that the salary and other paid expenses to which the Community Liaison Officer is entitled are paid timeously in accordance with the payment dates of his own staff. For details of the duties of the CLO refer to PS 4.

A separate item for overheads, charges and profit on the above item is applicable.

SECTION 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:

(b) SANS 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 SANS 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”.

Add the following:-

Two Employer’s nameboards shall be erected within one month of the commencement of construction and shall be placed where ordered by the Engineer. Any damage to this board shall be repaired within 14 days of a written instruction received from the Engineer. For details of the board refer to the Standard Drawings contained in this document.

Erection of two Contractor’s nameboards that comply with the drawing(s) provided are required in the area of the Works, at a positions approved by the Engineer, who may at any time order their removal if any objections are received.

The board shall be manufactured from materials specified in Clause 3.1 of SANS 1200 AB but shall conform in the painting, decorating and detail with the recommendations for the Standard Board of the South African Institution of Civil Engineers.

All nameboards shall be removed 14 days prior to the date of the Final Approval Certificate.

PSAB 3.2 Office Building(s)

Delete the first sentence and substitute the following:
The Contractor shall supply and furnish three air-conditioned “Kwikjack” (6 m x 3 m) offices, (two for the use of the Engineer and his/her staff and one for the Employers’ inspectors) and one air-conditioned “Kwikjack” (9 m x 3.4 m) conference facility for conducting meetings. Minimum size of each air conditioner shall be 12000 btu.

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:

i) Electrical installation to include a light and two 15A plug points plus adequately sized air conditioning units (for heating and cooling) for each unit
ii) One refrigerator of at least 100 litre capacity
iii) One kettle of at least 2 litre capacity
iv) One tea set comprising six cups and saucers, six teaspoons, one teapot, one sugar bowl and one milk jug
v) Covered parking for four vehicles
vi) Uncovered parking space for two vehicles
vii) Two “Barhold” or similar wall mounted racks each with 6 clamps suitable for hanging A0 sized drawings
viii) One large meeting table (For meeting room only)
ix) Ten additional chairs (For meeting room only)
x) All other specified facilities (including wifi internet connection, printer, laptop, photocopier and camera)

PSAB 4 PLANT

PSAB 4.1 Telephone

Delete the Sub-Clause and substitute the following:

The Contractor will be required to supply the Engineer's Representative and Site Staff with air-time for their mobile phones (three in number) as soon as the Contract has commenced in the amount of R1 500.00 per month

The Contractor shall be responsible for the cost of all calls up to a maximum of R500 per month per mobile phone, installation, rental, supplies, maintenance, etc.

Add the following new clauses:

PSAB 4.2 Covered Parking Bay

The Contractor shall also supply and maintain four corrugated iron covered carports with closed sides and gravelled floor for the sole use of the Employers Agents Representative and the Employer.

PSAB 4.3 All other specified facilities

The Contractor will be required to supply the Engineer's Representative and Site Staff with the following:

i) Digital Camera
ii) Laptop
iii) Printer
iv) Wi-Fi Internet Connection
v) Access to a photocopier and associated consumables
vi) Hired vehicles (3 No.)

The camera, laptop and printer are to be as specified by the Engineer and supplied as Prime Cost items.

The vehicles are to be hired under a Provisional Sum item. The hire agreement shall allow for fully comprehensive insurance.

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 Engineer or his representative(s), the Employer's inspectors, CLO and PSC 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 Engineer two suitably educated labourers for use on and about the site on survey and other work directed by the Engineer at all reasonable times.

Add the following new clauses:

PSAB 5.6 Survey Equipment

Add new Sub-Clause:

The Contractor shall provide the following survey equipment on the Site from the commencement to the completion of the Works:

i) One automatic reading Engineer's level plus tripod
ii) One levelling staff (5 m long, 1 cm graduations)
iii) One staff angle bubble
iv) One metal change-point for levelling

v) One separate plumb-bob
vi) One spirit level (one metre long)
vii) One hammer (2 kg) with steel or wooden pegs as necessary
viii) One 50 m steel or glass fibre tape
ix) One 5,0 m (or longer) retractable steel tape

The equipment may be shared by arrangement between the Contractor and the Engineer or his representative on Site. The Contractor shall keep the equipment continuously insured against any loss, damage, or breakage and he shall indemnify the Engineer 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 5.7 Site Instruction books

The Engineer shall supply a site instruction book for specific use on the Site. All instructions given by the Engineer's Representative must be confirmed and countersigned by the Engineer. The instruction shall be countersigned by the Contractor before implementation.

The Contractor shall supply a triplicate book for site correspondence and inspection requests to the Engineer's Representative. Reasonable notice shall be allowed prior to inspections. All inspections requests and approval/disapproval thereof shall be recorded by the Site staff in writing. All requests must be signed and dated by the Engineer's Representative before implementation.

The Contractor in conjunction with the Engineer must ensure that a suitable site quality record system is put in place to record that each section, or work item, complies with the relative works specification.

PSAB 8 MEASUREMENT AND PAYMENT

PSAB 8.1 Scheduled Items

Delete the 1st sentence and substitute the following:

Items will be scheduled in terms of Sub-Clauses 8.3.2 and 8.4.2 of SANS1200 A.

PSAB 8.2.1 Fixed and Time-related Charges

Delete the 1st sentence and substitute the following:

The terms of Sub-Clause 8.2 of SANS 1200 A shall apply.

Add the following clauses:

PSAB 8.2.2 Furnished Office and Meeting Room

The Contractor shall supply, erect, maintain and service for the sole use of the Engineer's staff facilities as defined in PSAB 3.2 and PSAB5.2.

Payment will be made for the supply and erection of the above facilities under the provided fixed rate.

Payment will be made for the maintaining the above facilities in a suitable condition under the provided time related rate.

PSAB 8.2.3 Telephone

The Contractor shall provide air time as defined in Clause 4.1, as amended.

Payment will be made for supplying 3 x R500 monthly pre-paid airtime and data for the mobile telephone under the time related rate. The cost of making the airtime available shall be included in the tendered monthly rate rather than as a percentage mark-up (which would otherwise require invoices as proof of payment)

PSAB 8.2.4 Nameboards

The Contractor shall supply and erect nameboards in accordance with SANS 1200AB Clause 3.1.Payment will be made for the supply and erection of the nameboards under the provided fixed rate.

Payment will be made for maintaining the nameboards in a suitable condition under the relevant time related rate.

PSAB 8.2.5 Survey Assistants

Payment will be made for the employment of the survey assistants specified in Clause PSAB 5.5 under the provided fixed rate on verification of their availability by the Engineer. Should the survey assistants be removed from site during the course of the Contract then any payments made for the survey assistants will be reversed in the next interim payment certificate.

Payment will be made for the monthly cost of the survey assistants under the provided time related rate for as long as they are required to be available to assist the Engineer or his representatives.

PSAB 8.2.6 Survey Equipment

Payment will be made for the supply of the equipment specified in Clause PSAB 5.6 under the provided fixed rate on verification by the Engineer that the equipment specified is on site. Should any of this equipment be removed from site during the course of the Contract then any payments made for the supply of this equipment will be reversed in the next interim payment certificate.

Payment will be made for the maintaining of the above equipment in a suitable condition under the provided time related rate.

PSAB 8.2.7 Covered Parking Bay

Payment will be made for the supply and installation of covered parking bay specified in Clause PSAB 4.2 under the provided fixed rate on verification by the Engineer that the parking bay specified is erected on site. Should the parking bays be removed from site during the course of the contract then any payments made for the supply of this equipment will be reversed in the next interim payment certificate.

Payment will be made for the maintaining of the above parking bays in a suitable condition under the provided time related rate.

PSAB 8.2.8 All other specified facilities for the Engineer

The supply of laptops, printers and cameras are to be provided under a separate Prime Cost item with associated mark-up.

The vehicles are to be hired under a Provisional Sum item. The hire agreement shall allow for fully comprehensive insurance.

The cost of providing and maintaining all other facilities for the Engineer's Site Staff (such as cell phone airtime, access to WiFi and photocopying facilities) shall be included in the relevant fixed and time-related scheduled rates.

SECTION PSC: SITE CLEARANCE (APPLICABLE SABS 1200 C - 1980 AS AMENDED 1982)

PSC 3 MATERIALS

PSC 3.1 Disposal of Material

Add to this Sub-clause:

Material obtained from clearing shall be disposed of offsite by the Contractor at his expense. Disposal sites shall be appropriate for the nature of the material that is to be disposed of and have the approval of the Engineer, the Local Authority and the Environmental Officer. A disposal site for natural materials only exists within 2.4km of the site. 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 local authority.

Payment for the clearing, loading, transport, dumping fees and any other requirement or costs incurred shall be included in the rates submitted for site clearance.

PSC 5 CONSTRUCTION

PSC 5.1 Areas to be cleared and grubbed

Add the following:

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

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.2 Scheduled Items

PSC 8.2.1 Clear and grub

Add the following to this Clause:

The rate tendered for clearing and grubbing shall cover the cost of disposal of the material off the Site by approved means. Debris should be dealt with as per PSC 3.1.

PSC 8.2.14 Perimeter Fencing

Payment will be made per linear metre of y fencing installed in the manner specified on Drawing No. #, and the rate shall include for maintaining such fencing in good condition, including daily surveillance and repair, throughout the duration of construction.

JH SECTION PSD: EARTHWORKS (APPLICABLE TO SABS 1200 D - 1988)

PSD 2 Interpretations

PSD 2.3 Definitions

Amend the sentence headed "Restricted excavation" to read:

"Restricted excavation – All excavations for individual structures starting from the specified bulk excavation platform levels or, where no bulk excavation platform has been specified, from 150mm below natural ground level (ie excluding a nominal 150mm topsoil layer to be removed beforehand)."

PSD 3 MATERIALS

PSD 3.1.2 Classes of excavation

Replace Sub-clauses 3.1.2 (a) to (e) with the following:

All material encountered in any excavations for any purpose, including bulk and restricted excavations, will be classified as follows:

(a) Soft excavation
All material which can still be efficiently excavated (in the opinion of the Engineer) by 30t excavator fitted with 'rock bucket' (excavator bucket typically fitted with not more than 3 tines designed to loosen layered weathered solid sedimentary residual material). This includes both soft soil material and weak mudstone / siltstone.

(b) Intermediate
All mudstone and siltstone material that the Engineer agrees can be more efficiently loosened for excavation by 30t excavator fitted with Heavy Duty hydraulic breaker or by blasting (where allowed by the Engineer) rather than 'rock bucket' mentioned above.

(c) Hard Rock Excavation
1) Hard Rock by drilling and blasting: All unweathered sandstone and dolerite material that the Engineer agrees can be more efficiently loosened for excavation by drilling and blasting (only when allowed by the Engineer).
2) Hard Rock excavation by expanding grout (or any other non-explosive means): All material where Engineer disallows drilling and blasting (due to safety or social reasons) where material otherwise would have been more efficiently drilled and blasted as per (1) above but is too hard to be effectively removed by heavy duty hydraulic breaker.

Any unweathered boulders encountered shall be classified as 'Hard Rock: excavation by expanding grout (or any other non-explosive means)' where such boulders exceed 0,125m^3 (approx. 500 x 500 x 500mm) in volume. Boulders smaller than this size shall not be classified separately. Boulders smaller than the above shall not be classified.

PSD 3.3 Selection

PSD 3.3.1 General

Replace 3.3.1 with the following:
The Contractor is required to select, strip 150mm deep and conserve all topsoil from the following areas of Site:

- All bulk earthworks platform footprints;
- All internal road cut and fill footprints;
- The entire excavation footprint of structures (including Contractor's excavation for access and working space) where such excavation falls outside bulk earthworks platform footprints;
- Dehydrated sludge loading platform;
- Pipe trenches falling outside the excavation footprints of structures, platform footprints, and road cut and fill footprints;
- Temporary stockpile areas (except topsoil stockpile areas); and
- Any other otherwise undisturbed area used by Contractor for his own purposes.

The Contractor shall, for bulk, restricted and trench excavation, actively select-out and keep separate all materials into one of the following groups:

- Soft fully-weathered soil;

- Weak mudstone and siltstone (which is of little agricultural value, but still falls into the 'soft material' classification as defined in PSD 3.1.2 a).
- Intermediate material (as defined in PSD 3.1.2 b).
- Hard rock material (as defined in PSD 3.1.2 c).

Where the selected material is to be spoiled at the designated off-site spoil dump, the material shall be stockpiled separately at the spoil site in its respective group so that it can either be recovered later or selected by others. All material stockpiled on site for later use as backfilling or fill or landscaping shall also be stockpiled in their respective classification groups. Only material allowed by the Engineer to be spoilt to the on-site spoil platform may be mixed.

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 are 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.

PSD 5.1.1.2 Safeguarding of excavations

Replace Clause 5.1.1.2 (b) with the following:

The Contractor must note that the excavations for most of the structures are deep. The Contractor is responsible for ensuring that all temporary excavation faces are stable and safe at all times and shall either:-

- Provide a shoring system, designed by the Contractor and signed by a suitably qualified Professional Engineer, or

- Reduce the slope of excavations to the safe angle as determined by a suitably qualified Professional geotechnical engineer employed by the Contractor.

Add the following new Sub-Clauses:

PSD 5.1.1.3a) Explosives (Refer SANS 1921-1 Clause 4.7)

Notwithstanding Sub Clause 5.1.1.3 the Engineer shall be notified at least 48 hours beforehand of the Contractor's intention to use explosives on site

It shall be the Contractor's responsibility 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 Engineer's drawing at tender stage the Contractor shall 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 (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, subject to the following conditions:

- Excavating using explosives will only be allowed during the early phases of the Contract before any of the reinforced concrete foundations of adjacent structures (closer than 25m) are cast. The Contractor shall therefore either:
  - Proceed with restricted excavations for the clariflocculators and filter buildings in parallel with each other; or
  - At least, drill and blast for all clariflocculators and filter buildings in close order, but defer the actual removal of the broken hard material to 'as and when' desired.

(d) The Engineer 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.

(e) 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.

(f) The requirements of 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.

(g) 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 Engineer. The Contractor shall grant the Engineer access to all records maintained for the Inspector of Explosives or the Government Mining Engineer, as the case may be.

(h) Before any blasting is undertaken, the Contractor, together with the Engineer and the ISD Consultant and CLO 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. It is advised that a photographic record will be required of neighbouring structures before blasting commences. These structures will be pointed out by the Engineer. 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.

(i) 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 and 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.

(j) When blasting to specified profiles, the Contractor shall so arrange the holes and charges such 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 over break allowance specified in the Specification Data or in any other specification or given on a drawing.

PSD 5.1.1.3c) Limitations for Blasting

a) Approval of methods and keeping of records

No blasting work may be carried out prior to the Engineer's approval being given in writing

Prior to starting any drilling for the first section of blasting, the Contractor shall submit for approval to the Engineer, details of the proposed overall methods of blasting that will be used on site, including spacing, depth and pattern of holes, charging levels (kg/m3), 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 Engineer 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 Engineer of the intention to blast and at the same time shall note if any changes will be made relative to the approved method.

The Engineer 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 Engineer of any previous method.

After every blast, the Contractor shall, within 24 hours, submit to the Engineer 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 Engineer, 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

The Contractor shall be liable for all damages to services caused as a result of the Contractor's negligence.

PSD 5.1.3 Stormwater

Add the following to this Clause:

In that many of the excavations for structures cannot reasonably be made free-draining, it will be necessary to actively remove accumulated rain water from the excavations. The Contractor shall provide, operate and maintain sufficient pumping equipment, pipes and other equipment on site as may be necessary to keep all excavations largely free of standing water at all times.

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, pipeline(s) 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% - 5%	No cross-embankments required		
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 150 mm 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 0.5 m 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 Engineer, are permitted to be so left.

No additional payment will be made for the construction of cross-embankments which will be deemed to be included in the excavation rates.

PSD 5.1.4.1 Dust nuisance

Add the following to this Clause:

Given the very fine texture of the soil, in dry, windy weather, extremely dusty conditions can be expected on Site unless suitable mitigation measures are taken. The Contractor shall be responsible for actively implementing effective dust control measures such that dust levels do not hamper workers' health and productivity.

The Contractor shall plan his execution of the Works accordingly and shall use sufficient water (with or without approved additives) or other methods to keep the level of dust to a reasonable minimum. Water for this purpose may be abstracted from the nearby dam. This shall be done in consultation with the Engineer and to the Engineer's approval. The cost of all such mitigation measures shall be deemed to be included in the scheduled rates for excavation or Preliminary & General items.

PSD 5.1.6 Road Traffic Control

In the 4th line of Sub-Clause 5.1.6 amend "South African road traffic signs manual1)" to read:
"Southern African Development Community: Road Traffic Signs Manual1) and Chapter 13: [Road works Signing] of the South African Road Traffic Signs Manual1) ", and amend the footnote to read:
"1) Published by the Department of Transport, Pretoria."

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

Where work is to be carried out while half of the roadway is closed to traffic, flagmen shall be provided and temporary road signs shall be erected, maintained and operated."

PSD 5.2.2.1 Excavation for general earthworks and for structures (Refer SANS 1921-1 Clause 4.10)

Regarding over-excavation and overbreak, add the following to sub-clause (e):

Where the Contractor excavates in material classified as 'soft' (in terms of PSD3.1.2) to dimensions in excess of those shown on the drawings or ordered by the Engineer or if the material in the bottom of an excavation is loosened before concrete has been cast, or if there is any over-excavation, or any loose or disturbed soil, it shall be removed and the over-excavation under structures shall be replaced, at the Contractor's expense, by imported G2 crusher run material from commercial sources compacted to 100% modAASHTO density or, alternatively, with 15MPa/20 mass concrete.

For restricted excavation in material classified as 'intermediate' or 'hard rock' (as defined in PSD3.1.2), an allowance for an average overbreak layer of 150mm below the required founding level (ie underside of blinding layer) for all structures will be automatically added to the quantity measured for payment for restricted excavation. Similarly, measurement for replacing overbreak with compacted G2 material (as per filling of over excavation mentioned above) will be automatically measured for payment. Over-break (and G2 filling) beyond the 150mm overbreak allowance shall be deemed to be over-excavation and therefore to the Contractor's account.

Add the following new Sub-Clauses:

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

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

(g) Excavations to final level, ready to receive a blinding layer or concrete footing, shall be completed not less than 24 hours before such layer or footing is cast. The Contractor shall arrange for the inspection by the Engineer or his Representative of all surfaces immediately before backfilling of any kind or casting blinding.
(h) 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 20 mm protruding into the excavation profile.
(i) The Contractor shall not spoil, waste or stockpile excavated material without approval.

PSD 5.2.2.3 Disposal

Amend this Sub-Clause as follows:

A considerable volume of excavated material will need to be disposed of. A spoil site has been identified some 2,2km from the Site to the South-East (see locality inset on Bulk Earthworks drawing J31067/LAY LAY_110). There is also a fill platform on Site for the exclusive disposal of weak mudstone material. Material placed on this platform shall be spread and compacted in 150mm layers (compaction to 93% MOD AASHTO density).
As noted in PSD 3.3.1, spoil material shall be stockpiled separately at the spoil site in its respective group so that it can either be recovered later or loaded for other use by others.

PSD 5.2.4.2 Topsoiling

Add the following to Clause 5.2.4.2:

As Stage 2 of the Highbury WTW civil works will follow this Contract, topsoiling shall be limited to the cut and fill slopes of platforms and internal roads or where directed by the Engineer. It will be responsibility of the Stage 2 Contractor to topsoil all disturbed areas on completion.

PSD 5.2.5 Transport of Earthworks

PSD-5.2.5.1 Freehaul

Replace with the following:

All transportation of material within the boundary of the site and within less than 0,5 km from the site boundary shall be regarded as freehaul.

All material imported from commercial sources shall be classified as freehaul.

PSD-5.2.5.2 Overhaul

With the exception of material imported from commercial sources, all transportation of material beyond 0.5 km of the boundary of the site shall be classified as overhaul.

PSD 7 TESTING

PSD 7.2 Taking and testing of samples

Replace the contents of the sub-clause with the following:

The Contractor shall carry out sufficient process control checks on the compaction of all fill and backfill layers in the presence of the Engineer's Representative to be able to demonstrate that the specified compaction is being achieved. The frequency of testing shall be such that tests shall be carried out for every lift of backfill material starting from 300 mm. The costs of testing shall be deemed to be included in the rates for backfilling of the platform.

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.1 BASIC PRINCIPALS

Add the following Sub-clauses:

PSD 8.1.4 Restricted excavation: Provision for working space and access ramps

The tendered rates for provision of working space (see Sub-Clause 8.3.5) shall be deemed to include excavation and subsequent backfilling of any access ramps required and all measures required to render the sides of the excavation stable and the supply, installation, maintenance and removal of safety barricades.

PSD 8.1.5 Recording of original ground profiles

The tendered rate for excavation shall cover the cost of recording the original ground profiles, rock and/or foundation levels, as applicable prior to commencement of any excavation, including stripping of topsoil. This is required to allow the Engineer to check the Contractor's survey and adjust his design levels if necessary.

PSD 8.1.6 Backfilling of over-excavation

Backfilling over-excavation with compacted G2 material or mass concrete as specified in PSD 5.2.2.1(e) will not be measured for payment beyond unless the over-excavation is ordered by the Engineer to remove unsuitable material, in which case the additional excavation will be measured and paid as restricted excavation in 'soft' material and the G2 or mass concrete will be measured by volume, all to the additional dimensions ordered by the Engineer.

PSD 8.2.1 COMPUTATION OF QUANTITIES

Add the following to Clause 8.2.1:

The volume of excavated material will be measured from the net outline of the structures and the average depth of excavation unless otherwise approved by the Engineer.

As noted in PSD 5.2.2.1 e), for restricted excavation in material classified as 'intermediate' or 'hard rock' (as defined in PSD3.1.2), an allowance for an average overbreak layer of 150mm below the required founding level (i.e. underside of blinding layer) for all structures will be automatically added to the quantity measured for payment for restricted excavation; as will the volume of G2 backfill.

PSD 8.3 SCHEDULED ITEMS

PSD 8.3.2 Bulk Excavation

Replace the contents of this clause with the following:

Separate scheduled items will be provided for each type of excavation material (in accordance with the selection criteria specified in PSD 3.3.1), together with its method of excavation and intended destination / use. The classification criteria specified in PSD 3.2.2.1 is intended to assist with making the distinction between 'weak' mudstone / siltstone from 'intermediate' mudstone / siltstone material and between 'intermediate' and 'hard' material (unweathered sandstone and dolerite). The distinction between 'completely-weathered soft soil material' and 'weak mudstone' is fairly obvious, but shall none-the-less be as agreed with the Engineer's Representative. In all cases, the rates tendered shall make allowance for liaising and agreeing with the Engineer's Representative as to which selection category material being excavated falls into, how it is to be excavated and where such material is to be placed.

Except for measurement of overhaul to the designated spoil site, there are no 'extra-over' excavation items.

The tendered rates for excavation shall cover all costs associated with excavating and spoiling or filling and any conditioning, gridding and compaction required to achieve the required compaction density. The tendered rates for overhaul shall cover all costs associated with selecting, loading and transporting the spoil material to the designated spoil dump and depositing the material in a way there is no mixing of the different selection types.

PSD 8.3.3 Restricted Excavation

Replace the contents of this clause with the following:

Separate scheduled items will be provided for each type of excavation material (in accordance with the selection criteria specified in PSD 3.3.1), together with its method of excavation and intended destination / use as per PSD 8.3.2 Bulk Excavation. Separate scheduled items will be provided for each type of structure.

PSD 8.3.5 Extra excavation to provide working space around structures

In addition to the provisions of clause 8.3.5, the tendered rates for 'extra excavation in all materials for working space' shall also include for:

1) Any lateral support (if necessary for stability) and any other measures required to render and maintain the excavation sides in a safe, stable state at all times as specified in clause 5.1.1.2 and PSD 5.1.1.2 b);
2) The cost of temporarily stockpiling working-space material (on or off-site), spoiling any unsuitable and excess material, processing to OMC and backfilling and compacting to 95% Mod AASHTO density in layers not exceeding 150mm.
3) Provision of access ramps into the excavation (or other means of providing safe access for personnel and plant to enter and exit the excavations).
4) Provision and maintenance of a 1m high rigid barrier fence around all excavations deeper than 1,5m and where the sides of the excavation are steeper than 1 vertical : 2 horizontal.
5) Provision of storm water diversion berms or ditches upstream of the excavation and maintaining a minimum of accumulated rain water in the excavations.

PSD 8.3.6 Overhaul

Replace the contents of this Clause with the following:

All movement of cut to fill material shall be regarded as freehaul. In addition, all movement of topsoil, and any other material within the boundary of the site and less than 0.5 km from the site boundary shall be regarded as freehaul.

Overhaul will only be paid where the transportation of material is beyond 0.5 km of the boundary of the site.

Overhaul shall not apply to imported material from commercial sources.

The overhaul distance shall be measured from the point of exit of the site perimeter to the agreed centre of the designated spoil area.

PSD 8.3.15 Retrieval of spoil Material

Should spoiled material need to be retrieved from designated spoil site (only where instructed by the Engineer), this will be measured under the nearest equivalent scheduled item for excavation and also under 'extra-over for overhaul'.

SECTION PSDB: EARTHWORKS (PIPE TRENCHES) (APPLICABLE TO SABS 1200 DB - 1989)

PSDB 3 MATERIALS

PSDB 3.1 Classes of excavation

The classification of material for excavation shall be as specified in Project Specification Clause PSD 3.1.2.

PSDB 3.5(a) Backfill Material

In the third line delete "150 mm" and substitute "100 mm".

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

Add the following new Sub-Clause:

Where scheduled, or directed by the Engineer, backfill shall be stabilised with 8% cement by mass. The backfill material shall have a plasticity index not exceeding 10 and all material shall 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 thereafter 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 Engineer, shall be set aside and re-used as sub-base material.

(b) New material which shall conform to the requirements of:
Clause 3.2.1 of SABS 1200 ME for the Subbase
Clauses 3.2 and 3.3 of SABS 1200 MF for the Basecourse
Clause 3.2.2 of SABS 1200 ME for the Gravel Wearing Course
Clause 3 of SABS 1200 MH for the asphalt surfacing

PSDB 3.7 Selection

The selection of material for pipe trenches shall be as specified in Project Specification Clause PSD 3.3.

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 Engineer to be placed below the bottom of the trench.

PSDB 5 CONSTRUCTION

PSDB 5.1.2 Stormwater, Seepage and Dewatering of Excavations

PSDB 5.1.2.1 Throughout the works

Add the following to this Sub-clause:
In addition to the Contractor's responsibilities for dealing with water, the Engineer may order the Contractor to place a crushed stone bedding layer (minimum thickness 150 mm) on the trench bottom. Should the trench bottom conditions remain unstable due to the nature of the soil and the degree of saturation, the Engineer may order the Contractor to install a filter fabric on the trench bottom prior to the provision of the stone layer. Should the material in the trench bottom or the bedding material be of such a nature that it can penetrate the stone layer, the Engineer may instruct the Contractor to enclose the stone layer completely within a geotextile filter blanket which shall comply with the requirements below, and shall have overlaps of at least 200 mm.
The Contractor will only be paid for providing and laying the stone bedding layer and filter fabric after receipt of a written order to do so from the Engineer.

The cost of dealing with water as specified in Sub-clause PSDB 5.1.2.1, will be held to have been included in the tendered sums.

Stone bedding in water-logged conditions:

Where the use of a layer of crushed stone in the trench bottom has been authorized by the Engineer, it will be measured by volume calculated according to length multiplied by the minimum base width and specified thickness. The tendered rate shall cover the cost of preparation of the trench bottom to accommodate the layer of stone, the supply and placing of the layer of stone over at least the specified width and all related activities in order to produce a stable platform.

Geotextile filter fabric:

Where the Engineer has authorised the use of geotextile filter fabric, this shall be measured by area as: width x nett length, where the width shall be the full or half-width supplied by the manufacturer which conforms closest to the specified of plus 2 x base width plus 200mm. The tendered rate shall include the cost of supply, placing and losses as a result of overlaps and over excavated trench widths.

Geotextile to conform to the following minimum specifications:

Material:	Nonwoven, needle punched, Continuous Filament, Polyester Geotextile (minimum)
Tensile Strength:	10 kN/m (minimum)
UV Stability:	70% strength retained after 1000 hours
Permeability @ 50mm head:	$4.0m/sx10^{-3}$

The material shall be placed as directed and shall not be exposed to direct sunlight for prolonged periods.

Add new Sub-Clause"

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 Engineer, 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 50 mm 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 0.5 m thick from the bottom of the trench to the surface.

The costs of complying with this requirement including the supply, installation and maintenance of sack breakers, will be deemed to be included in the excavation rates for trenching.

PSDB 5.4 Excavation

Add to the Sub-Clause:

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 400 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 5.5 Trench Bottom

Add to the Sub-Clause:

In waterlogged conditions and/or where so instructed by the Engineer a 150 mm thick layer (see PSLB 5.2.5) of imported single sized stone (19 mm size unless otherwise instructed by the Engineer) with a geotextile filter surround (Geotextile to conform to the requirement of PSD 5.1.2.10 shall be constructed under the bedding layer specified for the pipes.

However where the Contractor's method of working results in waterlogged conditions in the trench bottom, the Contractor shall excavate and stabilize the trench at his own cost to the approval of the Engineer.

Jointing slots shall be cut of sufficient length and depth to allow for the proper jointing of pipes 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 Engineer, the jointing slots shall be refilled with selected soft material free from stone (bedding materials as specified under PSLB in the case of coated steel pipes) and then rammed to provide a continuous uniform support for the pipework. No specific payment will be made for forming and refilling slots, the cost of which will be 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.

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 Engineer's approval.

Add the following to the Sub-Clause

Unless otherwise ordered by the Engineer, all excavated material shall be kept within the pipe servitude. The toe of the bank of excavated material shall be trimmed well back from the edge of the trench so as to leave a minimum 0.6 m clearance between the toe of the bank and the edge of the trench. The Contractor shall keep this strip clear of excavated material at all times.

PSDB 5.6.3 Disposal of Soft Excavation Material

Add to the Sub-Clause:

Surplus material or unsuitable material shall be disposed of offsite by the Contractor as per the requirements of Clause PSD 5.2.2.3.

PSDB 5.6.6 Completion of backfilling

Add the following to this sub-clause:

The Contractor shall bring on to the site sufficient resources for pipe laying so that trenches do not remain open for longer than one week ahead or behind the pipe laying team.

PSDB 5.6.8 Transport for Earthworks for Trenches

Delete the Sub-Clause and substitute:

The requirements of Sub-Clause PSD5.2.5 of SABS 1200 D as applicable shall apply.

PSDB 5.7.2 Areas subject to Traffic Loads

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

PSDB 5.9.4 Bitumen Roads, Sub-Base and Base

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.

Where Items have been included in the Bill of Quantities to cover the reinstatement of certain surfaces (grassed lawns, 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 BASIC PRINCIPLES

Amend the last sentence of Sub-clause 8.1.2 (c), to read:
"The ground surface will be that existing after any bulk excavation has been carried out and before any embankment has been constructed, unless a portion of the embankment has to be constructed in order to achieve an acceptable cover over a pipe that is to be installed, in which case, measurement will be made from the level of embankment that produces an acceptable minimum cover over the pipe."

PSDB 8.1.4 BASIC PRINCIPLES

Delete 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 jointing slots as the cost of that work will be deemed to be included in the rates for trenching.

PSDB 8.3.2 Excavation

Add the following to the Sub-clause:

The rates for excavation of trenches shall also cover the cost of selection as specified in PSDB 3.7 Selection, as amended.

Extra-over payment will be made for intermediate and hard rock excavation as per PSDB 3.1 provided the surface levels of the intermediate layer and hard rock have been recorded on drawings signed by the Engineer before the material is excavated.

PSDB 8.3.3.4 Overhaul

Replace the contents of this Clause with the following:

All movement of cut to fill material shall be regarded as freehaul. In addition, all movement of topsoil, and any other material within the boundary of the site and less than 0.5 km from the site boundary shall be regarded as freehaul.

Overhaul will only be paid where the transportation of material is beyond 0.5 km of the boundary of the site.
Overhaul shall not apply to imported material from commercial sources.

The overhaul distance shall be measured from the point of exit of the site perimeter to the agreed centre of the designated spoil area.

SECTION PSDK: GABIONS AND PITCHING (APPLICABLE TO SABS 1200 DK - 1996)

PSDK 3 MATERIALS

PSDK 3.1.2 Gabion Cages

Add to the Sub-Clause:

The wire used for the fabrication of wire mesh cages and for lacing and bracing operations shall be plain zinc-coated mild steel wire. No PVC coating will be required.

PSDK 3.1.2 Gabions

Replace Clause 3.1.2 with the following:

Gabion boxes shall consist of double twisted, hexagonal wire mesh of nominal 80 mm mesh, with 4.4 mm o/d frame wire and 2.7 mm o/d mesh wire. Complete with partitions at 1 m centres. All wire to be mild steel to SANS 1580 – 2010, zinc coated by hot-dip galvanizing to SANS 675 – 2009.

Mattresses shall consist of double twisted, hexagonal wire mesh of nominal 80 mm mesh, with 4.4 mm o/d frame and 2.7 mm o/d mesh wire. Complete with partitions at 1 m centres. All wire to be mild steel to SANS 1580 – 2010, zinc coated by hot dip galvanizing to SANS 675 – 2011.

PSDK 3.1.3 Geotextile

Add to the Sub-Clause:

Geotextile filter fabric:

Where the Engineer has authorised the use of geotextile filter fabric, this shall be measured by area as: width x nett length, where the width shall be the full or half-width supplied by the manufacturer which conforms closest to the specified of plus 2 x base width plus 200mm. The tendered rate shall include the cost of supply, placing and losses as a result of overlaps and over excavated trench widths.

Geotextile to conform to the following minimum specifications:

Material: Nonwoven, needle punched, Continuous Filament, Polyester Geotextile (minimum)
Tensile Strength: 14 kN/m (minimum)
UV Stability: 70% strength retained after 1000 hours
Permeability @ 50mm head: 3.6 m/sx10^{-3}

The material shall be placed as directed and shall not be exposed to direct sunlight for prolonged periods.

PSDK 3.2.1.2 Stone

Amend the Sub-Clause as follows:

In Table 2, Column 2, for extra heavy, replace 300 with 500.

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 2.7 (Refer to PSDK 3.1.2) mm diameter galvanised steel wires.

Nominal 80 mm mesh shall be used for mattress cages with 2.7 (refer to PSDK 3.1.2) mm diameter galvanised steel wires.

Selvedge wire shall be galvanised and the diameter shall be a minimum of 4mm.

PSDK 5 CONSTRUCTION

Add new Sub-Clause:

PSDK 5.1.3 Diaphragms

Each diaphragm shall be connected in the same manner to the sides and top panels in addition to the bottom panel.

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 are to be used will be indicated on site by the Engineer.

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.

SECTION PSDM: EARTHWORKS (ROADS, SUBGRADE) (APPLICABLE TO SABS 1200 DM - 1981)

PSDM 3 MATERIALS

PSDM 3.1 Classification for excavations purposes

Delete the clause and replace with the following:

The classification of material for excavation shall be as specified in Project Specification Clause PSD 3.1.2.

PSDM 3.2.3 Selected Layer

Add the following:

The Contractor shall obtain selected subgrade material from the existing stockpile on site. The unit rate tendered shall include all related costs, including haulage. The material quality shall comply with that of a G7 natural gravel as specified in SANS 1200 and shall be compacted to the specified Mod AASHTO Density.

PSDM 5 CONSTRUCTION

PSDM 5.2.2.4Temporary stockpiling of Materials

Add the following paragraph:

The Contractor shall programme the works in such a manner that suitable excavated material from site or imported from a commercial sources, shall be placed directly in the appropriate position in fill to ensure that temporary stockpiling is not needed. No payment shall be made for the temporary stockpiling of material except when so ordered in writing by the Engineer.

PSDM 5.2.3.3a) Preparation and compaction of road bed

Substitute the first paragraph with the following:

The roadbed shall be scarified to a depth of 150 mm, watered, shaped and compacted to 93 % of AASHTO density (100 % for sand), except where otherwise ordered by the Engineer.

Where the existing subgrade material does not conform as a minimum with the G9 specifications as per the TRH 20, the Contractor is to notify the Engineer and request approval for inclusion of a selected sub-grade layer. In this case the box floor shall be levelled and compacted with two passes of a vibratory roller.

PSDM 5.2.8 Transport of earthworks

Delete the Sub-clause and substitute:

PSDM 7 TESTING

PSDM 7.3.2 Routine inspection testing

Replace the contents of this sub-clause with the following:

No density shall be less than the specified minimum density for the relevant layer.

The cost of additional testing ordered by the Engineer, and of which the results do not comply with the specified minimum requirement for the material, shall be borne by the Contractor and will be subtracted from the monthly payment certificates.

PSDM 8 MEASUREMENT AND PAYMENT

be paid as per the rate for normal excavation (8.3.4 or 8.3.5 as appropriate).

PSG CONCRETE (STRUCTURAL) (SANS 1200 G)

PSG 2: INTERPRETATIONS

PSG 2.4.2 Strength concrete

Add the following to this Sub-clause:

With the exception of mixes weaker than 15 MPa, all concrete for the Works shall be considered to be strength concrete.

Unless otherwise specified on the drawings or in the Schedule of Quantities, all structural concrete shall be Grade 35 MPa/19.

PSG 3: MATERIALS

PSG 3.2 Cement

Add the following to this Sub-clause:

CEM1 42.5 as specified in SABS EN 197-1 common cements, a 75% CEM1 42.5 and 25% PFA blend or 50% slagment and 50% CEM1 shall be used as specified in the relevant sections of SANS 1491 and SANS EN 197-1. Any variations to these are subject to the Engineer's approval.

For non-structural concrete CEMI 32.5 is acceptable.

PSG 3.2.3 Storage

Add the following to this Sub-clause:

Cement shall be used in the order in which it is received (first in, first out basis)

Cement kept in storage for longer than 6 weeks shall be removed from site and not used in the Works.

Any cement that shows signs of hydration, such as the formation of lumps, may not be used and is to be immediately removed from site.

PSG 3.3 Water

Replace the contents of this clause with the following:

Only potable quality water from an approved source may be used for mixing concrete. Water from a river or stream may only be used for curing.

PSG 3.4 Aggregates

PSG 3.4.1 Applicable Specification

Add the following to this Sub-clause:

The maximum aggregate size shall be 25 mm. Any aggregate may be used provided the free sodium alkali content in the concrete mix does not cause an alkali-aggregate reaction.

Coarse aggregate may be obtained from the nearest available commercial sources, and shall be subject to the Engineer's approval.

Fine aggregate may be obtained from local sources subject to testing of its suitability by an approved laboratory and approval by the Engineer.

Aggregates shall be tested periodically for reactivity, the costs of which shall be deemed included in the rate tendered for concrete. A design mix will have to be made and the results submitted to the Engineer for approval before construction begins.

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

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

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

Aggregates for grouting

Notwithstanding the requirements of Sub-clause 3.4.1, the grading of the fine aggregate (sand) and coarse aggregate (stone or pea gravel) to be used for grouting shall conform to the grading given in Tables 1 and 2 respectively, below.

TABLE 1 - SAND	
Test sieve nominal aperture size, mm	% Passing (by mass)
9,5	100
4,75	95 - 100
1,18	45 - 65
0,3	5 - 15
0,15	0 - 5

TABLE 2 - STONE OR PEA GRAVEL	
Test sieve nominal aperture size, mm	% Passing (by mass)
9,5	100
4,74	95 - 100
2,36	0 - 5

Dolomitic Aggregate

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

PSG 3.5 Admixtures

Add the following Sub-clause to clause 3.5:

PSG 3.5.3 Pulverized fly ash (PFA)

PSG 3.5.3.1 General

Concrete containing a percentage of FA shall be termed FA concrete. Pulverized fly ash (PFA) shall conform to the requirement of SANS 1491-2.

All concrete used shall consist of FA in the concrete unless otherwise shown on the drawings or ordered by the Engineer.

FA concrete shall conform to the requirements of SANS 1200 G for concrete and the additional requirements specified below.

PSG 3.5.3.2 Source and quality

Fly Ash shall be procured from an approved source and shall be of a consistent quality conforming to SANS 1491-2. In particular it shall be tested for and shall conform to the following:

the loss on ignition shall not exceed 5%
the percentage by mass retained on 45 micron screen shall not exceed 12.5%

PSG 3.5.3.3 Cementitious material

The cementitious material used for FA concrete shall consist of a mixture of between 75% and 80% by mass of ordinary Portland cement and of between 25% and 20% by mass of FA.

Add the following Clauses:

PSG 3.9 Granolithic screed

Granolithic screed shall consist of:

Cement	1 part by mass
Sand	1,25 parts by mass
Coarse aggregate	2 parts by mass

The coarse aggregate shall consist of granite or other approved chips which shall pass a 10 mm sieve and be retained on a 5 mm sieve.

The cement/water ratio of the mix shall be at least 2,0.

PSG 3.10 Bond breaker

The bond breaker where specified under floor slabs shall be 250 micrometre polythene sheet complying with SANS 952, Type D.

~~Where bitumen impregnated resilient fibreboard is specified, it shall comply with American Federal Specification HH-F-341a for Type 1, Class B.~~

PSG 3.11 Materials for movement joints

PSG 3.11.1 General

The various jointing materials, the manufacturers of the materials and the methods of application shall be as approved by the Engineer. Materials shall be stored and protected to avoid damage, degradation, distortion or contamination.

The joint materials shall be resistant to ultraviolet light and to biological degradation.

PSG 3.11.2 Waterstops

Waterstops shall be of approved manufacture and of the pattern and the material and widths scheduled and specified and shown on the drawings. They shall comply with the tolerances specified in Clause 6.1 of SANS 1200G. They shall conform to Specifications CKS 388 or 389, for natural rubber or PVC respectively, and have the appropriate physical properties as set out below:

	PVC	Rubber
Tensile strength (@ 25oC)	12,2 MPa	20,7 MPa
Elongation at break (@ 25oC)	250%	500%
Hardness BS degrees (IRHD @ 25oC)	-	60 to 65o
Softness (BS)	28 to 52o	-

All intersections between waterstops shall be prepared by mitring and welding/vulcanising intersection pieces in the factory in accordance with the manufacturer's instructions and to approval of the Engineer. Only straight lengths of waterstop may be field welded using the appropriate jigs and tools.

Where required, waterstops shall have eyelets so that they may be tied securely to the adjacent reinforcement. "Rearguard"-type waterstops shall have flanges or cleats that grip effectively.

PSG 3.11.3 Fillers

Closed cell expanded polyethylene fillers shall comply with the following:

Property	Unit	Value Test Method
Density	kg/m3 110	DIN 53420
Compression Stress at compression strains of 10% 25% 50%	kPa 175 kPa 210 kPa 340	DIN 53577 DIN 53577 DIN 53577
Compression set after 24 hours recovery	% 14	
Tensile Strength	kPa 680	DIN 53571
Elongation at Break	% 49	DIN 53571
Max. water absorption after 24 hours by volume	% 0,1	ASTM C-177

Fillers shall be pre-cut to suit the application with a tear-out strip for forming the specified recess for the sealant. If so required the filler shall be glued into position with approved epoxy glue.

PSG 3.11.4 Bond breakers, primers and sealants

The bond breaker (if specified) shall be self-adhesive PVC tape (or equal, approved material) with a width the same as the joint recess into which it is to be applied.

The primer, if required for the sealant, shall be fully compatible with the sealing compound that is to be used.

The elastomeric sealant shall be either a two-component polysulphide liquid polymer base complying with the requirements of SANS 110 or a polyethylene based polyurethane "pouring grade" for horizontal or near horizontal joints or "gun grade" for vertical/overhead joints and joints steeper than 1 in 10 to the horizontal. All elastomeric sealants shall comply with BS 4254 Type A1 and shall have a movement tolerance of 25%.

PSG 3.12 Precast paving slabs

The paving slabs shall comply with the requirements of SANS 541, shall be as scheduled and with patterned surface, or equal approved. Samples of the types which the Contractor proposes to use shall be submitted for approval prior to construction.

PSG 4: PLANT

PSG 4.3 Mixing plant

PSG 4.3.1 General Requirement for Mixing Plant

Add the following to this Sub-clause:

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

PSG 4.4 Vibrators

Add the following to this Sub-clause:

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

Vibrators for in-situ concrete shall be of the internal or immersion type.

PSG 4.5 Formwork

PSG 4.5.3 Ties

Add the following to this Sub-clause:

The use of sleeves for formwork ties through the walls of water retaining structures will not be permitted. Ties, when cast in, shall have some form of positive anchorage to prevent any rotation when loosening formwork and some form of water bar to restrict seepage along the tie.

For Watertight concrete structures the shutters shall be fastened using an approved imbedded fastening system. Open ferrules will not be permitted.

Add the following Clause:

PSG 4.6 Water-bath

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

PSG 5 CONSTRUCTION

PSG 5.1 Reinforcing

PSG 5.1.2 Fixing

Add the following to this Sub-clause:

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

Fixing blocks for the attachment of fixtures may be embedded in concrete provided that the strength or any other desirable feature (such as appearance of the member) is not, in the opinion of the Engineer, impaired thereby.

Supports shall be of approved precast concrete blocks properly shaped to maintain position or proprietary supports of an approved type. Concrete blocks shall be adequately cured as specified. Wooden supports shall not be used nor shall bars be placed in succeeding layers of fresh concrete nor shall bars be adjusted during the placing of concrete. Tie-wire shall point away from the nearest formwork face.

Where clips, stools and other supports are not shown on the drawings and are structurally not required, the Contractor shall provide those supports he deems necessary to ensure the correct positioning of the reinforcement, to the satisfaction of the Engineer. The cost of such steel, labour, and other fixing materials shall be inclusive in the rate for the scheduled reinforcement and no additional payment shall be made.

PSG 5.2 Formwork

PSG 5.2.1 Classification of finishes

Add the following to this Sub-clause:

Rough formwork Degree of Accuracy III may be used on the outside faces where the concrete is more than 500 mm below the final ground level.

Smooth formwork Degree of Accuracy II will be used elsewhere.

Where specified special finishes shall be to Degree of Accuracy I

PSG 5.2.2 Preparation of formwork

Add the following to this Sub-clause:

All exposed external angles in concrete work shall have 20 mm x 20 mm chamfers unless otherwise specified or ordered, but the top edge of a slab that is to receive an applied finish shall not be chamfered.

PSG 5.5 Concrete

PSG 5.5.1 Quality

Add the following to this clause:

35 MPa concrete with the minimum and maximum cement contents of 325 kg/m3 and 450 kg/m3 respectively shall be used. For concrete containing extenders the maximum cement content shall be 450 kg/m3. The water to cement ratio shall not exceed 0.50. All concrete mix designs shall be approved by the Engineer in advance.

The mix design and casting procedure shall be approved by the Engineer prior to casting.

All Water Retaining structures and all manholes shall be constructed using watertight concrete. The Contractor shall abide by all conditions set out in sub-clause 5.5.11 as amended of SABS 1200 G, and pay particular attention to this aspect of the works.

Cubes shall be taken on all pours in accordance with SABS 1200 G. Payment shall be included in the rate tendered for the supply of concrete. No payment shall be made for concrete pours on which no cube tests have been performed. A single cube test comprises the mean crushing strength of 3 cubes taken from the same batch of concrete and cubes must be taken at the frequency specified SANS 1200 G

The concrete shall be tested for water sorptivity, oxygen permeability, chloride conductivity, depth of cover and shrinkage; the details of the tests are given on the specification.

PSG 5.5.1.4 Chloride content

Add the following to this Sub-clause:

Efflorescence will not be acceptable on any exposed concrete surface

PSG 5.5.1.5 Durability

Add to this Sub-clause the following:

The water/cement ratio, as specified in Table 5, but shall not exceeding 0.5.

PSG 5.5.1.6 Prescribed mix concrete

Add the following to this Sub-clause:

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

"No-fines" concrete:

A nominal aggregate size of 19 mm shall be used in the manufacture of "no-fines" concrete.

No-fines concrete shall be laid under where specified and shall consist of coarse aggregate, cement and water only. No fine aggregate shall be used. Sandwiching or layering of pours will not be permitted. The Contractor shall cast to the profile depth in one pour.

The mixing of the cement and water paste shall have the consistency of paint capable of coating each coarse aggregate particle uniformly and sufficiently to form a small fillet at all the contact points of each stone in the aggregate.

Between 24 and 48 hours after the no-fines layer has been laid it shall be covered with 1:4 cement: sand mortar layer 20 mm thick. The mix shall be comparatively dry to ensure that it does not penetrate and block the cavities in the no-fines concrete. The surface shall be steel floated to form a plane surface.

The mortar skim shall be cured in the same manner as concrete for a period of not less than 2 days.
Payment shall be per cubic metre of no-fines concrete placed. The rate shall include compaction and skimming to the approval of the Engineer.

PSG 5.5.1.7 Strength Concrete

Add the following to this Sub-clause:

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

The Contractor shall submit details of the proposed concrete aggregates and design mix to the Engineer for approval, after which he shall be required to make a trial mix and obtain cube test results to validate the proposed mix. Only after receipt of satisfactory cube test results, the Contractor shall be permitted to use the mix in the construction of water retaining structures. The cost of designing and proving the proposed concrete mix shall be deemed to be included in the tendered rates.

The Engineer may call for revised mix designs at any stage during the Contract.

Where blinding layers are specified, the concrete shall be grade 15 MPa/19 placed and finished off to the final level.

In order to facilitate or increase the workability of concrete in the fresh/plastic state, to ensure watertightness without increasing the water/cement ratio, the Engineer may approve the use of an additive.

The workability of concrete shall be assessed by means of the slump test. The slump shall be between 75 ± 25mm.

Curing

Curing shall be done using a curing compound to the Engineer's approval and frequency or, in addition to water curing, well-secured plastic sheeting, shall be used. Water curing alone shall not be permitted. Where the Contractor fails to cure for a minimum of 7 days, no payment shall be made for the relevant pour of concrete.

PSG 5.5.2 Batching

Add the following to this Sub-clause:

Batching of all strength concrete shall be by mass. Prescribed concrete may be batched by volume. Batching shall not be done by wheelbarrow.

All concrete shall be mechanically mixed.

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

PSG 5.5.3.2 Ready-mixed concrete

Replace the contents of this Sub-clause with the following:

Concrete from a central concrete production facility other than on the construction site will be permitted if the facility is within a 40 km radius of the site and, apart from test results in terms of Sub-clauses 7.3.1, 7.3.2 and/or 7.3.3, test results obtained by such a production facility as part of its quality control system will be accepted for evaluation in terms of Sub-clause 7.3.4, provided the cubes are stored and cured on site.

PSG 5.5.5 Placing

Add the following Sub-clause:

PSG 5.5.5.10 Casting of concrete in excavation

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

Concrete used in pipe trenches for encasement and for the thrust / anchor blocks may be cast directly against the side of the excavation.

After vibration, the concrete shall be spaded in corners, in angles and against forms to release air bubbles which may have been trapped in these positions.

PSG 5.5.7 Construction joints

Add the following to these Sub-clauses:

PSG 5.5.7.1 General

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

All joints, other than expansion, contraction and other movement joints shall be treated as follows:

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

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

All constructional joints shall be dealt with as specified in Sub-clause 5.5.7.3, as amended.

Unless construction joints between designated joints shown on the drawings are authorized by the Engineer in writing, concrete in the floor and wall shall be cast continuously between the designated joints shown on the drawings.

PSG 5.5.7.2 Formed joints (generally vertical or near vertical)

Formed joints will be considered to be designated joints as defined in Sub-clause 2.4.3. (The forming of a straight edge to a construction joint as specified in PSG 5.5.7.1, as amended, General does not constitute a formed joint).

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

PSG 5.5.7.3 Non-designated joints

Any non-designated joints shall be identical to designated joints, as shown on the drawings, which would be used in similar positions and shall perform the same function.

Add the following Sub-clauses:

PSG 5.5.7.4 Joints between footings or floors and walls or columns

Construction joints between foundations, footings or floors and walls, columns or piers connected to them, shall not be made flush with the supporting surface, but shall be made at a distance above the footing or floor shown as on the drawings or approved by the Engineer. The "kicker" shall be cast as an integral part of the foundation, footing or floor.

PSG 5.5.7.5 Construction Joints In Circular Reservoirs

Construction Joints In Walls Or Footings
Construction joints may only be placed where shown on the drawings or to the approval of the Engineer. Vertical joints in the walls of the reservoir are permitted only in the pre-stressed reservoir. These joints shall only be permitted radially on each side of stressing buttresses. No vertical joints shall be permitted in the reinforced concrete reservoir.

The entire contact surface along the joint in the concrete already cast shall be chipped or water jetted to expose the coarse aggregate to 5 mm beyond the surrounding matrix. Care shall be taken to ensure that the concrete structure is not damaged and that all loose material is removed. The surface must be thoroughly cleaned and wetted before casting against the joint.

All construction joints in the reservoir walls and footing shall be cast with water stops. Water stops shall be as per detail drawings. No construction joints will be permitted in the floor.

Payment shall be per linear meter. The rate shall include supply and casting in of the water stop as per detail drawings.

Construction Joints In Roof Slabs

Construction joints in the roof slab are permitted. The position of these joints shall be approved by the Engineer.
These joints shall be cast against a vertical shutter leaving a 15 mm deep by 20 mm wide recess which is sealed with a one part poly-sulphide sealer on completion. The sealer used and method of application shall be to the Engineer's approval.
No water stops are required; however, the completed roof shall be tested for water tightness in accordance with Sub-clause PSG 7.2.5(b), as amended. No additional payment shall be made for these joints.

Expansion and Contraction Joints

Expansion and contraction joints shall be constructed as detailed on drawings using PVC or rubber water stops.

Water stops extruded from recycled material shall not be permitted.

Prior to bandaging, concrete surfaces shall be scabbled with a mechanical scabbler and water jetted with a 200 bar water jet. All joints shall be butt jointed and patched over.

The waterproofing bandage shall comprise of two elements:

(i) A 2 mm thick Hypalon or Combiflex strip

(ii) (For Expansion joints) A 2 mm x 60 mm stainless steel strip with polythene backing bond breaker to the detail shown on the drawing.

The bandage shall be applied by coating the concrete and underside of the hyperlon bandage with an epoxy adhesive. The stainless steel strip is first positioned over the joint and the bandage with epoxy adhesive placed over the stainless steel strip. All trapped air shall be eliminated by hand rolling the bandage until the epoxy is fully cured.

Payment shall be per linear meter. The rate shall cover all costs for the supply and application of water stops and bandaging including the installation of the stainless steel strip.

PSG 5.5.7.6 Application of primers and adhesives

The concrete to which the primer or adhesive is to be applied shall be dry and shall be cleaned of all dust, grit, grease, surface laitance and foreign matter by compressed air and/or water, solvents, or other suitable approved means. The Contractor shall provide on Site an approved moisture meter to measure the degree of dryness of the joint. This meter shall be made available to the Engineer for testing. The joint shall be approved for the application of the primer and adhesive if the moisture content of the concrete is less than or equal to 5%. It may be necessary to dry the concrete surfaces locally to reduce the moisture content to 5% or less.

PSG 5.5.7.7 Contraction and expansion joints

Contraction and expansion joints shall be formed true to line in smooth formwork.

All surfaces shall be thoroughly cleaned of all accretions of concrete or other foreign matter by scraping or other approved means.

Particular care shall be taken to compact the concrete around waterstops, edges, etc.

Rebates for seals shall be formed to required dimensions and lines, or cut true to line and size after floating the surface and before the final set of the cement has taken place. All rebates, etc., shall be adequately protected against damage until the completion of the work; accidental damage which in the opinion of the Engineer will impair the performance or appearance of the joint shall be made good by reconstructing the work as directed by the Engineer. Rebates for seals shall be grit blasted or wire brushed on all faces to remove surface laitance and thoroughly cleaned with soft brushes and/or compressed air jets, and, if necessary, dried by blow-lamp or other approved means before priming.

PSG 5.5.7.8 Installation of waterstops in joints

Waterstops shall be held in the formwork so as to prevent air pockets forming underneath them. Special precautions shall be taken, to the approval of the Engineer, to ensure that all flexible waterstops are in perfect contact with well compacted void-free concrete.

PSG 5.5.7.9 Installation of joint filler in expansion joints

Joints in the filler shall be neatly butted so as to exclude mortar from the joint. Edges of filler strip against waterstops, concrete, formwork, projections, etc., shall also be closely fitted to exclude mortar, so that there is no resistance (other than the compression of the filler) to the expansion movement for which the joint is designed.

Joint filler shall be fixed to the first cast of concrete with an approved adhesive and as directed by the Engineer.

PSG 5.5.7.10 Application of joint seals

Rebates shall be cleaned as required by PSG 5.5.7.6 Application of primers and adhesives and shall be inspected and approved by the Engineer's Representative before filling.
Joint sealants and primers shall be applied strictly in accordance with the manufacturer's instructions. Flow and non-slumping grades shall be used for horizontal and vertical joints respectively.
Immediately after the compound is applied the joint shall be protected against damage until completion of the Contract.

PSG 5.5.8 Curing and protection

Add the following to this Sub-clause:

PSG 5.5.8.1 Horizontal surfaces

Surfaces of the concrete shall be treated with a curing compound complying with Sub-clause PSG 5.5.8.3 Post-Crystallization (Concentrate & Modified) slurry coat and curing.

PSG 5.5.8.2 Formed surfaces

In order to improve the effectiveness of the crystallization treatment, the specified minimum time for the removal of the formwork shall be three days. All surfaces shall be pressure cleaned in accordance to the product manufacturer's requirement.

PSG 5.5.8.3 Post-Crystallization (Concentrate & Modified) slurry coat and curing

The Concrete surfaces to receive a concentrate slurry coat treatment shall have an open capillary system to provide 'tooth and suction', and shall be free from scale, excess form oil, laitance, curing compounds and foreign matter.

Surfaces shall be smooth and uncovered from excess form oil, laitance and foreign matter. The concrete should be lightly water blasted to remove such material for surface preparation.

Concrete surfaces must be thoroughly saturated with clean water prior to application in order to ensure the growth of the crystalline formation deep within the pores of the concrete. Wetting to be done must be at least 1hr before application. If concrete surface dries out before application, it must be re-wetted.

The concentrate slurry is applied at a coverage rate of 1kg/m² using a semi-stiff nylon bristle block brush – work slurry well into the surface, filling surface pores and hairline cracks. The coating must be uniformly applied at approximately 1.25 mm thickness. The second modified slurry coat with the same application rate must be applied within 48 hours of the first coat. Light pre-watering between coats may be required when drying out signs appear. Detail coating applications shall be confirmed by the manufacturing.

Cure by spray for minimum of 3 days must be established once the final coat has been applied. Protect from rainfall, puddling of water, wind & frost for at least 48 hours after application. When plastic sheeting is used as protection allowance must be made for the coating to breathe.

PSG 5.5.8.4 Curing for normal concrete surfaces

The use of membrane curing compounds will be allowed on vertical faces or steeply inclined faces (i.e. steeper than 45o to the horizontal) of cast in situ members of the structures subject to the Contractor producing sufficient, satisfactory cube crushing strength test results where the crushing strength of cubes which have been cured with the proposed curing membrane and left exposed to the elements are compared with those of an equal number of water cured cubes. The crushing strength of cubes cured with the proposed membrane shall be at least 85% of the crushing strength of the water cured cubes.

Before any membrane curing compound is used, each batch shall be tested on a trial surface to ensure that it forms a satisfactory membrane, and any compound which is unsatisfactory in the opinion of the Engineer, shall be rejected. Curing membranes will be disallowed if permanent discolouration of the concrete takes place. Surfaces where curing membranes are used shall be treated in such a manner that the final concrete texture and colour blends in with the rest of the concrete work. Furthermore, the Engineer shall, at his discretion, require the Contractor immediately to adopt an effective alternative means of curing any area of the structure to which a membrane has been applied which, in the opinion of the Engineer, is unsatisfactory. The curing compound used shall be to the approval of the Engineer. Wax based curing compounds will not be permitted.

The curing compound shall be applied immediately as formwork is progressively stripped or, in the case of unformed surfaces, when the concrete has taken its initial set. It shall preferably be applied by spraying and the rate of application shall be strictly in accordance with the manufacturer's recommendations. A method of monitoring the area to which curing compound has been applied and the application rate shall be as approved by the Engineer and rigidly applied by the Contractor.

Surfaces of joint rebates, where elastomeric sealant is to be applied, shall be protected from contamination by curing compound by the use of masking tape.

PSG 5.5.9 Adverse Weather Condition

Replace the contents of Sub-clause 5.5.9.2 with the following:

No placing of concrete shall take place if the ambient temperature exceeds 32oC, or is likely to rise to above 32oC during the casting period or within eight hours after casting is completed.

If concrete is to be cast during times of high ambient temperature or hot drying winds, the Contractor shall be responsible for taking the necessary steps to keep the placement temperature as low as possible. Such steps include the spraying of the coarse aggregate with water, the painting of silos with a reflecting aluminium paint, the insulation of tanks and pipelines, and the protection of concrete ingredients against the direct rays of the sun. The area of the pour shall be shaded before and during concreting and the concrete shall be shaded from the time of mixing until eight hours after placing.

Windbreaks shall be erected if necessary.

PSG 5.5.10 Concrete surfaces

Replace the contents of this Clause with the following:

PSG 5.5.10.1 Screeded finish

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

PSG 5.5.10.2 Wood-floated finish

Where wood-floating is ordered or scheduled, the surface shall first be given a finish as specified in Sub-clause PSG 5.10.1, as amended, Screeded finish and, after the concrete has hardened sufficiently, it shall be wood-floated, either by hand or machine, only sufficiently to produce a uniform surface free from screeding marks.

PSG 5.5.10.3 Steel-floated finish

Where steel-floating is specified or scheduled, the surface shall be treated as specified in Sub-clause PSG 5.5.10.1, as amended, Screeded finish except that, when the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, the screeded surface shall be steel-trowelled under firm pressure to produce a dense, smooth, uniform surface free from trowel marks.

PSG 5.5.10.4 Granolithic screeds

PSG 5.5.10.4.1 General

Before placing any granolithic screeds the base concrete shall be chipped to expose the aggregate over 100% of the area to be screeded and soaked with water for at least 24 hours.

The base concrete shall be thoroughly cleaned by scrubbing and all standing water removed after soaking. A 1:2 cement/sand grout shall then be brushed into the prepared surface followed by the granolithic screed before the grout sets. The granolithic screed shall be of the driest feasible consistency with a slump not exceeding 50 mm and shall be formed true to profile and shape as required and shown on drawings. Before placing granolithic screed against an adjacent band of granolithic screed the edge of the latter shall be prepared by chipping back to firm material, wire brushing and brushing with grout as for the base concrete.

Granolithic screed shall be compacted to remove all air and shall be screeded and finished with a steel trowel to Degree of Accuracy 1.

The trowelling shall be carried out in the following stages:

a) First - as soon as the granolithic screed has been compacted and screeded.

b) Second - after 2 hours to close the surface and remove laitance.

c) Third - after a further 4 hours.

The time intervals are estimated as appropriate to normal temperature conditions and shall be varied by the Contractor to ensure a smooth dense finish.
Granolithic screed shall be cured as specified in Sub-clause 5.5.8(b), as amended, but shall additionally be protected from direct sunlight and drying winds as it is being placed.

All screeding necessary to accommodate mechanical equipment shall be done under the equipment supplier's supervision and in strict accordance with his instructions. It shall be commenced as soon as the equipment supplier gives notice on completion of erection and shall be finished expeditiously.

PSG 5.5.10.4.2 Screed to floor (Where Specified)

Where screed is specified it shall be approximately 50 mm thickness is required to each floor.

The screed shall be formed from granolithic concrete as specified in Sub-clause PSG 5.5.10.4 Granolithic screed. The screed shall be applied after the mechanical equipment has been erected by the mechanical plant contractor and shall be laid in alternate concentric rings not greater than 2,00 m in width. A period of 24 hours shall elapse before the intervening rings are laid.

The Contractor shall supply and fit a plywood template to the clarifier mechanism to act as a guide in determining the finished screed level. He shall not use the template to physically form the screed surface nor shall he place an excessive load on the scraper mechanism.

The Contractor shall only operate the scraper mechanism in strict accordance with the instructions of the manufacturer and the Engineer, and he shall make good any damage resulting from the use of the machinery.

Granolithic concrete shall be placed in position for a distance of approximately 3,0 m in front of the template and consolidated and roughly trimmed to level. The surface of the screed shall then be trimmed off to the level of the template which shall be moved as required by hand operation of the mechanism.

The trimmed surface shall be steel float finished and the edges of the ring left in a rough vertical condition to provide a key for the adjoining ring.

The preparation of the base concrete shall be done in accordance with Sub-clause PSG 5.5.10.1, as amended, Screeded finish. Before placing granolithic concrete against an adjacent band of granolithic concrete the edge of the latter shall be prepared by chipping back to firm material, wire brushing, and brushing with grout as for the base concrete.

Concrete to manholes shall be watertight concrete.

PSG 5.5.11 Watertight Concrete

Add the following to this Sub-clause:

The water-tightness of the reservoirs, all liquid retaining structures and concrete chambers shall be tested as indicated below:

On completion the structure shall be cleaned and shall be filled with water at an approved rate. After allowing a period of absorption of 3 days, the depth of water shall be recorded and the water allowed to stand for a further 7 days during which the total permissible drop in water level after allowing for evaporation should not exceed 10 mm.

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

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

The floors, walls and roofs of all water retaining structures shall be considered to be watertight concrete structures.

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

The cost of the above tests will be deemed to be included if the rates for the relative concrete to be provided by the contractor.

PSG 5.5.14 Defects

Add the following to this Sub-clause:

All defects shall be repaired as soon as possible after the formwork has been removed and the Engineer has inspected the concrete. A statement of the method to be used for each repair shall be submitted to the Engineer for his approval before any work is carried out. The Engineer may prohibit the further placing of concrete in the particular area concerned until he is satisfied that the repair has been satisfactorily executed.

Add the following sub-clauses:

PSG 5.5.16 Casting pipes and specials in concrete

Where the pipe or special is supplied by others the Contractor may elect to provide a box-out in the wall and cast the unit in at a later stage. When constructing such box-outs reinforcement shall not be cut but shall run through the opening. Reinforcement shall be cut and/or bent out at a later stage to suit the item being cast in. After installation of the item the remaining reinforcement shall be bent back in position.

Where entry holes for pipes/specials have been provided in the walls, the Contractor shall be responsible for the concreting in of such pipes/specials regardless of whether or not these have been supplied by himself.

Before commencing the positioning in holes of any pipes/specials the Contractor shall:

remove all formwork and boxing remaining in the holes;

make any alternations required to the position and shape of the holes and cut reinforcement to suit the item, as directed by the Engineer; and

thoroughly scabble the sides of the holes so as to obtain a satisfactory bond surface for the new concrete and treat the surface as specified in Sub-clause 5.5.7.3, as amended.

Immediately prior to the placing of mortar and concrete around the pipes, the surface of the existing concrete shall be saturated with water. All surplus water shall be removed and the surface covered with a layer, approximately 12 mm thick, of mortar made of the same mix as the concrete in which the pipes/specials are to be placed.

The concrete ingredients shall be mixed and placed as dry as possible to obtain a dense, waterproof concrete. The concrete shall be carefully worked around the puddle flange, if any, and the pipe barrel or body of the special, and shall be vibrated in layers so as to obviate a falling away from pipe/special surfaces of the concrete already placed. The whole shall, when set, form a dense, homogeneous, and waterproof mass.

PSG 5.5.17 Precast paving slabs

The area to be paved shall be compacted to a minimum of 93% Mod AASSHTO density (100% for sand), trimmed and then treated with an approved weedkiller, with care being taken to avoid contaminating surrounding areas. The paving slabs shall be laid on a sand bed approximately 25 mm thick, which shall be graded to the required levels and slopes as approved by the Engineer. The joints between the slabs shall be 2 mm to 6 mm wide and shall be grouted with cement mortar. Gaps in the pattern of slabs shall be filled with Grade 15MPa/19 concrete and given a wood floated finish.

PSG 5.5.18 Items to be cast in or grouted into concrete

PSG 5.5.18.1 Fixings for equipment supplied under separate contract

a) The Contractor will be responsible for the forming of pockets to the details shown on the drawings to accommodate holding down bolts for equipment supplied under a separate contract. Holding down bolts will be supplied by and positioned by others.

b) After casting of the concrete all shuttering shall be removed and the sides of the bolt holes and surface on which the machine base is to be placed shall be scabbled to remove all defective concrete, laitance, dirt, oil, grease and loose material.

c) Upon completion of the positioning and alignment of equipment and when instructed by the Engineer the Contractor shall in collaboration with the mechanical contractor, grout up pockets and baseplates by filling pockets and voids under the baseplates with an approved non-shrink grout.

PSG 5.5.18.2 Fixings for items supplied under this Contract

Holding down bolts or other fixings required for the installation of items supplied under this Contract shall be provided by the Contractor. These fixings shall be cast in or grouted into pockets or installed by other means as approved by the Engineer.

Where anchor bolts are used which are installed into holes drilled into concrete or masonry these shall be of a type approved by the Engineer. All such bolts used shall be manufactured from stainless steel or a metal with a resistance to corrosion equal to that of grade 304 stainless steel. The metal used for bolts shall be compatible with galvanized mild steel.

Anchor bolts shall have minimum pull-out forces and minimum ultimate lateral loads at least equal to those specified below:

Specified Anchor Size	Minimum Pull-out Force (kN)	Minimum Ultimate Lateral Load (kN)
M6	10,35	7,60
M8	13,70	11,15
M10	19,44	15,95
M12	31,85	26,90
M16	50,45	45,80
M20	60,50	71,20

PSG 5.5.18.3 Plastic puddle pipe items supplied under this Contract

Plastic puddle pipe cast-in fittings as indicated per drawing required for the installation of items supplied under this Contract shall be provided by the Contractor. These fittings shall be cast in or grouted into pockets or installed by other means as approved by the Engineer.

All such fittings shall be manufactured from uPVC CLASS 16 according to the drawings in accordance with SANS 966. The welded puddle shall be governed in accordance with standards DVS 2207 and SANS 10268. All welded items shall be issued with an accredited quality certificate from an accredited manufacturer.

PSG 5.5.18.3 Supervision

The Contractor shall be responsible for ensuring that the erection of the concrete work is carried out under the supervision of a person with adequate knowledge of the mixing, transporting, placing and curing of concrete.

Programme and Plant

Prior to carrying out any concrete work, the Contractor shall obtain the approval of the Engineer in respect of:

- Structural programme,
- Concrete plant details,
- Materials to be used in concrete,
- Details of concrete,
- Construction joints

PSG7 TESTS

PSG 7.1.2 Frequency of sampling

Add the following to this clause:

One sample shall consist of three concrete test cubes.

For each sample taken the position in the structure shall be recorded where the batch represented by that sample is placed as also the date sampled.

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

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

PSG 7.2 Testing

Add the following Sub-clauses:

PSG 7.2.5 Testing Watertight Concrete

The Clear/potable water retaining structures shall be disinfected before testing. Any re-testing that may be required shall be at the Contractor's expense.

The entire inside surface of the structure including columns and roof shall be thoroughly hosed down with water and brushed until properly cleaned off all dirt and other foreign matter.
The floor of the structure shall then be flooded to a depth of 300 mm with purified water, with calcium hypochlorite solution being added gradually to mix thoroughly as the water enters. The water shall be dosed with calcium hypochlorite at a rate of 150 grams per cubic meter of water entering the structure. The entire inside surface shall again be scrubbed using this water. The workers engaged in this operation shall wear clean rubber boots. On

completion the water is to be run to waste once the free chlorine is reduced to an acceptable level, and the floor of the structure shall be swept clean.
The chlorinated water shall be stored until the free chlorine level has dropped to an acceptable level. Excess dirt swept from the floor into the sump may be discharged subject to written approval being obtained from the Local Authority.

Payment shall be a lump sum. The rate shall cover the costs of all materials and water used.
The structure shall be tested for water tightness in accordance with BS 8007 1987 Section 9.
Testing of the Structure:

For testing the liquid retention, the structure shall be cleaned and initially filled to the normal maximum level with the water at a uniform rate of not greater than 2 m in 24 hours.

When first filled, the water level should be maintained by the addition of further water for a stabilising period while absorption and autogenous healing take place. After a stabilization period of 21 days, refill (top up) and record the water level at 24 hour intervals for a test period of 7 days. During this 7 day test period the total permissible drop in level, after allowing for evaporation and rainfall, should not exceed 10 mm.

Notwithstanding the satisfactory completion of the test, any evidence of seepage of the liquid to the outside faces of the liquid-retaining walls shall be assessed by the Engineer against the requirements of the specification. Any necessary remedial treatment of the concrete, cracks, or joints shall be carried out from the liquid face where practicable. If a lining is used for this purpose, it shall be sufficiently flexible and not be in any way detrimental to the water quality.

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

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

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

Testing of the Roof of water retaining structures

The roof shall be tested on completion by using a hose or sprinkler system to obtain a sheet flow over the whole area of the roof for a period of not less than 6 hours.

The roof shall be considered satisfactory if no leaks or damp patches appear on the soffit.

PSG 7.2.6 Durability Testing:

Concrete shall comply with the durability parameters defined below:

Water Sorptivity:

Sorptivity is sensitive to surface effects and may be used to assess the effectiveness of initial curing.

Oxygen Permeability:

Permeability is sensitive to changes in the coarse pore fraction and is thus a means of assessing the degree of compaction of concrete. It may be used to quantify the microstructure of the concrete and is sensitive to macro-defects such as voids and cracks. Permeability shall be tested in a manner approved by the Engineer.

Chloride Conductivity:

Chloride conductivity provides a method of characterisation of concrete in the marine environment and may be used to assess the chloride resistance of concrete.

Unlike oxygen permeability and water sorptivity, chloride conductivity is not really a measure of construction quality, but it shall be used for materials selection and design of mixes in aggressive chloride conditions. It will therefore only be used as a check on mix designs during the initial stages of construction.

Concrete Cover:

Concrete cover is a dimensional indicator of cover concrete depth. Cover concrete is the outer concrete layer which protects the internal reinforcing steel, and its depth varies according to the requirements of the different environmental exposure classes.

Test for cover shall be conducted using an approved calibrated electromagnetic cover meter.

This test shall be conducted when instructed by the Engineer to confirm that the specified depth of concrete cover has been achieved. The cover meter tests shall cover at least 1 m2 for every 10 m2 exposed. The average cover of the 1 m2 subjected to the test shall be used to determine the payment, unless the Contractor chooses to carry out additional tests as detailed under clause PSG 7.3.8. The cover meter must be calibrated for each project by drilling and measuring actual cover in at least 3 locations to validate the readings.

Minimum cover to reinforcing for the utility building and guard house shall be as indicated on the drawings.

General:

Durability predictions will be based on the following tests that shall be arranged by the contractor. The durability testing shall be carried out by a laboratory approved by the Engineer.

For testing, water sorptivity, oxygen permeability and chlorine conductivity, cores of 68 mm diameter shall be extracted from the structure when the concrete reaches the age of at least 28 days and tested for the durability criteria set out in PSG 7.3.7. The frequency of the testing at the start of the contract shall be such that there is at least one test (consisting of 2 cores) per discrete concrete element, or per 15 m3 poured (whichever is the lesser), until such time that the Engineer is satisfied that the specified criteria are consistently achievable. Hereafter testing shall be limited to one test per discrete concrete element or maximum concrete pour of 40 m3 (whichever is the lesser), or as directed by the Engineer. Depending on access requirements, the frequency and locations of the tests may be changed to suit site requirements as directed by the Engineer. Note that for decks and walls, the cores shall be taken on the exposed faces of the concrete i.e. the soffit and side wall face, taking care not to cut the reinforcing bars. Where the cores do contain pieces of reinforcing steel, they shall not be used for the tests, particularly in the chloride conductivity test or where bleeding cavities may have formed.

The cores shall be extracted through the cover concrete from the constructed concrete element and a slice (25 mm thick) shall then be cut from the outer surface of this core such that the slice is representative of the middle layer of the cover concrete, i.e. the middle layer being a 25 mm thick slice of concrete, 5 mm from the exposed outer surface extending in towards the reinforcement, and tested. The positions at which the cores shall be extracted shall be as indicated by the Engineer.

Filling of the holes left by the drilling of the cores shall be the responsibility of the contractor and shall be carried out using an approved proprietary non-shrink repair mortar so as to restore structural integrity and durability of the structural element tested. The cost of drilling and filling of the holes shall be included in the rate make-up of pay items for durability testing.

PSG 7.2.7 Depth Of Concrete Cover

The procedure for testing for depth of reinforcement from concrete surface shall be in accordance with the manufacturer's requirements for the relevant electromagnetic cover meter. The number of readings taken to each 1 m2 to be tested shall be such that an accurate average cover can be determined for the tested area.

PSG 7.2.8 Shrinkage

The dry shrinkage tests shall be conducted in accordance with SABS 1085. The drying shrinkage shall not exceed 0.04%.

PSG 7.3 Acceptance Criteria for Strength Concrete

Add the following Sub-clauses:

PSG 7.3.6 Durability Parameters Acceptance Ranges

When tested in accordance with the test procedures described below for each potential durability parameter, the concrete shall meet the limits given in the tables below:

PSG 7.3.6.1 Water Sorptivity And Oxygen Permeability

Table PSG 7.3.6.1 Water Sorptivity and Oxygen Permeability

Acceptance Category	Test No. / Description / Unit	
	Water Sorptivity (mm/h)	Oxygen Permeability (log scale)
Concrete made, cured and tested in laboratory	6	> 10.0
Full acceptance of in-situ cast concrete	< 8	> 9.15
Conditional acceptance of in-situ cast concrete (with remedial measures)	8 - 15	8.75 – 9.15
Rejection	> 15	< 8.75

PSG 7.3.6.2 Chloride Conductivity

Table PSG 7.3.6.2	Chloride Conductivity (severe to very severe conditions)							
Concrete	100% PC		10% CSF		30% FA		50% GGBS	
Curing Period	28d	90d	28d	90d	28d	90d	28d	90d
Full wet cured	1.25	1.00	0.50	0.45	1.50	0.40	1.25	1.00
Moist cured (3 – 7d)	1.75	1.60	0.60	0.55	2.25	1.25	2.25	2.00

PSG 7.3.6.3 Concrete Cover

Table PSG 7.3.6.3	Concrete Cover		
Test Description	Specified Cover (mm)	Acceptance Range	
		Minimum	Maximum
Concrete cover to reinforcement	20 – 30	As specified	As specified + 5 mm
	30 - 80	As specified	As specified + 10 mm

PSG 7.3.6 Durability Index Tests

Testing for durability shall be carried out using test panels which are constructed with the same concrete mix, formwork type, and compaction and curing methods as it actually used in the liquid retaining structure. The test panel shall be 150 mm thick, and of at least 0.5 m sides. Samples for testing shall be obtained from the face of the test panel that mimics the cast face of its intended use in the structure, after a period of 28 days curing. The following test panels shall be constructed and tested:

a) One test as part of trial mixes
b) One test for the first 50m3 batch of concrete.
c) Thereafter 1 set for every discreet element namely floor slabs, sloped floor slabs, walls and columns (4 No. total) upon instruction by the Engineer.

Any additional durability tests will be paid for as extras. The durability tests are to be carried out by an accredited laboratory approved by the supplier in terms his Quality Management System. Each test as quantified in the Bill of Quantities shall include each of the following tests:

a) Oxygen permeability index test (OPI)
b) Water sorptivity index test (including porosity)
c) Chloride conductivity index test

(e.g. One No. durability test includes permeability testing, water sorptivity testing and chloride conductivity testing).

The test procedures for these tests are obtained from the University of Cape Town Durability Index Test Manual.

Two sets of four cores each (70 mm Dia.) are required from a test panel: four cores for the oxygen permeability and water sorptivity tests; four cores for the chloride conductivity test. The required target values for the tests are summarized in the table below. (These are the average values for the four core specimens used for the testing on each occasion). These values are required to be met Simultaneously.

PSG 7.3.6.1 Durability Test Parameters

DURABILITY INDEX TEST	TARGET VALUE
Oxygen permeability index	≥ 10 (log scale)
Chloride conductivity index	≤ 0.6 m.sec/cm
Water Sorptivity	≤ 8 mm / hr0.5

In the case that the results do not comply with the above values in the above table, another set of cores shall be drilled from the test panel. Where the second set of cores fails to comply with target values, a drum from that batch of concrete shall be sampled by way of drilling four cores for each of the oxygen permeability test and the chloride conductivity test. If these sets of cores fail any of the target values as stated above, the results will be reviewed by the Engineer who will assess them in accordance with the required durability parameters. If these results are still not found to be satisfactory by

the Engineer, the Contractor shall propose alternative methods to improve the durability of the mix and/or any items cast. The contractor shall keep records of all tests results relating to the samples tested.

The contractor shall ensure that site testing is carried out by a trained person. The contractor shall ensure that all off-site laboratory testing is performed in an approved laboratory approved in terms of their Quality Management System.

PSG 7.3.7 Criteria for the Compliance with the Requirements

No extra payment shall be made for cube strength testing. The cost of cube strength testing shall be included in the rates tendered for concrete.

Water used for testing shall be free of charge except for failed tests when water will be charged at standard municipal rates.

In the event that the actual achieved average cube strengths of an element are less than 85% of the target mean strength, the Engineer may instruct the taking of cores for additional strength testing. The cost of taking the cores and repairing the holes in the structures shall be for the Contractor's account.

The Engineer will conduct routine tests for the durability parameters on cores taken from the completed elements during the construction, the costs for which shall be to the Employer's account unless the parameters are not met.

The test results shall be accepted or rejected based on the criteria as set out in PSG 7.3.6.1 based on the following categories:

Full Acceptance:
Concrete shall be accepted unconditionally and full payment shall be made.

Conditional Acceptance:
Concrete may be accepted at the Engineer's discretion with a warning that construction methods be examined to improve the durability criteria. A reduced payment shall be applied to all the relevant pay items under SABS 1200 G for the non-conforming element or concrete pour. Alternatively, the Contractor may elect to carry out remedial work to improve the durability of the concrete to the criterion of "Full Acceptance" to the satisfaction of the Engineer, and receive full payment. All proposed remedial measures shall be subject to the approval of the Engineer. The cost of all such remedial work shall be for the Contractor's account.

Rejection:
The concrete shall be removed and replaced with fresh concrete at the expense of the Contractor, as directed by the Engineer.

Should the test result(s) indicate conditional acceptance or rejection of the item tested, the Contractor shall have the option of carrying out additional tests on that item, at his own expense, to confirm or disapprove the original test result(s). Not more than two such additional tests shall be carried out.

PSG 7.3.8 Procedure in the Event of Non-Compliance with the Requirements

Structural concrete elements or concrete pours shall be represented by test cubes and extracted cores, which shall be tested for strengths and the appropriate durability parameters.

If the durability parameters have been proved acceptable, the costs for such testing shall be borne by the Employer. However, where non-compliance to the specified parameters has been identified, the assessed element shall be rejected and at the Engineer's sole discretion any of the following measures may be considered at the Contractor's expense:

Coating with an approved product specifically designed to improve the non-conforming parameter depending on the severity of the test results.
Acceptance at reduced payment.
Demolition and rebuilding.

PSG 7.3.9 Tests Ordered By the Engineer

One concrete cube strength test shall comprise the results of tests carried out on three standard test cubes made from concrete sampled from one batch of concrete in accordance with these specifications.

Percentage payment for concrete cover shall be based on the average result of the total number of cover meter tests performed on a particular concrete element.

The overall percentage payment applied to a concrete member shall be based on the average of the percentage payments applicable to each durability parameter, together with the percentage payment based on the strength requirements described in the project specifications.

The reduced payments shall apply to the relevant payment items scheduled in the Schedule of Quantities.

PSG 7.3.10 Determination Of Reduced Payment

Payments for all durability concrete shall be based on the test results. The durability parameters are calculated according to Tables PSG 7.3.10.1, PSG 7.3.10.2 and PSG 7.3.10.3 below.

Table PSG 7.3.10.1 Water Sorptivity

TEST	Coastal (≤ 5 km from coast and up to 15 km up river valleys/estuaries)		Inland (> 1 km from coast)	
Water sorptivity (mm/h)	TEST RESULT	% PAYMENT	TEST RESULT	% PAYMENT
	< 8	100%	< 8	100%
	8 < 12	90%	≥ 8 < 12	90%
	12 < 15	85%	≥ 12 < 15	85%
	≥ 15	0%	≥ 15	0%

Table PSG 7.3.10.2 Oxygen Permeability

TEST	Coastal (≤ 5 km from coast and up to 15 km up river valleys/estuaries)		Inland (> 1 km from coast)	
Oxygen Permeability Index (log scale)	TEST RESULT	% PAYMENT	TEST RESULT	% PAYMENT
	> 9.15	100%	> 9.5	100%
	> 9.0 ≤ 9.15	90%	>9.25 ≤ 9.5	90%
	> 8.75 ≤ 9.0	85%	>9.0≤ 9.25	85%
	≤ 8.75	0%	≤ 9.0	0%

Table PSG 7.3.10.3 Concrete Cover

TEST	Coastal (≤ 5 km from coast and up to 15 km up river valleys/estuaries)		Inland (> 1 km from coast)	
	TEST RESULT	% PAYMENT	TEST RESULT	% PAYMENT
30 mm specified	≥ 30 ≤ 40	100 %	≥ 30 ≤ 40	100 %
	≥ 25 < 30	40 %	≥ 20 < 30	40 %
	< 25 or > 40	0 %	< 20or> 40	0 %
40 mm specified	≥ 40 ≤ 50	100 %	≥ 40 ≤ 50	100 %
	≥ 35 < 40	40 %	≥ 30 < 40	40 %
	< 35 or > 50	0 %	<30or>50	0 %
50 mm specified	≥ 50 ≤ 60	100 %	≥ 50 ≤ 60	100 %
	≥ 45 < 50	40 %	≥ 40 < 50	40 %
	< 45 or > 60	0 %	< 40or> 60	0 %
60 mm specified	≥ 60 ≤ 70	100 %	≥ 60 ≤ 70	100 %
	≥ 55 < 60	40 %	≥ 50 < 60	40 %
	< 55 or > 70	0 %	< 50or> 70	0 %

65 mm specified	≥ 65 ≤ 75	100 %	≥ 65 ≤ 75	100 %
	≥ 60 < 65	40 %	≥ 55 < 65	40 %
	< 60 or > 75	0 %	< 55or > 75	0 %
75 mm specified	≥ 75 ≤ 85	100 %	≥ 75 ≤ 85	100 %
	≥ 70 < 75	40 %	≥ 65 < 75	40 %
	< 70 or > 85	0 %	<65 or> 85	0 %
80 mm specified	≥ 80 ≤ 90	100 %	≥ 80 ≤ 90	100 %
	≥ 75 < 80	40 %	≥ 70 < 80	40 %
	< 75 or > 90	0 %	<70 > 90	0 %

Percentage payment for concrete cover shall be based on the average result of the total number of cover meter tests performed on a particular concrete element.

The overall percentage payment applied to a concrete member shall be based on the average of the percentage payments applicable to each durability parameter, together with the percentage payment based on the strength requirements described in the project specifications.

The reduced payments shall apply to the relevant payment items scheduled in the Schedule of Quantities.

PSG 7.3.11 Grouting

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

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

PSG 8 MEASUREMENT AND PAYMENT

PSG 8.1.1 Formwork

Add the following Sub-clause:

PSG 8.1.1.7 Edges of blinding layer

No separate payment will be made for formwork to the edge of the blinding layer. The rates tendered for concrete to the blinding layer shall cover the cost of such formwork.

PSG 8.1.1.8 Chamfers and fillets

No additional payment will be made for chamfers and fillets up to 40 mm wide. Larger fillets and chamfers will be measured by length in accordance with Sub-clause 8.2.5.

PSG 8.1.2 Reinforcement

Add the following to Sub-clauses 8.1.2.2 and 8.1.2.3:

Notwithstanding the method of measuring and paying for reinforcement specified in Sub-clauses 8.1.2.2 and 8.1.2.3, reinforcement will be measured and paid for as scheduled.

PSG 8.1.3 Concrete

Add the following to Sub-clauses 8.1.3.3:

The rates for concrete shall also cover:

the use of dolomitic aggregate where prescribed,
the cost of the preparation of design mixes by an approved laboratory and submission for approval by the Engineer,

screeded finish of unformed surface as specified in PSG 5.5.10.1, as amended, Screeded finish, and inclusion of admixtures where specified.

PSG 8.2 Scheduled Formwork Items

Add the following payment item to this clause:

PSG 8.2.7 Kickers .....Unit: m2

Formwork to the edges of kickers will be measured as plane (or circular) vertical (not as narrow widths).

PSG 8.2.8 Edges of blinding layer

No separate payment will be made for formwork to the edge of the blinding layer. The rates tendered for concrete to the blinding layer shall cover the cost of such formwork.

PSG 8.2.9 Chamfers and fillets.....Unit: m2

No additional payment will be made for chamfers and fillets up to 40 mm wide. Larger fillets and chamfers will be measured by length in accordance with Sub clause 8.2.5.

PSG 8.4 Concrete

PSG 8.4.4 Unformed surface finishes .....Unit: m2

Add the following to this Sub-clause:

The rates for unformed surface finishes shall cover the cost of providing the respective surface finish as specified in PSG 5.5.10, as amended, Concrete Surfaces.

PSG 8.5 Joints

Add the following to this clause:

Only designated joints as shown on the drawings will be measured for payment according to the length of each type of joint constructed. The rate shall cover the cost of all materials, labour and plant required to construct each type of joint specified on the drawings, including the cost of all shuttering, treatment of the joint as specified in Sub-clause 5.5.7.3, as amended, the provision of chamfers as specified where concrete is exposed, as well as testing and repairing where necessary.

Non-designated joints will not be measured for payment.

Add the following Sub-clause to this payment clause:

PSG 8.5.1 Formed joints .....Unit: m

Formed joints will be measured by the length of the joint.

The rates shall cover the cost of all operations and materials specified in Sub-clause 5.5.7, as amended, and Sub-clause PSG 5.5.7.2, as amended, Formed joints (generally vertical or near vertical), and detailed on the drawings such as joint filler, dowel bars and tubes, bitumen coats, etc., but excluding waterstops or waterbars.

Waterstops and waterbars will be measured by length separately for each type.

PSG 8.7 Grouting .....Unit: m2

Add the following to this payment clause:

Grouting of base plates and equipment bases will be measured by the volume of grout used.

The rate shall cover the cost of the supply and floating in of grout under the plates to ensure solid and complete filling of the gap.

PSG 8.8 HD Bolts and miscellaneous Metal Work .....Unit: t

Add the following to this payment clause:

Fixing of holding down bolts will be measured by number. The rate shall cover the cost of all things necessary to ensure that the bolts are effectively and rigidly held in position during casting, complete with sleeved pockets, all as detailed on the drawings.

Add the following payment items:

PSG 8.9 Impervious membrane .....Unit: m2

The impervious membrane will be measured by the surface area covered excluding laps and wastage. The rate shall cover the cost of the supply, laying, jointing of sheets as recommended by the supplier and final trimming of outer edges.

PSG 8.10 No-fines concrete .....Unit: m2

No-fines concrete will be measured by area.

The rate shall cover the cost of supplying materials, constructing and placing in position the no-fines concrete, and shall include for the steel floated 20 mm mortar skim.

PSG 8.11 Items cast in concrete .....Unit: No.

Items cast in concrete will be measured by number separately for each type of item.

Notwithstanding Sub-clause 8.2.6, the rate shall cover the cost of fixing in position and casting in the item as construction proceeds, irrespective of whether the Contractor chooses to fix the item in the formwork and cast it in directly or to box out a hole and grout the item in subsequently.

The item will be measured and paid separately.

The rate for the puddle pipes shall cover the cost of all things necessary to ensure that the fitting are effectively and rigidly held in position during casting including the certification and all as detailed on the drawings. Repairs for leaking cast in items will not be paid for.

PSG 8.12 Granolithic screeds.....Unit: m2

Special floor finish will be measured by area. The rate shall cover the cost of the supply and application of the specified material, complete as specified by the manufacturer and to the approval of the Engineer. Repairs to unsatisfactory work will not be paid for.

Measurement of granolithic screeds will be by the surface area covered.

The unit rate or lump sum shall cover the cost of all materials, labour and equipment required to provide the screed as specified in Sub-clause PSG 5.5.10.4, as amended, Granolithic screeds. The rate shall include the steel float finish.

PSG 8.13 Precast paving slabs.....Unit: m2

Precast paving slabs will be measured by the area paved.

The rate shall cover the cost of compacting the area, application of weed-killer, supplying, laying and bedding the slabs, grouting the joints and filling any gaps, all as specified.

PSG 8.14 PFA concrete.....Unit: m3

Measurement and payment for PFA concrete shall be as specified in Sub-clause 8.1.3 as amended.

The tendered rate shall cover all costs in connection with the supply, storage, handling on site and mixing in of PFA.

PSG 8.15 Watertightness test.....Unit: No.

The watertightness test will be paid by a lump sum separately for each structure.

The sum shall cover the cost of all labour, equipment and materials to carry out the tests, as specified in Sub-clause PSG 5.5.11, as amended, Watertightness test, to rectify faults and to achieve a test result to the satisfaction of the Engineer.

The sum shall include for all water required over and above that required for one filling of the water retaining structure based on the assumption that water will be available.

A provisional item is provided for an extra payment to the above to allow for the water not being available in time and the Contractor has to make his own other arrangements for providing water for testing. Such an arrangement shall only come into effect on the Engineer's instruction.

PSG 8.16 Slurry coat and curing .....Unit: m2

Supply & apply waterproof treatment with proprietary crystalline additive to all areas inside tank.

The rate shall cover for the supply and surface treatment of specified concrete surfaces according to Sub-clause PSG 5.5.8.3, as amended.

PSG 8.16 Miscellaneous Metalwork.....Unit: No.

Payment shall be by number. Separate items shall be scheduled for the following where required:

Manhole covers

The manhole cover in the reservoir roof shall be installed to the details shown on the drawings. The rate shall include supply, bitumen coating, installation and casting of the frame into the supporting concrete.

Reservoir ventilators

The reservoir ventilators in the reservoir roof shall be installed to the details shown on the drawings. The rate shall include fabrication, galvanising, shuttering, grouting and installation.

Step irons
Cast iron step irons shall be cast into the side of the reservoir wall, sump and manholes as detailed. The rate shall include for the supply and installation of the step irons.

PSG 8.17 Black Plastic Bond Breaker.....Unit: m2

A 500 micron black plastic continuous layer is to be laid over the no-fines concrete under the reservoir floor. The side and end laps shall not be less than 100mm. Just before casting the sheeting shall be perforated in a grid pattern at 1 m centres.

Payment shall be by the square meter laid. Care shall be taken not to rip or tear the sheeting. All repairs shall be at the Contractor's expense.

PSG 8.18 Teflon Sliding Bearings.....Unit: m

Neoprene (Kilcher or similarly approved) Teflon sliding bearings shall be placed on the top of the reservoir wall prior to casting the roof slab. A 3T50/50 bearing shall be used for the reinforced concrete reservoir, while a 3T50/100 bearing shall be used for the prestressed concrete reservoir. The top of the wall shall be cast to a smooth steel float finish.

Payment shall be per linear metre for the preparing and placing of the bearings. The rate shall include the supply, laying, jointing and masking of the bearings to the polystyrene strip.

PSG 8.19 Polyurethane sealants.....Unit: m

A polyurethane sealant (UV-resistant) shall be used on the outside joint between the reservoir roof and walls to the details shown and shall be finished off neatly leaving a smooth regular finish.

Payment shall be per linear metre. The rate shall include the supply, preparation, sealing and finishing.

PSG 8.20 Commercial Laboratory.....Unit: Prov Sum

A Provisional Sum for the services of a commercial laboratory has been included in the Bill of Quantities for the Engineer's Acceptance Testing. The use of this laboratory is for additional testing required over and above the testing specified in SANS 1200 G and the variations to SANS 1200 G specified above. Testing shall only be paid on written instruction for additional testing from the Engineer.

The procedure for sampling and manufacturing, storing, curing and testing test cubes shall be in accordance with SABS 863.

SECTION PSHA: STRUCTURAL STEELWORK (SUNDRY ITEMS) (APPLICABLE TO SABS 1200 HA 1990)

PSHA 3 MATERIALS

Add the following under this heading:

Where the words "Structural Steelwork" appear in the heading and in other relevant Clauses, amend to read "Aluminium, Stainless Steel and Structural Steel".

PSHA 3.1 Structural Steel

Delete the Sub-Clause and substitute:

Except where scheduled to the contrary or shown on the drawings, the grade of steel to be used in the manufacture of the following shall be that grade normally supplied by reputable manufacturers approved by the Engineer:

All structural steelwork which shall include ladders, safety cages and platforms, shall be manufactured from 300W grade steel in conformity with SABS 1431, except where shown to the contrary on the drawings or in the schedule of quantities.

All stainless steel shall be grade 304, except where shown to the contrary on the drawings or in the schedule of quantities.

Grade 3CR12 steel shall be used where scheduled or shown on the drawings and shall be fully pickled and passivated prior to installation.

Structural steelwork shall comply with Grade 43 of BS 4360. All steel pipes and specials, irrespective of diameter, shall be fabricated from plain ended pipes. The use of screwed flanges and fittings shall not be permitted, except for use on air-valve assemblies. All fabrication shall take place in a suitable workshop prior to galvanizing, and no cutting or welding of pipes on site shall be permitted.

Add the following clauses:

PSHA 3.1.2 Stainless steel

All stainless steel items shall be Grade 304L material.

PSHA 3.1.3 Aluminium

All aluminium items shall be grade M57S material anodized in accordance with SANS 999 Grade 25.

PSHA 3.3.1 Bolts and nuts

Add the following to this Sub-clause:

All bolts, nuts and washers within water retaining structures or exposed to the rain, or with a diameter of 10 mm or less, all anchor bolts of any size in concrete or brickwork and all bolts of any size used in conjunction with stainless steel items, shall be manufactured from Grade 304L stainless steel.

All other bolts, nuts and washers with a diameter of 12 mm or greater shall be hot dip galvanized to SANS 10684. Nuts shall be tapped before galvanizing, taking into consideration the extra clearance necessary to allow for the thickness of galvanizing on the bolts. If, after installation, there is any indication that galvanising has been stripped from either the nut or the bolt, both nut and bolt shall be removed and replaced.

PSHA 5 CONSTRUCTION

PSHA 5.1.2 Contractor to Provide Shop Details

Add to the Sub-Clause:

The Contractor shall prepare his own shop details based on the dimensions and details given on the drawings and will be required to submit his shop details to the Engineer at least 3 weeks prior to fabrication. Written consent must be obtained from the Engineer, prior to commencing fabrication. The Contractor is still responsible for ensuring that the shop details are dimensionally correct.

PSHA 5.2.6 Handrails

Add to the Sub-Clause:

Handrailing shall be of tubular construction in Grade 304L stainless steel of an approved proprietary make.
Hand and knee rails shall be not less than 32 mm O.D. (wall thickness not less than 1,6 mm) and the height of the handrails (centre) shall be 1 000 mm above walk-way level, with knee rails located approximately midway between.
Stanchions shall be not less than 44 mm O.D. (wall thickness not less than 1,6mm) and shall have ball type or spun and flared connectors to suit horizontal or angled handrailing as required. The base plates shall not be less than 8mm thick.

In general all bends in the hand and knee railing shall be 140 mm radius. Handrails shall be either side or top mounted and shall be fastened with stainless steel nuts, bolts and washers.
Spacing between stanchions shall be determined by site conditions but in no case shall it exceed 1 800 mm c/c. At bends, stanchions shall be provided on either side at a distance of 300 mm from mid-bend.
Finished handrailing shall be true to line and level and connections shall be securely fixed by means of 2 No. stainless steel pins, finished flush on each side of the joints (to the approval of the Engineer).

All ends shall have closures joining the hand and knee railing.

The rate quoted per metre is to include for the supply and installation of the handrail, knee rail, portion of a stanchion, footing, holding down bolts and nuts and is to be inclusive of all cutting, mitring, welding, grinding and waste.

PSHA 5.2.7 Ladders

Add to the Sub-Clause:

Stairs and ladders are to be provided in accordance with the details shown on the drawings.

PSHA 5.2.8 Open Grid Floors

Add to the Sub-Clause:

Open grid steel flooring is to be cut and framed to the required panel shapes and sizes all in accordance with the details shown on the drawings.

PSHA 5.2.10 Protective Treatment

Add to the Sub-Clause:

All mild steel shall be hot-dip galvanised except where shown to the contrary on the drawings or in the schedule of quantities.

Hot-dip galvanising shall conform to SABS 121;2000 for heavy duty coatings or equivalent.

Screwed and socketed tubing shall be galvanised in compliance with BS 1387. Galvanised malleable cast iron fittings shall comply with SABS 509.

Add the following clauses:

PSHA 5.2.11 Hand stops and stop logs

Aluminium hand stops shall close drop tight and be manufactured to the dimensions shown on drawings.
Fabrication details of hand stops and stop logs shall be submitted to the Engineer for approval before manufacture commences. Hand stops with daylight openings exceeding 0,5 m2 shall be supplied as two equal sized stop logs with a neoprene interface seal.

The hand stops and stop logs shall be supplied with aluminium frames which are suitable for casting into concrete, and shall, where necessary, be provided with strengthening plates to withstand the pressure of the full water depth. The stop logs shall be provided with resilient water seals under each unit to provide a drop-tight seal.

PSHA 5.2.12 Corrosion protection

The open grid and chequer plate flooring panels, ladders and handrails shall be galvanized in accordance with the requirements of Sub-clause 5.9 of SANS 1200 HC.

In addition handrails shall be degreased, primed and painted yellow with two coats of recoatable polyurethane to a minimum total dry film thickness of 70 micrometers after installation.

PSHA 5.2.11 Pipe Clamps and Brackets and/or Supports (New Sub-Clause)

Clamps and brackets around pipes and supports under pipes and valves are to be constructed to the details shown on the drawings and are to be provided with all necessary bolts for fixing to concrete.

Where pipes and valves are supported inside concrete chambers on fabricated steel pipe supports, a layer of 6 mm thick GP rubber sheet (Shore hardness 65) shall be attached to the top surface of the steel support by contact adhesive prior to receiving the pipe or valve to be supported. The rubber is to extend 20mm beyond the edges of the plate.

PSHA 5.3.6 Grouting

Add to the Sub-Clause:

The Contractor will be fully responsible for all grouting work under this Contract.

PSHA 6 TOLERANCES

PSHA 6.1.3 Accuracy of Erection

Add to the Sub-Clause:

The accuracy of erection shall be the degree of accuracy II as tabulated but amended as follows:

In items d)1) and d)2) of the table the Degree of Accuracy given as "+ 5" shall be read as "+ 3".

PSHA 7 TESTING

PSHA 7.1 Test Certificates

Delete the part sentence "in terms of the project specification" from the wording of the Sub-Clause and add the words "when so requested by the former" at the end of the sentence.

PSHA 8 MEASUREMENT AND PAYMENT

PSHA 8.3 Scheduled Items

Add the following introduction to the subsequent Sub-Clauses:
The tendered rates shall cover the cost of preparing shop details (where applicable), the supply of all materials, fabrication, process control, loading, transporting to Site, off-loading, erection (unless separately included), setting into concrete or brickwork and grouting in. They shall also include for the supply of all nuts, bolts, holding down bolts, washers, rivets, cutting to waste, all temporary bracing, templates and shuttering necessary for installing, transporting and erecting.

Where the scheduled items for steelwork include corrosion protection, then the price stated shall also include for such protection as specified in SABS 1200 HC as amended by PSHC. Similarly the materials and corrosion protection for nuts, bolts, washers etc shall match the steelwork ordered.

Where the requirements of the above introduction conflict with the requirements of Sub-Clauses 8.3.1 to 8.3.6 inclusive the requirements of the introduction shall take precedence.

PSHA 8.3.2 Handrails

Add the following to this clause:

Handrails will be measured according to Sub-clause 8.3.2(a) and the relevant drawing.

The rates shall include for painting as specified.

PSHA 8.3.6 Corrosion protection

Add the following to this clause:

Notwithstanding the requirements of Sub-clause 8.3.6, corrosion protection (painting and galvanizing) will not be measured separately, the prices tendered for the steel items being held to include for the cost of corrosion protection as specified.

Add the following clauses:

PSHA 8.3.7 Hand stops.....Unit: No.

Hand stops will be measured by number. The tendered rate shall cover the cost of supply, delivery, corrosion protection and complete installation of gates and frames.

SECTION PSHC: CORROSION PROTECTION OF STRUCTURAL STEEL (APPLICABLE TO SABS 1200 HC: 1988)

PSHC CONSTRUCTION

PSHC 5.1 Structural steel

All structural steel members shall be hot dip galvanized.

PSHC 5.3 Dressing and Repairs During Fabrication

Add to the Sub-Clause:
Edges shall be ground to a smooth radius of at least 1 mm unless otherwise indicated

PSHC 5.4.1 Preparation for Coating-General

Add to the Sub-Clause:
The work of surface preparation prior to painting shall be carried out at the manufacturer's works.
The work of surface preparation prior to galvanising shall be carried out at the galvaniser's works.

PSHC 5.4.3.1 Abrasive Blast Cleaning

Add to (a) General:
The standard of blast cleaning required in terms of Swedish Standard SIS-05-59-00 is Sa 2 1/2.
The surface profile after blasting shall be in accordance with the paint manufacturer's requirements for the particular paint system being used.
Add to (b) Dry Abrasive Blast Cleaning
The blast cleaning media shall not be recycled.

PSHC 5.4.3.2 Cleaning by Hand or with Power Tools

Add to the Sub-Clause:

Cleaning by hand or power tools, where permitted or ordered by the Engineer, shall be to standard St 3 of SIS-05-59-00.

PSHC 5.7 Coating system for New Steelwork

Add to the Sub-Clause:
All structural steel members shall be hot dip galvanized
The coating system to be applied under this Contract shall be carried out strictly in accordance with the manufacturers instructions which written instructions shall be obtained by the Contractor and a copy handed to the Engineer's Representative prior to commencing painting operations.
The paint system to be used shall be selected by the Contractor from the following alternative systems:

PSHC 5.7.1 Painting System No. 1

For structural steelwork coastal regions - exterior work

AECI Dulux	DFT (µm)	Plascon	DFT (µm)
Zinc galv 6(2)	75	Zinc rich primer M1 233	70
Zinc galv 1	touch up	Chemcote High Build CHC 101 – light grey	70
Chlorinated Rubber – Kemrist	90 165	Chemcote enamel CHC 3000 series	30 170

PSHC 5.7.2 Painting System No.2

For structural steelwork coastal regions - interior work

AECI Dulux	DFT (µm)	Plascon	DFT (µm)
Zinc galv 6(2)	60	Degrease with Aquasolv GR	-
Zinc galv 1	touch up	Zinc phosphate Primer UC 182	55
Chlorinated Rubber – Kemrist	60 120	Alkyd undercoat UC 189	35
		Enamel	30 120

PSHC 5.7.3 Painting System No.3

For overcoating galvanised work

AECI Dulux	DFT (µm)	Plascon	DFT (µm)
Prepare surface Galvkleen	-	Prepare surface cleaner GIC	-
Corrocote 2(2)	10	Galvogrip metal primer	30
Chlorinated Rubber – Kemrist	70 80	Universal undercoat UCI	30
		Supergloss Enamel Code G	25 85

PSHC 5.8 Application of Painting Coatings

Add to the Sub-Clause:

No application of paint shall be carried out before the paint manufacturer has approved the firm of applicators and the plant to be used, except where instructed to the contrary by the Engineer.

Where applicable, the range of temperature, outside the range of +5o to 35oC, within which paint may be applied, shall be that range which the Contractor shall obtain in writing from the manufacturer of the paint.

The embedded lengths of irremovable fasteners which penetrate deeper than 75mm from the concrete face may be left as base metal. The remaining portion shall comply with the paint system specified for the adjacent steelwork.

Surfaces which will become inaccessible for coating after fabrication or erection shall be given the full paint treatment specified plus one further top coat prior to the surfaces becoming inaccessible.

PSHC 5.9 Application of Metal Coatings

Add to the Sub-Clause:

The grade of HDG (hot dipped galvanising) required shall be carried out in accordance with SABS 121:2000, and shall be that for heavy duty coatings. This shall be applicable to all metalwork where HDG is called for either on the drawings or in the Schedule of Quantities.

Add the following Clause:

PSHC 5.11 Structural steel

All structural steel members shall be hot dip galvanized.

PSHC 5.12 Floor panels, handrails, ladders and the like

The open grid and chequer plate flooring panels and frames, handrails, ladders and similar items shall be hot dip galvanized in accordance with the requirements of Sub-clause 5.9.

Handrails shall also be painted with a vinyl copolymer coating of the required colours.

PSHC 6 TOLERANCES

PSHC 6.5 Dry film thickness

Add the following Sub-clauses to this Clause:

PSHC 6.5.1 Individual coatings

At least 90% of all thicknesses measured shall comply with the minimum thickness of the system specification. Up to 10% of all readings may be below the specific minimum thickness, but no reading shall be less than 70% of the specified minimum thickness.

PSHC 6.5.2 Total dry film thickness

Not more than 10% of readings shall be less than the minimum specified and no reading shall be less than 90% of the specified minimum. For immersion conditions no reading shall exceed the mean specified thickness by greater than 60% of the minimum, unless a concession is granted by the Engineer.

PSHC 7 TESTING

PSHC 7.1d) Testing by the Contractor

Tests are not required to be carried out after the application of each intermediate coat.

PSHC 7.3.8 Dry Film Thickness

The frequency of DFT test readings required is to be in accordance with SABS Method 141.

SECTION PSL: MEDIUM PRESSURE PIPELINES (APPLICABLE TO SABS 1200 L – 1983)

PSL 1 SCOPE

PSL 1.1 Add the following:

MuPVC : Modified polyvinyl chloride
GRP : Glass Reinforced Polyester
GMS : Galvanised Mild Steel
SS : Stainless Steel
HDPE : High-density polyethylene

PSL 3 MATERIALS (Clause 3.1)

Amend Sub-Clause 3.1 as follows:

"Pipes and fittings shall be of the types specified in the schedule or in the project specification and, unless otherwise required in terms of the project specification, they are their couplings shall be capable of withstanding the applicable test pressure. All pipes and fittings shall be supplied complete with couplings and jointing material.

Satisfactory temporary end covers shall be provided for the protection of threads, flanges, and prepared ends of plain ended pipes and fittings, and to prevent damage to internal lining during transportation and during on site.

The materials and construction of all pipes, fittings, valves and specials shall comply with the appropriate SANS, BS or other appropriate specification, whether stated or not, and shall be approved by the Engineer. Only full-length pipes bearing the relevant standard's mark will be acceptable. Cut pipes shall only be used at pipe junctions to position valves and specials as shown on the drawings, and at connections to structures. When laying the pipes the markings shall be visible from above.

The Contractor shall be responsible for the structural and hydraulic design of all bends and fittings where these are not standard off the shelf items designed and guaranteed by the manufacturer for the purpose intended.

The Engineer shall at all reasonable times have free access to the place where the goods are manufactured for the purpose of examining and sampling the materials and goods, and if necessary for supervising the testing and marking of goods. The manufacturer shall supply free of charge every facility and all labour required for such examination, sampling, inspection, testing and marking before delivery and shall provide and maintain in good order suitable, convenient and accurate apparatus for testing goods."

PSL3.1 MuPVC Pipes (Clause 3.7.3)

Add a new clause:

MPVC pipes and fittings shall be fitted with spigot and socket rubber ring joints and shall comply with the requirements of SANS 966-2: 2010 (MPVC).

PSL 3.1.3 General (Fittings and Specials)

The Contractor will be responsible for supplying all specials and fittings.

PSL3.2 AC Pipes and Specials GRP pipes (SANS 1748-1: 1998)

Glass reinforced pipe and fittings shall conform to ASTM D3262, ASTM3754, AWWA C950 and SANS 1748 -1 : 1998 Glass Fibre Reinforced Thermosetting Plastics (GRP) pipes Part 1 : Pipes for Water Supply , Sewerage or drainage. GRP pipe shall be jointed with Double Bell couplings. Pressure rating, stiffness and diameter as detailed in the bill of quantities and drawings.

PSL3.2 AC Pipes and Specials

Asbestos Cement or Fibre Cement production shall not be used.

PSL3.2 Steel pipes (Clause 3.7.4)

Steel pipes shall be groove ended galvanised carbon steel pipes with Klambon type cast galvanised SP couplings or similar approved and shall comply with the requirements of SANS 62.

PSL3.4 Steel pipes, fittings and specials

PSL3.4.1 General

Amend this sub-clause as follows:

All steel pipes and specials for reservoirs, irrespective of diameter, shall be fabricated from plain ended pipes. The use of screwed flanges and fittings shall not be permitted. All fabrication shall take place in a suitable workshop prior to galvanising, and no cutting or welding of pipes on site shall be permitted.

"The Contractor shall, if so instructed, make available to the Engineer the maker's certificates covering the chemical analysis and physical properties of the steel used in the manufacture of pipes and specials, and shall provide written confirmation that welding has been carried out by coded welders.

The pipes shall be hydraulically tested before leaving the factory to the test pressure specified in Sub-Clause 7.3 of SANS 1200 L. The methods of sampling and testing of the manufactured pipes shall comply with Sections 6 and 7 of SANS 719.

The tests shall be carried out at the place of manufacture and at the expense of the Contractor. Upon delivery of the goods concerned the Contractor shall submit a signed certificate giving results of the tests and certifying that the goods concerned have been manufactured in accordance with this specification."

PSL3.4.3 Steel pipes of nominal bore over 150mm

Steel pipes shall comply with the following material specifications:

a) Electrical resistance welded (ERW) steel pipe API (American Petroleum Institute) 5L Grade X42 with a 290 MPa yield stress and 414 MPa minimum ultimate tensile stress (UTS).

b) Pipe lengths delivered to site to be 18 metres long except where adjacent to specials.

c) The main pipeline shall be joined by welding but flanges of the specified Class will be provided for future connections and for connections to fittings and valves.

d) All welds to conform to SANS 10044 or API 1104, with dye penetration of 10%.

e) For the internal lining, a cement mortar lining with a minimum thickness of 6 mm is to be applied.

f) For the external coating a 2LPE system comprising a Fusion Bonded Medium Density Polyethylene coating, Sintakote or similar, in accordance with SANS 4427 with a 2.3mm minimum DFT.

PSL 3.4.4 Fittings and Specials

Add to the Sub-Clause:

All steel bends, fittings and specials shall be fabricated to the dimensions and details shown on the drawings and/or described in the Bill of Quantities.

The sides of taper pieces shall diverge at an angle of not more than 19° to each other.

The bend, fitting, and special fabricator shall supply written confirmation that all hand welding has been carried out by coded welders.

Bends, fittings, and specials ≥DN600 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 534. The nominal dimensions of each bend, fitting and special required are itemised in the Bill 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 Contractor will be responsible for providing and fixing strengthening webs, crotch plates, gussets, etc. as shown on the drawings and as may be necessary to prevent excessive deflection or deformation of fittings and specials when subjected to hydraulic tests and the rate for the work will be deemed to include for the provision of this reinforcing wherever necessary.

Bends shall be fabricated in accordance with the Table below.

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)
9 º and larger but less than 15 º	2 segment bend
15 º and larger but less than 45 º	3 segment bend
45 º and larger but less than 60 º	4 segment bend
60 º and larger but less than 75 º	5 segment bend
75 º and larger but less than 90 º	6 segment bend

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 Engineer 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 60-65 shore hardness, with a vulcanised joint. It shall need to be stretched over the pipe circumference to ensure a tight fit.

PSL 3.7 OTHER TYPES OF PIPES

PSL3.7.1 uPVC PIPES

uPVC pipes and fittings shall be fitted with spigot and socket rubber ring joints and shall comply with the requirements of SANS 966-1.

PSL 3.7.2 Polyethylene Pipes

Replace "SABS 533" in this clause with "SANS 4427".

Add the following new sub-clauses to Clause 3.7:

PSL3.7.3 mPVC Pipes (Clause 3.7.3)

MPVC pipes and fittings shall be fitted with spigot and socket rubber ring joints and shall comply with the requirements of SANS 966-2: 2010 (MPVC).

PSL3.7.4 GRP PIPES

Glass reinforced pipe and fittings shall conform to ASTM D3262, ASTM3754, AWWA C950 and SANS 1748 -1 : 1998 Glass Fibre Reinforced Thermosetting Plastics (GRP) pipes Part 1 : Pipes for Water Supply , Sewerage or drainage. GRP pipe shall be stiffness SN 5000 jointed with Double Bell couplings. The pressure rating and diameter as detailed in the schedule of quantities and drawings.

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 3.9.3.8.

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 Clause 15 of BS 534 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.

The steel used shall conform to the appropriate British Standard Specification and 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 "Copon KSIR88" (or similar approved) within 4 hours of abrasive blast cleaning the metal surfaces of the coupling in accordance with Swedish Standard SIS 05 5900 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.

Flanged bolted connections shall comply with the following:

All flanges shall have a raised face.

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 rust inhibitor (Plascon Rustix 84 or equal approved). 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 SABS 121:2000 and shall comply with the relevant requirements of SABS 135 – 1985 and SABS 136 – 1985 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 Clause PSL 3.9.3.8.

PSL 3.9 CORROSION PROTECTION

PSL 3.9.2 Steel Pipes

PSL 3.9.2.4 Holiday Testing – Epoxy Linings and Coatings (New Sub-Clause)

Add new Sub-Clause:

All Holiday Testing of epoxy linings and coatings shall be carried out with an instrument approved by the Engineer. The sparking detection test shall conform to the standards as set out in SANS 1217:2001 and BS 3003 Part 1. 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 Engineer for approval. Method statements for the process of holiday testing shall be submitted to the Engineer for approval.

The correct equipment for the type of applicationshaill 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 Engineer.

PSL 3.9.1.1 Steel Pipes of Nominal Bore up to 150mm

All steel pipe specials of nominal bore up to 150 mm shall be factory coated and lined with hot-fused Rilsan (nylon polyamide 11) coating to a DFT of at least 350 microns generally in accordance with Subclause 3.9.2.2 and in accordance with the epoxy manufacturer's specifications for preparation of the receiving surface and application of the product.

PSL 3.9.2.2 Steel Pipes of Nominal Bore over 150mm

Unless otherwise scheduled, all mild steel specials up to DN500 in size shall be factory coated and lined with hot-fused Rilsan (nylon polyamide 11) coating to a DFT of at least 350 microns generally in accordance with Subclause 3.9.2.2

and in accordance with the epoxy manufacturer's specifications for preparation of the receiving surface and application of the product.

Unless otherwise scheduled, all mild steel specials larger than DN500 shall be factory coated and lined with a solvent-free two-pack glassflake surface-tolerant epoxy paint (DENSO S.T. 100 or similar approved) applied in two layers to a total DFT of at least 350 micrometres generally in accordance with Subclause 3.9.2.2 and in accordance with the epoxy manufacturer's specifications for preparation of the receiving surface and application of the product.

Unless otherwise specified, all steel pipes, fittings and specials with a cement mortar lining shall be in accordance with the requirements of the Australian Standard ASW 1281:2001 with thicknesses as stated in Clause 3.9.1 (and 3.9.2 for DN 250 pipes).

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 for the preparation of all 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 pipe steel surfaces which have been stripped of their corrosion protection layers, 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.

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 ie before grit blasting and/or power brushing starts. Degreasing shall be carried out using a non volatile solvent (e.g. "Aquasolve", "Chesterton Nr. 261 Safety Solvent Cleaner" or similar

approved substance). The surface shall then be cleaned with potable water and left to dry completely before the next step is taken.

Grit Blasting – Internal Lining Repair:

Grit blasting of bare metal surfaces shall take place after degreasing of the area. The finished grit blasted surface shall be 75 micron with an angular profile.

Transition areas from EPOXY internal lining, to bare metal which have 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.

The Contractor shall provide the Engineer with a method statement for approval for each type/location of grit blasting, before work commences.
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 St2 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 specifications. 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 shall 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 Engineer and could be products similar to "Denso ST100", "Sigma SF 523", "Nordbak", etc.

For the repair of cement mortar linings, "Epidermix 338" or similar approved will be required.

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 Engineer 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:

When 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. For pipes that are too small for internal access for hand repairs, 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.

For pipes large enough for safe internal access, the cement-mortar lining shall be made-good with the same materials, but by hand.

PSL 3.9.3.4 Repair and Making Good of Solvent Free Epoxy Linings (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 Engineer'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 making good of internal solvent free epoxy linings 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 manufacturer's specifications. The Contractor shall ensure that making good of linings 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 DN 600 steel pipes that are to be field-welded shall be 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 Engineer, they may be used. Irrespective of which products are approved by the Engineer and used by the Contractor, all procedures shall be carried out strictly in accordance with the Contractor's method statements which shall 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.

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.

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.

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 Engineer. Tenderers shall nonetheless allow for the profiling tape in their tendered rates).

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 in accordance Umgeni Water's specification for "Pipe Lining System 2: Solvent-Free Epoxy Lining" 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 in accordance Umgeni Water's specification for "Pipe Lining System 2: Solvent-Free Epoxy Lining".

All crotch plates and wrappers/collars shall be coated in accordance with project specification for "Pipe Coating System 1: Solvent-Free Epoxy Lining".

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 Buried Flanges and Flexible Adaptor/Anchoring Joints (New Sub-Clause)

Add new Sub-clause:

All buried 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 Engineer).

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.

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".
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.

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.

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.

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.
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.

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.

PSL3.9.3 PROTECTION AGAINST ELECTROLYTIC CORROSION

Add the following new sub-clause to Clause 3.9.3

PSL 3.9.3.1 CATHODIC PROTECTION

Soil resistivity tests and a stray current survey are to be carried out by the contractor.

The design of the Cathodic Protection System shall be carried out by an approved Specialist in this field appointed by the Contractor and submitted to the Engineer, one calendar month before commencing construction, for acceptance.

A Provisional Sum has been allowed in the Tender Documents for the testing, design, supply and construction of a cathodic or other corrosion protection system. After acceptance by the Engineer of the design of the system the Contractor shall with in fourteen days prepare a detailed cost proposal, including schedules of quantities, for the supply and installation of the system for approval by the Engineer. The proposal shall be supported by a full breakdown of costs with supporting documentation such as quotations from suppliers etc. Payment may be claimed after completion of the relevant item, at the approved rates, in the monthly Certificates in the normal manner. The contractor shall allow in his programme for completion of the design prior to commencement of laying of pipes. Any pipes which have to be removed subsequent to laying for implementation of a corrosion protection system shall be to the Contractor's cost.

PSL3.9.5 JOINTS, BOLTS, NUTS AND WASHERS.

Replace sub-clause 3.9.5 with the following:

All bolts, nuts and washers shall be hot-dip galvanised in accordance with SANS 121:2011. Under no circumstances shall electro-plating be accepted as an alternative means of corrosion protection.

PSL3.9.6 CORROSIVE SOILS

Replace sub-clause 3.9.6 with the following:

All underground screwed steel joints and saddles are to be treated with a compatible primer, packed with a bitumen or tar based mastic and wrapped with "Denso Tape". The cost of this work shall be included in the rates tendered for supplying and fixing pipes and specials.

PSL 3.9.7 CATHODIC PROTECTION

Soil resistivity tests and a stray current survey are to be carried out by the contractor.

The design of the Cathodic Protection System shall be carried out by an approved Specialist in this field appointed by the Contractor and submitted to the Engineer, one calendar month before commencing construction, for acceptance.

Provisional Sums have been allowed in the Tender Documents for the testing, design, supply and construction of a cathodic corrosion protection system. After acceptance by the Engineer of the design of the system the Contractor shall with in fourteen days prepare a detailed cost proposal, including schedules of quantities, for the supply and installation of the system for approval by the Engineer. The proposal shall be supported by a full breakdown of costs with supporting documentation such as quotations from suppliers etc. Payment may be claimed after completion of the relevant item, at the approved rates, in the monthly Certificates in the normal manner. The contractor shall allow in his programme for completion of the design prior to commencement of laying of pipes. Any pipes which have to be removed subsequent to laying for implementation of a corrosion protection system shall be to the Contractor's cost.

PSL 3.10 VALVES

Add the following sub-clauses to Clause 3.10:

PSL 3.10.1 GATE VALVES

Unless otherwise scheduled, gate valves shall be double flanged with ductile iron bodies and stainless steel trim, and shall conform with all relevant sections of SANS 664 or BS 5163, specifications and subsequent amendments. Flanges shall be drilled to BS4504 or SANS 1123 for 25 bar or 16 bar working pressure as specified, and compatible with pipework flanges.

Gate valves shall be of the wedge gate type, VOSA or similar approved. Approval shall only be given for the specified or equivalent valves from well-established and well known manufacturers with a proven record of supply and service of equivalent products within the southern African region. Valves shall be Class 16 or 25 as specified or shown on the drawings, clockwise closing and shall have non-rising spindles of high quality high tensile manganese bronze. The direction of closing shall be cast into the handwheel (where specified) or valve casing with the words "OPEN" and "CLOSE" respectively. The gate shall be guided within the body of the valve to fit accurately onto the seat and to avoid possible buckling. Where extended spindles are required, they shall be suitably supported to prevent swaying and buckling, and to guarantee the intended use of the valve. All gate valves shall be drop tight when tested in accordance with the requirements of BS 5163. All gate valves of 600mm and larger shall be fitted with an integral bypass valve.

All gate valves shall be capable of being operated manually with a maximum applied torque of 150Nm for valves with a nominal diameter of more than 450mm and 100Nm for valves with a nominal diameter less than 450mm.

Valves shall be grit blast cleaned to S15 standard and a solvent-free sintered epoxy powder applied in one coat by the use of arc-spray machines to provide a dry film thickness of not less than 450 micron.

Flanged valves shall be complete with galvanised or titanium coated bolts and nuts, gaskets and insertion rings.

All isolating valves for air valves shall be supplied with a cast iron hand wheel. All other valves shall be provided with a cap top for use with a valve key.

PSL 3.10.2 AIR VALVES

Air release and vacuum break valves shall be double orifice with anti-shock orifice mechanism, of type "Vent-O-Mat Series RBX" or similar approved with flanged inlets and rated for a minimum of 16 or 25 bar working pressure as specified.

The valve shall have an integral surge alleviation mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure due to high velocity air discharge or the subsequent rejoining of separated water columns. The limitation of pressure rise must be achieved be deceleration of approaching water prior to valve closure.

The intake/discharge orifice area shall be equal to the nominal size of the valve.
The inlet shall be fitted with an isolating valve with vertical spindle, key operated from above.
Air valves shall be able to withstand twice the maximum rated pressure and must provide a positive drop tight closure from a minimum pressure of 50 kPa up to the maximum rated pressure.

PSL 3.10.3 NON-RETURN VALVES

Non-return valves shall comply with the requirements of BS 5153 or the relevant SANS specification for working pressures as specified for each application. They shall be double flanged and of general construction details as specified for gate valves with anti shock closing characteristics. Flanges shall be drilled to BS4504 or SANS 1123 for 25 bar or 16 bar working pressure as specified, and compatible with pipework flanges.

Check valves shall be RGR axial flow, Vent-O-Mat Maxiflow or similar approved. Valves shall be fast acting with short travel and designed to minimise slamming.

Add the following Clauses:

PSL 3.12 METERS

PSL 3.12.1 FLOW METERS

Magnetic Flow Meters specified shall be IP68 rated Endress & Hauser or similar approved magnetic flow type meters suitable for measuring flows in the ranges specified and for installation in a pipelines of diameter specified. The unit shall be capable of link up to the existing telemetry system and shall have 2 x 4 to 20mA outputs and two relays.

Measurement accuracy shall be within 0.2%. Maximum head loss through the meter and taper sections (if any) shall not be greater than 0.3m.

The rate tendered shall include for selection, supply and fitting of the meter with all necessary fittings and specials to fit the meter in a nominal 600mm diameter pipe, linking up to power supply, link up to the existing telemetry system located within 50m, including all necessary fittings and sundries to provide a complete working installation, testing and commissioning.

Mechanical flow meters, where specified, shall be able to provide pulsed output for continuous flow rate monitoring suitable for telemetry link-up. Flanged in-line strainers shall be provided with all mechanical flow meters installed. The strainers shall have removable components to allow access for cleaning and maintenance without removing the flanged strainer body."

The rate tendered shall include for selection, supply and fitting of the mechanical meter with all necessary fittings, specials and sundries to provide a complete working installation, testing and commissioning.
Supply and installation of strainers shall be measured separately.

PSL 3.12.2 WATER METERS

The meters shall be of the semi-positive rotary piston volumetric type and be to Class C specification.

Bulk water meters shall be supplied and built into the meter chambers as detailed in the drawings. Fittings and the construction of the chambers will be measured elsewhere.

Water meters must comply with the SANS Specification No. 1529-1: 2006 and must be approved in terms of Section 18 of the Trade Metrology Act, Act No. 77 of 1973, as amended by the Trade Metrology Amendment Act, Act No. 42 of 1994.

All water meters offered must be tested and sealed by an authorised official in an SANS 17025 accredited laboratory, situated within the borders of the Republic of South Africa.

PSL 4 PLANT

PSL 4.4 Packing (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 5 CONSTRUCTION

PSL 5.1 LAYING

PSL 5.1.1 GENERAL

Add the following to sub-clause 5.1.1

Pipes shall be handled and laid in accordance with the manufacturer's specifications.
Large changes in horizontal or vertical alignment of the pipeline will be accommodated by special bends as detailed on the drawings.

Small changes in horizontal or vertical alignment will be accommodated at the pipe joints. In no case shall the deflection exceed two thirds of the recommendations of the relevant SANS, BS or other relevant specification, or of the pipe manufacturer.

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.

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 fact that 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 shall 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, is 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 possible immediately 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 Engineer 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 Engineer 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 are to be installed in pipe work only 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 Engineer.

PSL 5.1.4 DEPTH AND COVER

Add the following to sub-clause 5.1.4.1

During construction there shall be not less than 0.9 m of cover over the pipes where construction traffic is liable to cross the pipeline, Road crossings shall not be utilised until the construction of the road layers has reached the stage where 0.9 m cover over the pipe is available.

Where the actual clearance between pipe crossings or other services is less than the minimum clearance of 150 mm the main shall be laid beneath the service crossed at an invert level which allows for the minimum clearance. The main shall be laid horizontally at this level for a distance of at least 3.0 m on either side of the centreline of the service crossed and then gradually revert to the minimum cover as specified above.

No decrease in cover or clear space between the pipe barrels as specified will be permitted unless otherwise instructed by the Engineer in writing.

A minimum cover of 800 mm from natural ground level shall be maintained generally other than under road/railway crossings where 1 000 mm shall be maintained and a maximum cover of 1.2 m to the top of pipe shall be maintained throughout, unless otherwise specified or shown on the drawings.

PSL 5.1.5 Pipe Support (New 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 Engineer.

PSL 5.1.6 End Caps (New Sub-Clause)

Add new Sub-Clause:

The Contractor shall, at the end of each days work, fit end caps to the open ends of the pipeline under construction. The end caps shall be manufactured in such a manner that they can be fitted to seal off the pipeline to the extent that it is totally dust and water proof. The end caps 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 5.1.7 Marker Posts (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 Engineer.

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 Flanged Joints

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 (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 shall 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 600 or Greater)

Delete the title and replace with “Welding (Steel Pipelines)”.

Delete the 1st sentence and replace with:

Field welding of steel pipelines shall be carried out in accordance with the relevant requirements of the latest version of API 1104. The Contractor, prior to commencement of welding, 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 this 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 shall be produced in accordance with the welding procedure. Should constant repairs be required on welds carried out by one particular welder, the Engineer may request that the welder be re-tested or removed from the project.

Add to the Sub-clause:

Radiographic Examination of Shop Welds

The Contractor shall provide a manufacturer's certificate proving that the following examinations were carried out in the factory:

i) ONE HUNDRED percent radiographic examination of all welds deposited by an approved automatic process.

ii) ONE HUNDRED percent radiographic examination of all welds deposited manually or semi-automatically, and repairs to welds done by an automatic process.

In addition the Contractor shall include in his prices for the manufacture of pipes, bends, fittings and specials for the cost of carrying out, under the supervision of the inspector appointed by the 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.

The Engineer shall in all cases determine which welds are to be radiographed on the quantity basis specified above. All radiographs and records thereof made by the Contractor shall be made available to the Engineer to enable him to determine whether the welds are acceptable or not and no lining or wrapping of pipes shall be permitted until the welds have been accepted by the Engineer. To avoid any unnecessary delays, at· the option of the fabricator, radiographs may be approved by the manufacturer's inspectors subject to them being subsequently submitted to, and approved by the Engineer.

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 Engineer and the Contractor.

Production Testing of Welds (Not applicable to pipes supplied by the Employer)

The Contractor shall also include in his prices for the supply of pipes the cost of carrying out at the factory, non-destructive tests of shop production welds (additional to the qualification tests for welding procedure) on the following basis:-

One pipe from each one hundred pipes produced shall be selected at random and specimens for two guided cold bend tests and one transverse tensile test shall be cut therefrom and tested in accordance with SABS 719:1971, Section 7.

In the case of the guided cold bend tests, where welding is carried from one side only, bend - specimens shall be tested with the rest of the bend in tension; where welded from both sides the specimens shall be tested with the inner and outer welds in tension alternately.

Tensile tests shall be carried out as for the qualification tests.

The pipes from which successfully tested specimens have been taken shall be trimmed to the maximum possible length and shall be accepted by the Employer for payment purposes as full standard pipe lengths.

In the event of the welds of any pipe failing to reach the standard of acceptance, such pipe shall be rejected. Two further plate coupons shall be prepared from different pipes, selected at random by the Engineer, for each specimen that has failed to reach the required standard. In the event of such additional tests proving to be satisfactory repairs to the pipe originally failing any test will be permitted by the Engineer and such repairs and subsequent re-test shall be at the Contractor's expense. In the event of the additional tests also failing to reach the required standard the Engineer shall have the right to reject the entire batch of pipes from which the coupon plates were cut.

PSL 5.2.3.1 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 5.2.3.2 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 5.2.3.3 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 5.2.3.4 Clearance (New Sub-Clause)

Add new Sub-Clause:

The minimum clearance around the pipe during welding shall be 500mm or such other minimum distance that may be required to facilitate compliance with the approved welding procedure. When welding in a trench, adequately sized “fox holes” shall be excavated/formed so as to provide adequate access for the welders.

PSL 5.2.3.5 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 shall be removed prior to corrosion protection application.

PSL 5.2.3.6 Non-Destructive Testing After Construction (New Sub-Clause)

Add new Sub-Clause:

For applicable pipelines, the Employer's CP Professional Services Provider will carry out coating integrity surveys along the full length of the pipeline after laying and backfilling of the pipe up to 300 mm above the crown of the pipe. The PCM testing (Pipe Current Mapping) method will be used except in the vicinity of Eskom's HV overhead power lines where the DCVG (direct current voltage gradient) method of testing will be used.

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 Engineer 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 Engineer 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.

A copy of a document that describes the methodology that will be followed when undertaking the DCVG survey will be available for inspection by Tenderers at the briefing meeting.

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 Engineer monthly. Should there be repetitive or serious defects, this information shall be forwarded to the Engineer immediately.

PSL 5.2.5 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 shall 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 5.5 ANCHOR/THRUST BLOCKS AND PEDESTALS

Add to the Sub-Clause:

If the steel pipelines that to be laid under this Contract are to be continuously welded or flanged, anchor/thrust blocks will not not required at tees, bends, terminal valves and end caps.

PSL 5.6 VALVE AND HYDRANT CHAMBERS

Add the following sub-clause 5.6.2

The Contractor shall provide the Engineer with all relevant dimensions of valves fittings and specials for the purposes of finally sizing chambers and the designing of the reinforcement at least 40 working days prior to such sizes and reinforcement schedules being required. No extensions of time for delays resulting from failure to supply this information on time will be entertained. Any redesign costs due to supply of incorrect information will be to the Contractor's account.

PSL 5.10 DISINFECTION OF PIPELINE

Replace the Sub-clause with the following:

Introduction

The price for testing, flushing out and disinfecting pipelines and fittings is included in the schedule of items for supply and installation.

On completion of construction, after pressure testing and prior to commissioning the pipeline is to be flushed out and disinfected by the Contractor in accordance with this specification.

Definitions

Within this document the term HYPOCHLORITE SOLUTION means a commercial solution of sodium hypochlorite containing 10 % to 15 % of available chlorine. Also, 10 % HYPOCHLORITE SOLUTION means hypochlorite solution diluted one in ten with water which thus has approximately 1 % of available chlorine.

Bulk supplies of sodium hypochlorite solution (Chloros for instance), are supplied at 10 to 15% available chlorine. This fraction declines progressively as the hypochlorite decays to chloride, chlorate and oxygen. Assume in practice that there is only 10 % available chlorine.

Within this document AVAILABLE CHLORINE and all chlorine concentrations means FREE CHLORINE available to the water environment for its disinfection.
Completed installation

Ensure that all water used for disinfection purposes has a free chlorine residual of at least 20 mg/ℓ. Refer to Table 1 and 2 in the section on dosage of chlorinating agents.

During chlorination the pipeline shall be kept full of water.

New mains

Do not connect any new main into supply until the water from designated sampling points, having stood in the main for at least 20 hrs and has met the criteria specified herein.

New mains are laid with the intention of ensuring as far as possible, the exclusion of debris and contamination, but presume at the disinfection stage that debris and contamination does exist and that this debris is resistant to disinfection, e.g. compacted soil or detritus at the joints.

The disinfection procedure, which should follow pressure testing, includes the following:
Swabbing and flushing of the main.
Soaking of the main for a minimum period of 20 hrs, using a minimum concentration of 20 mg/ℓ of available chlorine in mains water.
Removal of excess chlorine by flushing the main.

Dosage rates of chlorination agents.

Tables 1 and 2 provide estimates of the minimum dose rates of sodium hypochlorite solution, chlorine gas or bleach powder, tables or granules to achieve chlorine levels of 20 mg per litre when dilute mains water which has a zero chlorine demand.

Table 1 – dosage for 1,000 m of pipeline to give 20 mg available chlorine per litre

Pipe diameter	Volume of 1000m of pipeline	Weight of bleaching powder granules or tablets to 20 mg/ℓ	Weight of chlorine to give 20mg/ℓ	Volume of hypochlorite solution to give 20 mg/ℓ
mm	m3	gm	gm	litres
50	1,9	80	40	0,4
75	4,4	180	90	0,8
100	7,9	320	160	1,5
150	17,7	700	350	3,5
200	31,4	1,260	630	6,2
250	49,1	2,000	980	9,7
300	70,7	2,800	1400	14,0
350	96,2	3,800	1900	19,0
400	125,6	5,000	2500	24,6
500	196,3	7,800	3900	38,4
600	282,6	11,200	5600	55,4

Table 2 – dose rates for 20 mg available chlorine per litre

Flow rate in pipeline*		Hypochlorite solution injection rate for 20 mg/ℓ		Cholorine injection rate for 20mg/ℓ
litres/sec	m3/hr	litres/hr	mℓ/sec	gm/hour
1 2 3 4 5 6 7 8 9	3,6 7,2 10,9 14,4 18,0 21,6 25,2 28,8 32,4	0,7 1,4 2,2 2,9 3,6 4,3 5,0 5,8 6,5	0,2 0,4 0,6 0,8 1,0 1,2 1,4 1,6 1,8	72 144 216 288 360 430 500 576 650

* For flows greater than 9 litre/sec the dose rates can be calculated as follows:-
e.g flow of 186 litres/sec = 100+ 80+ 6= 100x1 +10x8 + 6 litres/sec
hypochlorite solution injection rate = 100x0.7 +10x 5.8 + 4,3 =70 + 58 +4.3 = 132,3 litres/hr

Disposal of chlorinated water

When the pipeline has passed all disinfection criteria it must be drained without causing a hazard.

The following can be explored as possible methods of the disposal of the chlorinated water, and the most suitable method will be employed.

- Foul Sewer
- Overland
- Watercourse

PSL 7 TESTING

PSL 7.1 GENERAL

PSL 7.3 STANDARD HYDRAULIC PIPE TEST

Add new Sub-clause:

Water used for one filling of the pipeline for hydraulic testing will be provided by the Employer free of charge. Water will be made available from the nearest operational reservoir. Additional water used due to unsuccessful hydraulic tests will be charged at the Employer's bulk rate per kilolitre. Filling of the pipeline for hydraulic testing shall be carried out slowly to enable air to escape and under the direction of the Engineer.

An item has been provided in the Bill of Quantities to cover the cost of conveying water from the supply point to the test section of pipeline.

PSL 7.3.1 Test Pressure and Time of Test

Add to the Sub-clause:

Pipeline shall be subjected to field test pressures equivalent to the heads or pressures shown on the drawings.

The sections in which a pipeline may be tested will be at the discretion of the Contractor, except that a pipeline shall not be tested in sections exceeding a maximum allowable length of 2 000 m unless otherwise agreed by the Engineer and also taking cognisance of the requirements of Clause C3.5.17 of the project specification. Notwithstanding the foregoing, all stream and river crossings that are to be encased in concrete shall be successfully pressure tested prior to the placing of the concrete encasing. 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 as a result of testing the pipeline in intermediate sections.

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, cement mortar lined pipe shall be left for 24 hours to permit maximum saturation of the 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 7.3.3 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 Water for Testing Purposes

Water used for one filling of the pipeline for hydraulic testing will be provided by the Employer free of charge. Water will be made available from the nearest operational reservoir. Additional water used due to unsuccessful hydraulic tests will be charged at the Employer's bulk rate per kilolitre. Filling of the pipeline for hydraulic testing shall be carried out slowly to enable air to escape and under the direction of the Engineer.
An item has been provided in the Bill of Quantities to cover the cost of conveying water from the supply point to the test section of pipeline.

PSL 7.3.5 Initial Filling of Pipeline (New 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 Engineer and will also be monitored by ORTDM personnel. Under no circumstances will the Contractor be allowed to carry out filling of the pipeline without the supervision of the Engineer, neither shall he/she permit any other persons to carry out such filling without the written permission of the Engineer.

Any damage to the pipeline caused by non-compliance with this clause shall be rectified at the Contractor's expense.

PSL 7.3.6 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 Engineer. For this reason, testing shall be carried out against a blank flange or bullnose end cap at these locations.

PSL 7.3.7 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 7.3.8 Draining of the Pipeline (New Sub-Clause)

Add new Sub-clause:

The pipeline may have to be drained to carry out remedial measures. 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 Engineer.

PSL 7.4 TESTS ON EXPOXY COATINGS

PSL 7.4.1 Holiday Testing – Epoxy Linings and Coatings (New Sub-Clause)

Add new Sub-Clause:

All Holiday Testing of epoxy linings and coatings shall be carried out with an instrument approved by the Engineer. The sparking detection test shall conform to the standards as set out in SANS 1217:2001 and BS 3003 Part 1. 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 Engineer for approval. Method statements for the process of holiday testing shall be submitted to the Engineer for approval.
The correct equipment for the type of applicationshaill 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 Engineer.

PSL 7.5 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 of the entire pipeline has been successfully completed.

PSL 7.6 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 Engineer's satisfaction.

PSL 8 MEASUREMENT AND PAYMENT

PSL 8.2 SCHEDULED ITEMS

PSL 8.2.1 Inspection, Acceptance, Loading and Transporting from Employer's pipeyard, Lay and Bed Pipes Fittings, Specials and Couplings

Add to sub-clause:

Where pipes are supplied 'free-issue' by the Employer, the rate for 'supply, lay, bed …etc' shall exclude the cost of supplying the pipes. A separate per meter length of pipe item will be scheduled for inspecting the pipes in the Employer's pipeyard together with Engineer, identifying and documenting any defects, acceptance of responsibility for pipes from Employer, loading, transporting to site and off-loading alongside the trench.

The tendered rate for inspection, accepting, loading, transporting and offloading on site shall cover the cost of inspecting in Employer's pipeyard, documenting any defects, formal acceptance (signing of acceptance certificate) of the pipes supplied to the Contractor by the Employer, taking full responsibility for the pipes thereafter, loading, transporting to site and off-loading and making good any damage, to the satisfaction of the Engineer, incurred in the process.

Where separate rates in respect of water for testing, disinfection and the hydraulic test itself are provided, the rate for "lay and bed pipes" excludes the cost associated with conveyance of water to fill the pipeline, the field pressure testing and disinfection of the pipeline. Separate items have been included in the Bill of Quantities for the cost associated with the conveyance of water required for testing, pressure testing, and disinfection of the pipeline. The rate shall include the cost of corrosion protection.

A maximum payment of 85 % of the tendered rate may be made for the completed section of pipeline which has not yet been hydraulically pressure tested. A further payment of 15% of the tendered rate will be made upon successful completion of the pressure testing for the relevant section of pipeline.

PSL 8.2.2 Extra-over 8.2.1 for Supplying, Fixing, and Bedding of Specials Complete with Couplings

Add the following to this payment clause:

The rates for shall include the cost of corrosion protection.

PSL 8.2.3 Extra-over 8.2.1 for Supplying, Fixing, and Bedding of Valves

Add the following to this payment clause:

The rates for shall include the cost of corrosion protection.

PSL 8.2.11 Anchor/thrust blocks and pedestals

Add the following to this payment clause:

Notwithstanding Sub-clause 8.2.11 anchor/thrust blocks and pedestals will be measured only by volume of concrete to the net dimensions shown on the drawings or ordered. The rate shall cover the cost of excavation, concrete and formwork.

PSL 8.2.13 Valve and Hydrant Chambers, etc.

Replace this payment clause:

Separate payment items are provided for valves, fittings and the chamber components.

PSL 8.2.14 Manholes

Replace this payment clause:

Separate payment items are provided for valves, fittings and the manhole components.

PSL 8.2.15 Special Wrapping in Corrosive Soil

Delete the heading and substitute: Corrosion Protection

Delete the Sub-Clause and substitute the following:

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.

Add new items:

External corrosion protection to flanges, adaptor joints, valves…….. 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 8.2.16 Cut Pipes (New Sub-Clause)

Add new item:

Extra over for forming scarf joint…….Unit : No

Add new item:

Extra over for forming mitre cut joint……Unit : No

Add new item:

Extra over for cutting pipe as closure……..Unit : No

The rates shall cover the cost of the cutting of the pipes and forming the joint and welding and making good of the internal lining and external coating, testing, and forming joint holes in trench in all materials to facilitate in-situ welding.

PSL 8.2.17 Cutting into and Connecting to Existing Pipeline (New Sub-Clause)

"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.

SECTION PSLB: BEDDING (PIPES) (APPLICABLE TO SABS 1200 LB - 1983)

PSLB 2.3 DEFINITIONS

Main fill:

Delete "150 mm" in second line and substitute "300 mm".

PSLB 3 MATERIALS

PSLB 3.1 SELECTED GRANULAR MATERIAL

All bedding used for the cradle beneath and surrounding the 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 shall be classified as silty to fine sand having a stiffness ratio of not less than 5,0 MPa. Furthermore, the materials shall, preferably, be obtained from river transported deposits 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 bedding sand requirements and complies with this specification at all times. At least one grading analysis shall be carried out for every 100 linear metres of bedding placed. The results of these tests shall be forwarded to the Engineer 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 bedding material at all times.

PSLB 3.2 SELECTED FILL MATERIAL

Not required. All material up to the underside of main fill shall be selected granular as specified in PSLB 3.1.

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 PSDB 5.4 and the provisions of PSDB 3.7. 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 Engineer, bedding material can be produced from the excavated material, the Contractor shall, if so ordered by the Engineer, screen or otherwise treat (as scheduled) the excavated material in order to produce material suitable for bedding.

PSLB 5 CONSTRUCTION

PLSB 5.1 GENERAL

PSLB 5.1.2 DETAILS OF BEDDING

Delete and replace with:

Pipes shall be bedded and protected in accordance with the details shown on the drawings.

PSLB 5.1.2 Details of Bedding)

Add the following to Sub-Clause 5.1.2 of SANS 1200 LB:

Where indicated on the drawings, or as otherwise indicated by the Engineer, 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 bidim and provided with outlet pipes if and where indicated.

PSLB 5.1.4 Compacting

Delete the second line and substitute:

top of the pipeline) shall be 93% mod AASHTO.

Add to Sub-Clause 5.1.4:

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 Engineer'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 pipe laying the Contractor will be required to submit, to the Engineer, 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 and flanged joints shall be left exposed with a minimum of 300 mm clearance around the bottom of the pipe during hydraulic pressure testing of the pipe to facilitate inspection.

PSLB 5.2.5 Stone Bedding (New Sub-Clause)

In areas where waterlogged conditions exist or where ordered by the Engineer, special drains consisting of a 200 mm thickness (See PSLB 5.1.2 c)) 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 100mm 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 150 mm thick 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.

PSLB 5.3(b) Selected Fill Blanket

Delete "200 mm" from title.

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 8.1.6 Freehaul

Delete the Sub-Clause and substitute the following:

All haul of bedding material will be regarded as free haul. No overhaul will be paid for bedding under this Contract.

PSLC CABLE DUCTS (SANS 1200 LC)

PSLC 3 MATERIALS

PSLC 3.1 DUCTS

Add the following to sub-clause 3.1:

Class 6 uPVC HDPE pipes (dia 110 mm or 160 mm) shall be used as ducts for electric cables under streets. Ducts for Telkom shall be of pitch-impregnated fibre pipes.

Add the following sub-clause to clause 3.1

PSLC 3.2 BEDDING

Replace sub-clause 3.2 with the following:

The provisions of SABS 1200 LB: Bedding (Pipes) and the relevant project specification shall apply mutatis mutandis and payment shall be made under the appropriate payment clauses of SABS 1200 LB.

PSLC 3.3 BACKFILL

Substitute sub-clause 3.3 with the following:

The provisions of SABS 1200 DB: Earthworks (Pipe Trenches) and the relevant project specification shall apply mutatis mutandis and payment shall be made under the appropriate payment clauses of SABS 1200 DB.

PSLC 3.4 CABLE DUCT MARKERS

Add the following to sub-clause 3.4:

Cable duct markers shall be provided as specified in Sub-clause PSLC 5.10.

PSLC5 CONSTRUCTION

PSLC 5.1 EXCAVATION OF TRENCHES

PSLC 5.1.1 Trench Widths and Depths

Add the following to sub-clause 5.1.1:

Trench widths shall be in accordance with the provisions of SABS 1200 DB: Earthworks (Pipe Trenches).

The minimum depth of cover over ducts shall be 600 mm from the final road level.

Add the following to Clause 5.1

PSLC 5.1.3 Excavation of Trenches at Road Crossings

The minimum depth of cover over ducts shall be 300 mm where construction traffic is liable to cross them. Road crossings shall therefore be constructed after the construction of the roadworks has reached the stage where the required cover is available.

PSLC 5.2 BEDDING AND COMPACTION OF BEDDING

Substitute sub-clauses 5.2.1 and 5.2.2 with the following:

All ducts shall be laid on a Class C bedding according to the provisions of SABS 1200 LB: Bedding (Pipes). Backfilling shall be according to the provisions of SABS 1200 DB: Earthworks (Pipe Trenches).

PSLC 5.4 BACKFILLING AND COMPACTION

Add the following to sub-clause 5.4:
Road crossings shall be backfilled with sand from designated borrow pits, the site or commercial sources, whichever is applicable, up to underneath the subbase, and compacted to a minimum of 100 % of MOD AASHTO density.

PSLC 5.8 ROAD CROSSINGS

Substitute "0.5 m" in the last sentence of sub-clause 5.8 with "1,0 m" and add the following:

Ducts for road crossings shall be effectively sealed by means of end caps.

PSLC 5.10 POSITION TO BE MARKED

Add the following to sub-clause 5.10:

The lettering height shall be at least 70 mm.

The positions of ducts shall be marked by means of incisions on top of the kerb. The dimensions of such incisions shall be at least 40 mm long, 3 mm wide and 5 mm deep and the spacing, where more than one incision is required, shall be 20 mm. Ducts for Telkom crossings and electrical crossings shall be marked with green and red painted incisions respectively.

The draw wire, as specified in Sub-clause PSLC 5.3.3, shall be secured to a 150 x 150 x 150 mm grade 20 MPa/19 mm concrete marker, which shall be installed with a depth of cover of 50-100 mm below the top of kerb or sidewalk level.

Add the following clause to Section 5: Construction:

PSLC 5.12 DRAW AND JOINT BOXES FOR TELKOM CABLES

Draw and joint boxes shall be constructed strictly in accordance with the positions and details given on the plans.

PSLC7 TESTING

PSLC 7.2 COMPACTION TESTS

Addd the following to sub-clause 7.2:

The Contractor shall, for at least one out of every five road crossings, submit density tests to the Engineer at the Contractor's own expense. The decision as to which road crossing densities shall be tested, rests with the Engineer.

PSLC 8 MEASUREMENT AND PAYMENT

PSLC 8.2 SCHEDULED ITEMS

PSLC 8.2.5 Supply, Lay, Bed And Prove Duct Unit : m

Substitute "GPO" in sub-clause 8.2.5(a) with "Telkom".

Add the following to sub-clause 8.2.5(a):

The rates for the installation of Telkom distribution ducts parallel to streets shall first be submitted by the Employer to Telkom for approval. The installation of these ducts will only form part of this contract if approved by Telkom.

PSLC 8.2.8 Cable Markers Unit : No

Add the following to Sub-clause 8.2.8:

The rate shall also cover the cost of the end cap and the incisions, concrete marker and draw wire, as specified in Sub-clause PSLC 5.10, as amended.

LD Sewers

SECTION PSLE: STORMWATER DRAINAGE (APPLICABLE TO SABS 1200 LE -

PSLE 3 MATERIALS

PSLE 3.1(a) Precast Concrete Pipes

Delete the sub-clause and substitute:
Concrete pipes shall be of reinforced concrete and shall comply with SABS 677 and be of the class as indicated on the drawings or scheduled in the Bill of Quantities.

PSLE 3.1 (d) Skewed Ends

Add to the Sub-Clause:
Wherever required skew ends may be cut on site.

PSLE 3.1 (f) Pipes for Subsoil Drains (new Sub-clause)

Add new Sub-Clause:

Pipes for subsoil drains shall have the specified internal diameter, which shall not be less than 100 mm, and shall be slotted uPVC or HDPE pipes with a wall thickness in accordance with Class 4 pressure pipes to SABS 966 or SABS ISO 4427.

The size of the perforations in perforated pipes shall in all cases be 8 mm + 1,5mm diameter and the number of perforations per metre shall not be less than 26 for 100 mm pipe and 52 for 150 mm pipe. Perforations shall be spaced in two rows for 100 mm pipes and four rows for 150 mm pipes.

Slotted uPVC or HDPE pipes shall have a slot width of 8 mm with a tolerance of 1,5mm in width. The arrangement of slots shall be to the Engineer's approval but the total slot area shall not be less than specified for the perforations.

PSLE 3.4.1 Bricks

Add to the Sub-Clause:

Cement bricks complying with the relevant requirements of SABS 1215 shall be considered as being acceptable.

PSLE 3.6 Concrete (new Sub-Clause)

Concrete shall comply with the relevant requirements of SABS 1200 G or SABS 1200 GA, whichever is included in the project specification.

PSLE 3.7 Permeable Material for Groundwater Drains

Add the following new Sub-Clause:

Permeable filter materials for groundwater drains shall consist of crushed stone of suitable grading.

Permeable materials shall conform to the following requirements:

Crushed stone shall be clean, hard single sized stone and shall be free from shale, clay and other deleterious substances.

The aggregate crushing value of the stone shall not exceed 30 when tested in accordance with TMH 1 Test Method B1.

PSLE 5 CONSTRUCTION

PSLE 5.1.4 Culvert Construction after Earthfill

Add to the Sub-Clause:

Wherever possible pipes and rectangular culverts shall be laid under trench conditions.

The compacted fill shall first be constructed to a height of 300 mm above the culvert before excavating for the culvert.

The trench width shall not exceed the outside diameter of the pipe plus 600 mm. A working width of 600 mm each side shall be allowed for rectangular culverts.

PSLE 5.2.2 Pipe Culverts

Add to the sub-clause:

The bedding for stormwater pipes shall be to the requirements of SABS 1200 LB as amended by the project specification and shown on the drawings.

The ogee joints shall be fitted with 200 mm x 6 mm rubber sealing collars conforming to the latest SABS 974 Specification and with a Shore hardness of approximately 40 degrees, or alternatively, the ogee joints shall be primed and double wrapped in accordance with the manufacturer's recommendations with 200 mm wide impermeable wrapping tape to the Engineer's approval.

PSLE 5.2.3 Concrete Casing of Pipelines

In second line of the Sub-Clause substitute "Grade 15/19" for "mix 15".

PSLE 5.2.6 Construction of Groundwater Drains

Add the following Sub-Clause:

On completion of excavation the trench shall be lined with geotextile as specified or shown of the drawings.

A layer of permeable material of the class and thickness as shown on the drawings shall be placed on the bottom of the trench and lightly tamped and finished to the required gradient.

Pipes of the type and size required shall then be firmly bedded on the permeable material true to level and grades coupled where required and the trench backfilled in layers not exceeding 100mm with further permeable material to such height above the pipes as shown on the drawing or directed by the Engineer. The permeable material shall be lightly compacted and finished to the required level. The trench shall be specially protected against the ingress of water before completing the impermeable layer.

When placing successive layers the lower layer shall not be walked on or disturbed more than can be avoided. Care shall be taken to prevent the contamination of permeable material during construction of the groundwater drains and all permeable material contaminated by soil or silt shall be removed and replaced by the Contractor at his own expense.

Where plain butt joint pipes are used they shall be laid firmly together to prevent infiltration of backfill material. Perforated and slotted pipes shall be joined by couplers. Perforated pipes shall be laid with the perforations at the bottom, as instructed.

The higher end of groundwater pipe drains shall be sealed off with a cap or loose concrete cap of Class 20/19 concrete, as shown on the drawings, and at the lower end the pipe drain shall be built into a concrete headwall providing a positive outlet or connected to stormwater pipes or culverts.

PSLE 5.8 Open Drains (new Sub-clause)

Add new Sub-Clause:

Open drains are to be constructed to the details shown on the drawings, or as directed by the Engineer, to the correct line, levels and cross-sections. The material excavated from open drains is to be stockpiled for future use.

Measurement of open drain excavation shall be calculated from natural ground level or, in the case of drains within a road reserve, from the reduced level in the road excavation, and payment will be made on a rate per m^3 basis irrespective of depth. The rate is to include for all work required to trim the drain(s) to the correct lines and levels.

PSLE 5.9 Stone pitching (new Sub-Clause)

Where ordered by the Engineer, open drains, stormwater outlets, etc, shall be pitched with stone. Notwithstanding the provisions of SANS 1200 DK Clause 3.2.1 Table 2 pitching for lining drains and stormwater outlets shall have a minimum size of 100 x 100 x 75 mm deep. In all other respects the provisions of SANS 1200 DK as amended by the Project Specification shall apply. Before pitching is commenced, all slopes and surfaces to receive pitching shall be carefully trimmed and dressed to the correct lines and grades. The pitching stones are to be laid with joints broken as much as possible and are to be hammered solidly into position to present a regular and uniform surface. All joints are to be grouted to their full depth with 4:1 cement:sand mortar.

PSLE 5.10 Cutting of Pipes (new Sub-Clause)

As far as is possible culvert lengths shall be such that pipe units need not be cut. Should any straight or skew cuts be necessary, such cutting will not be measured and paid for separately in terms of Sub-Clause 8.2.4 since all additional work required in cutting the pipes as well as the wasted pipe ends shall be regarded as being included in the payment for the supply, lay, joint, bed and test of the relevant pipe culverts, as per Sub-Clause 8.2.1.

PSLE 8 MEASUREMENT AND PAYMENT

PSLE 8.2.1 Supply and Lay Concrete Pipe Culverts

Delete the title of the sub-clause and substitute:

Supply, Lay, Joint, Bed and Test Pipelines

Add to the Sub-Clause:

The bedding shall be to the requirements of SABS 1200 LB as amended by the project specification and shown on the drawings.

Add to the Sub-Clause:

The rates shall cover the cost of providing the pipes as well as the cost of laying, bedding, jointing and making connections into manholes, including dealing with stormwater flow and testing the pipeline.

PSLE 8.2.4 Extra over Items 8.2.1 and 8.2.2 for Cutting End Units for Culverts on Site

Delete this Sub-Clause as no extra payment will be made for cutting end units for culverts.

PSLE 8.2.14 Minor Drainage Structures (new Sub-Clause)

Catchpits, manholes, drop inlets and headwalls constructed will be measured and paid for as complete units.

Item : Supply, construct and install drainage unit of the type, size category and depth stated in the Bill of Quantities;;……. Unit : No

The unit of measurement shall be the number of the particular type, size and category of drainage units supplied, constructed and installed in accordance with the drawings.

The tendered rate shall include for all materials, plant labour, supervision and incidentals for the construction of the drainage units complete and in accordance with the drawings.

The tendered rate shall further include for all necessary excavation in all materials, backfilling and disposal of surplus materials, formwork, concrete, benching, concrete finish, reinforcement, precast elements, steel channels and grids, step irons and all other items not specifically measured elsewhere, necessary for completion of the unit in accordance with the drawings.

The tendered rate shall include for all costs involved in complying with the requirements of the relevant specifications in respect of the individual types of work involved in completion of the units.

The tendered rates shall exclude for excavation in intermediate and hard material, payment for which shall be made as an extra over in the Schedule of Quantities.

PSLE 8.2.15 Stone Pitching (new Sub-Clause)

Payment for stone pitching (PSLE 5.9) will be made at a rate per unit finished area and the rate is to include for all trimming and dressing of the excavation, laying of the stones and grouting of the joints:. Unit : m^2

SECTION PSM: ROADS (GENERAL) (SANS 1200 M)

PSM 2 INTERPRETATIONS

PSM 2.2 Definitions

Add the following Sub-clause:

PSM 2.2.59 Classification of roads:

For the purpose of the Contract the internal roads will be defined as roads within the Water Treatment Works Site. The external road will be defined as the access road to the site from ??? to the access gate with a notional road reserve of ???..

PSM 5 CONSTRUCTION

PSM 5.1 Traffic Control/Safety measures

Add the following Sub-Clause:

When roads to be constructed under this contract join onto existing trafficked roads, the Contractor shall take all the necessary precautions to ensure the safety of the traveling public. To this end, signs warning through traffic of vehicles encroaching into the travelled way shall be erected by the Contractor prior to such work being undertaken. In addition flagmen shall be installed along the through road. These control measures shall be checked and recorded on a daily basis.

Under no circumstances shall drums be permitted to be used as traffic demarcation devices.

All signs must comply with the latest edition of the South African Road Traffic Sign Manual.

PSM 6 TOLERANCES

PSM 6.4 Level Control of road layers

Add the following sub-clause:

The Contractor shall submit to the Engineer, at the time of requesting acceptance of a road layer, a record of the surface levels of that section, taken at metre intervals to coincide with the level pegs. A sample form will be obtainable from the Engineer.

PSM 7 TESTING

PSM 7.1 General

Add the following to this Sub-Clause:

The random sampling method of TMH 5, for the location of positions, for field density testing will not necessarily be applied by the Engineer's Representative. Density testing shall be carried out where, in his opinion, the density of the compacted layer is suspect. The Contractor shall present the full width of the layer, between the stated linear stake values, for acceptance. Only in exceptional cases will partial widths of a layer be accepted for testing.

PSM 7.3 Routine Inspection and Testing

Add the following to this Sub-Clause:

The request for acceptance of a layer shall be submitted in writing, specifying the exact location of the section and type of layer. On receipt of all these details the Engineer's Representative will arrange for the necessary inspections and tests to satisfy himself that the road layer complies. Testing will be carried out as expeditiously as possible, and the results will be available within 24 hours of receipt of test request. The Contactor shall backfill the test holes left in the layer with a similar material to that of the layer tested and compact the material to a similar density. Concrete shall not be used."

PSM 7.4 Compaction Control

Add the following to this Sub-Clause:

Density test shall be carried out by the Contractor on each layer of the selected subgrade, subbase, base-course and shoulders/layers as soon as possible but not later than twenty-four hours (24) after compaction of that layer has been

completed, and the results of the test shall be submitted to the Engineer without delays and in any case not later than twelve hours (12 hours) after they become available.

The Contractor shall locate and test any soft or wet areas evident in any layer and shall, if these tests fail, re-compact and retest such areas for density before requesting the Engineer to carry out check tests.

The Contractor shall provide adequate equipment and facilities for carrying out the tests required to be performed by him. Should the Engineer at any time consider that the equipment and facilities are inadequate for this purpose, he may instruct the Contractor to cease work on the completion of subgrade, sub-base and base course until such time as the Contractor has remedied the deficiency of equipment, labour and facilities.

The results of the test carried out by the Engineer shall be regarded as final.

PSM 7.5 Engineer's Discretion

Notwithstanding the provision of clause 7 of SABS 1200 M, testing of a section of completed work shall be at the sole discretion of the Engineer who may refuse to check test and consequently not approve a section of work which contains obvious defects such as loose patches, over-wet material etc.

PSM 8 MEASUREMENT AND PAYMENT

PSM 8.1 Inspection and Testing of a road layer

Add the following Sub-Clause:

The cost of refilling and compacting the density test holes shall be included in the rate tendered for the construction of that layer.

SECTION PSME: SUBBASE (SANS 1200 ME)

PSDME 3 MATERIALS

PSME 3.2.1 Subbase Material

Replace the following in this Sub-clause with:

With reference Sub-clauses 3.2.1.d (ii) and 3.2.1.d (iii), the regional factor shall be taken as 0,6.

PSME 5 CONSTRUCTION

PSME 5.4.1 Placing

Add the following to this Sub-clause:

The subbase layer shall be 150mm thick unless shown otherwise on the drawings.

PSME 6 TOLERANCES

PSME 6.1.1 General

Add the following to this Sub-clause:

For layers, constructed of subbase quality material, on which the bituminous surface will be placed, the tolerance for dimensions and level shall be as set out in SABS 1200 MF, Sub-clauses 6.1.2 to 6.1.6 inclusive, as amended.

SECTION PSMF: BASE (SANS 1200 MF)

PSMF 3 MATERIALS

PSMF 3.3.2 Graded Crushed Stone

Add the following to Sub-clause 3.3.2, in the first sentence after the words:

SABS 1083 ..... “for 37,5mm stone”.

PSMF 5 CONSTRUCTION

PSMF 5.4.4 Compaction

Amend Sub-clause 5.4.4.2 (a) by depleting 98% and replace with 100%.

PSMF 6 TOLERANCES

PSMF 6.1.2 Grade

Delete the contents of Sub-clauses 6.1.2 (a) and (b) and replace with:

The height of the edge of the channel above the top of the completed base shall be not higher than the final asphalt level less 5mm. (Refer to SABS 1200 MH 6.3.4)

PSMF 6.1.5 Cross-section

Amend the Sub-clause as follows:

Delete “25mm” and replace by “15mm”.

PSMF 7 TESTING

PSMF 7.3 Routine Inspection and Testing

Delete Clause 7.3 and replace with the following:

The Density measured at all test holes shall be a minimum of 100% Mod. AASHTO density for the section of layer works to be acceptable.

SECTION PSMJ: SEGMENTED PAVING (SANS 1200MJ)

PSMJ 3 MATERIALS

PSMJ 3.1.2 Class, strength and type

Add the following to Sub-clause 3.1.2:

Blocks shall be 60 mm or 80 mm thick pavers, S-A type, Class 35 to the colour and type specified by the Landscape Architect. Blocks are to be 80mm thick for roads and 60mm thick for walkways and other non-vehicular areas.

PSMJ 3.3 Sand for bedding and jointing

Add the following to Sub-clause 3.3:

The sand used for the bedding layer shall not contain proportions of silt and clay materials smaller than 0.075 mm that exceed 15%.

PSMJ 5 CONSTRUCTION

PSMJ 5.3 Placing and compacting of sand bed.

Replace the first sentence of Sub-clause 5.3 with:

The bedding sand shall have a compacted thickness of 20mm.

Add the following to Sub-clause 5.3:

The Contractor must make allowance for the penetration of the bedding sand layer into the compacted subbase layer. Only the 20 mm homogenous bedding sand layer will be measured for payment purposes.

PSMJ 5.4 Laying of units

Replace the first paragraph of Sub-clause 5.4 with:

Blocks shall be laid in the herringbone pattern.

PSMJ 5.6.2 Paving subject to wheel loads exceeding 30 kN.

Add the following to Sub-clause 5.6.2:

The paving proposed will be subjected to wheel loads exceeding 30kN.

SECTION PSMK: KERBING AND CHANNELLING (SANS 1200 MK)

PSMK 3 MATERIALS

PSMK 3.2.1 General

Replace the last sentence of Sub-clause 3.2.1 with the following:

Precast units as indicated on the drawings shall be required in 1m lengths.

300 mm lengths shall be used in bellmouths and for radii less than 20 m. These kerbs shall be cast and not saw cut.

PSMK 3.9 Bedding Material

Delete this clause and replace with the following:

The material on which precast kerbs and channels are bedded shall consist of Grade 15/9 concrete to SANS 1200 GA and to the dimensions indicated on the drawings.

PSMJ 5 CONSTRUCTION

PSMK 5.2 Precast Concrete Kerbing and Channeling

Replace the second paragraph of Sub-clause 5.2 with the following:

Provision shall be made for expansion joints of width 10 mm at intervals not exceeding 10 m for kerbing, channelling and edging. The joints shall be filled with a suitable silicone or polysulphide sealant.

Notwithstanding the fact that vertical curves have not been specified where changes to grade of up to 2% occur, the kerbs and channels shall be laid to levels based on a minimum vertical curve length of 20 m.

No change in grade shall be applied on kerbs in bellmouths unless specific levels are indicated.

PSMK 8 MEASUREMENT AND PAYMENT

PSMK 8.1 Basic Principles

Add the following Sub-clause 8.1.4:

Measurement and payment for bedding as well as the backing of kerbs as specified in SABS 1200 MK 5.2 shall be included in the separate items scheduled in terms of Sub-clause 8.2.1 and 8.2.2 of SABS 1200 MK. The rates shall cover the cost of supplying and installing the bedding as specified in Sub-clause PSMK3.9, as amended.

SECTION PSMM: ANCILLIARY ROADWORKS (SANS 1200 MM)

PSMM 8 MEASUREMENT AND PAYMENT

PSMM 8.3.4 Excavation and Backfilling and concreting (if any) for sign supports…. Unit: No.

The unit of measurement shall be the number of sign post foundations excavated backfilled and concreted as specified. The rate shall include for all plant, labour and materials needed to cast concrete surrounds and backfilling with soil for each sign post base.

C3.4 Particular Specifications

Index

PA SUB-LETTING OF THE WORKS

PA1 SCOPE

This Particular Specification covers the requirements to be met by the Contractor in respect of the sub-letting of Work to local Subcontractors.

PA2 DEFINITIONS

PA2.1 "Local Subcontractor" shall mean an individual person, group of persons in association, or firm (whether formally registered or otherwise) not being associated with the Contractor other than by way of an existing Subcontract Agreement of the nature as contemplated in this Particular Specification:

(a) who shall have been resident in the area in which the Works are to be executed for a continuous period of not less than six months prior to the Closing Date for Bids; or

(b) who shall have been economically active and conducting business in the area in which the Works are to be executed, for a continuous period of not less than six months prior to the Closing Date for Bids; or

(c) whose "domicilium et executandi" shall have been within the area in which the Works are to be executed, for a continuous period of not less than six months prior to the Closing Date for Bids; and

(d) whose presence on the Site and engagement on the Works is acceptable or tolerable to the local community; and

(e) who shall be employed by the Contractor to undertake the execution of defined portions of the Works on a Subcontract and/or Task work basis.

PA2.2 The term "the area in which the Works are to be executed" shall for the purposes of this Particular Specification, be deemed to mean Anywhere within the O. R. Tambo District Municipality boundary.

PA2.3 "Sub-letting" shall mean the engagement of individual persons, groups of persons in association or firms or companies for the specific purpose of executing defined portions of the works, or of supplying specific materials or services necessary for the works, and who shall be remunerated for their services at pre-determined rates, which rates shall be directly related to the progress and/or extent of the work executed or service or materials supplied and not to the time expended thereon.

PA2.4 "Local Community" shall mean the community normally resident in the area in which the Works are to be executed.

PA3 MATERIALS

All materials incorporated in the Works undertaken by Subcontractors shall be in accordance with the requirements as set out in the drawings and in the relevant specifications.

PA4 PLANT

The Contractor shall provide all plant, tools and equipment as may be necessary for the execution and completion of the works undertaken by the Subcontractors, in all cases where the provision of such is not provided for in the Subcontract agreement.

PA5 THE SUBCONTRACT AGREEMENT

The Contractor shall be required to enter into a written Subcontract Agreement with each and every Subcontractor employed on the Works.

The Subcontract Agreement shall set out the scope of the works to be executed by the Subcontractor and the amounts which the Contractor will remunerate him for work satisfactorily executed.

The terms and conditions of the Subcontract Agreement between the Contractor and any Subcontractor employed by the Contractor in terms of this Clause shall, (subject to the provisions of the Conditions of Contract as well as this Particular Specification), be at the discretion of the Contractor and the Subcontractor, provided always that such Agreement shall be no more onerous on the Subcontractor than are the terms and provisions of this Contract on the Contractor.

Before entering into any Subcontract Agreement, the Contractor shall be responsible for ensuring that every Subcontractor fully understands his rights and liabilities under the Subcontract.

PA6 COPIES OF SUBCONTRACT AGREEMENT TO BE PROVIDED TO THE ENGINEER

The Contractor shall, on the request of the Engineer, provide the Engineer with full and complete copies of all Subcontract Agreements entered into in terms of this Contract.

PA7 REMUNERATION OF SUBCONTRACTORS

The method and units of measurement adopted by the Contractor for the purposes of remunerating Subcontractors for work satisfactorily executed, shall be appropriate to the nature and scope of the works executed by the Subcontractor and as agreed upon between the Contractor and the Subcontractor and recorded in the Subcontract Agreement.

In relation to the remuneration of Subcontractors the Contractor shall not be obligated in any way to adopt the units and method of measurement specified in this Contract for remuneration of the Contractor by the Employer.

The Contractor shall be fully liable for the payment of all amounts due to the Subcontractors in terms of their respective Subcontract Agreements.

PA8 CONTRACTOR TO INDEMNIFY THE EMPLOYER

In accordance with the provisions of Sub-clause 23(1) of the Conditions of Contract, all Subcontractors employed by the Contractor are deemed to be the agents, servants or workmen of the Contractor.

The Contractor shall indemnify the Employer in respect of all claims and liabilities of whatever

nature arising from the acts, defaults and neglects of any Subcontractor, his agents, servants or workmen.

PA9 SERVICES TO BE PROVIDED DIRECTLY BY THE CONTRACTOR

The Contractor shall, in accordance with the provisions of Clause 4.4 of the Conditions of Contract, remain fully liable in all respects, for the execution and completion of all the Works included in the Contract, including inter-alia:

(a) The timeous completion of the Works as specified in the Contract;

(b) The identification and employment of the Subcontractors;

(c) The provision of the Contract performance Surety Bond as required in terms of Clause 10 of the Conditions of Contract;

(d) The provision of all insurances specified in the Contract;

(e) The provision and maintenance of the Site Establishment;

(f) The management and administration of the Contract;

(g) The provision of all materials, transport, plant and hand-tools as may be necessary for the completion of the Works and which in terms of the Subcontract Agreements entered into, are not to be provided by the Subcontractors;

(h) The provision of all training, supervision and all assistance of whatever nature arising as may be necessary for the completion of the Works in accordance with the provisions of the Contract;

(i) The setting out of the Works;

(j) The provision of all "bridging finance" to the Subcontractors, as may be necessary to ensure the successful conclusion of the Contract.

(k) Training and developing the local Subcontractors in aspects pertaining to contract and site management, financial management, bidding etc, ensuring successful local entrepreneur development. Such training may be done by the Contractor, Engineer or a third party, but only on the express instruction of the Engineer in writing.

PA10 MEASUREMENT AND PAYMENT

The rates, sums and prices tendered for the various work items listed in the Schedule of Quantities, shall include for full and final compensation to the Contractor as described in the respective measurement and payment clauses set out in the Specifications, including normal training but excluding all costs relating to the sub-letting of the works.

Measurement and payment to the Contractor, in respect of the contractual obligation to undertake certain sections of the work on a Subcontract and/or sub-letting basis, shall be by way of Lump Sum price.

The lump sum price shall include for full and final compensation to the Contractor in respect of all additional costs incurred by the Contractor in executing the Works concerned on a

Subcontract and/or Sub-Let basis, in compliance with the provisions of Sub-clause PS9.6, this Particular Specification and all other related provisions of the Contract.

No payments shall be made to the Contractor under this item, in respect of:

(a) any work which has not been executed on a Subcontract or Sub-Let basis in accordance with the provisions of Sub-clause PS9.6 and this Particular Specification, notwithstanding any exemption as may have been granted by the Engineer in terms of Sub-clause PA10; nor

(b) any work not required to be executed by Subcontractors in terms of Sub-Clause PS9.6; nor

(c) any work executed by Nominated Subcontractors.

CP CORROSION PROTECTION FOR WATER AND WASTEWATER WORKS

PARTICULAR SPECIFICATION

CP - CORROSION PROTECTION FOR WATER AND WASTEWATER WORKS

Revision 1.0: May 2017

GIBB
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PARTICULAR SPECIFICATION CP - CORROSION PROTECTION FOR WATER AND WASTEWATER WORKS

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GIBB SPEC:
CP - CORROSION PROTECTION FOR WATER AND WASTEWATER WORKS

1 RESPONSIBILITY

It shall be the responsibility of the Contractor to paint all plant and equipment supplied under this Contract, with the exclusion of the items which do not require coating as defined hereinafter.

The responsibility of the Contractor covers all his equipment, painted or not painted, regarding corrosion resistance.

Any deviation from the following detailed requirements are to be clearly defined in the Tender. Unless so defined, no departure from this Specification will be allowed even for parts which may be considered as accessories (e.g. drive guards, foundation steel work, etc.)

2 DESIGN

Bearing, rolling or rubbing surfaces shall be constructed from corrosion resistant materials. Dissimilar metals in contact producing a potential difference exceeding 0,3 Volt on the galvanic series of metals and alloys in seawater shall either be insulated from each other or when a corrodible metal is welded to a corrosion resistant metal, the protective coating shall overlap onto the latter by at least 10 mm.

All copper alloys shall be zinc free.

Crevices shall be avoided whenever possible, or steps shall be taken to seal them when unavoidable. Blemish marks shall be filled and smoothed over before the application of the final external enamel coating, to achieve a pleasing effect.

Retention areas in water passages that may hold water, mud, leaves, debris, etc., shall be avoided.

2.1 Fasteners

Fasteners shall be comply with the requirements stated in SPEC MG.

2.2 Manifold and other pipes to be welded in situ

These pipes will generally be concrete encased in situ by the Civil Contractor. This means that the external surfaces of the pipes shall be prepared as defined hereinafter after welding and prior to encasement. The full specified coating shall however be applied to the external surfaces of pipes where they protrude from concrete to air, for a distance of at least 100 mm into the concrete. When directed by the Engineer, the concrete/steel pipe interface fillet shall be caulked with suitable approved mastic.

The internal surfaces shall however be factory coated to the Specification leaving 100 mm uncoated at the to-be-welded ends.
It is required that after the site-welds have been made, the full Corrosion Protection Specification shall be applied and tested.

2.3 Extent of coating required

Unless explicitly otherwise specified (e.g. for some kinds of fasteners) all surfaces of plant and equipment shall be coated, including both inside and outside of puddle pipes.

Nevertheless, all non-corrodible parts do not require coating. Pumps which are made of a material which can be considered as non-corrodible with regard to the quality of water to be handled may not require internal corrosion protection. This shall be clearly specified in the Tender, as well as the proposed non-corrodible material.

Labels and components where painting would adversely affect the operation or legibility shall not be painted.

Surfaces of all corrodible components which will normally come into contact with hydraulic fluid, oil or grease need not be painted but shall be free of rust and scale and be thoroughly clean.

3 SURFACE PREPARATION FOR ALL COATINGS

3.1 Important remarks

Mechanical pre-preparation as well as blast cleaning are required for all painted surfaces unless otherwise explicitly specified.

In the case of all wetted surfaces, the surface preparation will follow the satisfactory completion of any tests and inspections carried out on bare pipes, valves and pumps.

3.2 Mechanical pre-preparation

Welds shall be smooth and free from undercuts, protrusions and sharp edges that may protrude through the coating. Weld spatter, slag and loose scale shall be removed and sharp edges ground to a radius.

Deposits of oil, bitumen, coal tar or other contaminants shall be removed by scraping and final wiping with a rag soaked in white spirit.

3.3 Blast cleaning:

Blast cleaning shall be carried out in accordance with clause 4.3 of SANS C.O.P. 064.

Cleanliness grades required: ISO 8501-1:

- For metal spraying or epoxy coatings: SA 3.
- All other coatings: S.A. 2½.

Blast cleaned profile required:

- For metal sprayed surfaces (grit blasting only permitted): 50-100 microns.
- For Epoxy and all other coatings: 75 microns max.

Laminations, scales and occluded scale, which become visible after blast cleaning, shall be ground out, after which the area shall be blast cleaned once again. If such grinding penetrates deeper than 7% of the metal thickness, the area shall be repaired by welding or the metal shall be rejected at the discretion of the Engineer.

Occluded grit and hackles shall be abraded off. Dust and debris from blast cleaning shall be removed prior to coating to achieve a residual dust and debris level not exceeding 0,1% when determined by SANS Method 769.

3.4 Special cases

The external surfaces of steel pipes to be encased in concrete shall be:

- abrasive blast cleaned;
- coated with epoxy coat to DFT 175-200 microns.

The external surfaces of steel pipes to be buried in soil shall be thoroughly wire brushed prior to being treated as specified in clause 5.16.4.

Copper tubing and sections of pump and motor shafting exposed to air shall be thoroughly cleaned to a bright finish and covered with an oil resistant lacquer.

4 COATING MATERIALS AND APPLICATION

4.1 Epoxy:

Internal wetted surfaces of all pumps, pipes, specials and valves, and the exterior of all pipework and equipment mounted in underground chambers (valves, venturi elements etc.) but excluding non-corrodible surfaces where painting would adversely affect the operation of the equipment, shall be epoxy coated with an approved epoxy.

Various acceptable application methods are specified hereafter.

Epoxy paint containing coal tar will not be acceptable.

4.2 Epoxy and polyurethane top coat:

All surfaces of pipework and equipment normally exposed to air and located within the main body of the Pump Station shall be coated with an approved epoxy coat and recoatable polyurethane finish.

After surface preparation, one coat of an approved epoxy shall be followed by one coat of an approved recoatable polyurethane finish before dispatching from the Works. One further finishing coat shall be applied after erection on Site.

4.3 Galvanised Surfaces:

Internal wetted surfaces as well as surfaces exposed to air may be galvanised in accordance with SANS 763.

Surfaces to be galvanised shall first be degreased.
Galvanised surfaces shall receive an etching primer of zinc oxide to SANS 910 or calcium plumbate to SANS 912 before one coat of universal undercoat and two coats of an approved enamel paint are applied.

All threads that are cut in galvanised pipe shall be coated with a suitable rust preventive compound immediately after cutting and before assembling the pipework.

Galvanised surfaces which are damaged during transport or erection shall be repainted with an approved cold galvanising process. Aluminium painting will not be acceptable.

4.4 Steel pipes buried in soil:

The external surfaces shall be thoroughly wire brushed, primed with a suitable petrolatum tape primer and followed with at least one layer of an approved petrolatum tape (Densotape or equal). This shall be followed by a further layer of PVC tape wrapping with not less than 50% overlap.

4.5 Electrical equipment:

Transformers shall be coated in accordance with SANS 780.

Electric motors and regulators shall be coated in a manner in keeping with the high standard of this Specification and shall be acceptable to the Engineer. Details of materials and procedures shall be provided together with the Tender offer. Baked enamel finishes will be preferred.

Control consoles and switchgear panels shall be baked enamel.

5 APPLICATION OF EPOXY PROTECTIVE LINING

The directions laid down by this Specification and the paint Manufacturer for the mixing and curing, the application of solvents, the permissible working air temperature and humidity, overcoating times and dry film thickness shall be strictly adhered to. Certified records of material and operation shall be kept and produced for inspection when required by the Engineer.

Blast cleaned surfaces shall be coated as soon as possible after completion, inspection and approval of the surface. The time interval between cleaning and coating shall in any case not exceed the following:

- 4 hours when relative humidity is below 70%
- 2 hours when relative humidity is between 70 and 85%

Coating shall not take place when the relative humidity exceeds 85%, nor when the steel temperature is less than 2°C above dew point.

Each coating shall be uniform, smooth and glossy. The application shall be free of all tears, runs, sags, wrinkling, bubbles, blisters, pimples, spikes, orange peel, pinholes, holidays or dust particles.
Flange faces shall be treated on the machined surface with a film thickness not greater than 90 microns. Other parts of the flange and especially the throat shall be treated with the full system. All crevices shall be sealed with an approved water resistant sealer.

All internal site-welded joints shall be made good (i.e. mechanical pre-preparation and blast-cleaning) and the entire internal surface shall be retested for thickness and pinholes to the Specification.

The Tenderer may quote for any of the following systems, indicating in his Tender, which system is offered:

- Epoxy powder applications: One coat. Dry film thickness shall be not less than 400 microns for linings and 300 microns for coatings. Handling of coated equipment is not permitted within 8 hours of completion of the coating.

- Solvent-free epoxy application: One or two coats. Each coat shall be a different colour from the previous coating. Total dry-film thickness shall be not less than 300 microns for linings and 250 microns for coatings. Handling of coated equipment is not permitted within 16 hours of completion of the coating.

- Solvent-borne high-build epoxy application: Minimum of 2 coats, each coat shall be a different colour from the previous coating. Thickness of any one coat shall be not less than 85 microns nor more than 150 microns. Total dry-film thickness of both linings and coatings shall be not less than 300 microns. Handling of coated equipment is not permitted within 7 days of completion of the coating.

NOTE:

All coating thicknesses shall be measured by means of an approved calibrated eddy-current instrument within 72 hours of the final coat being applied.

All coatings and linings shall be tested for corrosion-protection integrity (absence of pinholes) by carrying-out a direct current wet-sponge 'holiday' detector test or high voltage spark test.

The above requirements apply to both Shop as well as Site applications of epoxy linings including site-repaired coatings.

6 HANDLING AND TRANSPORTATION OF PAINTED ITEMS

Coated components shall be handled with due regard to the relatively soft nature of organic coatings and appropriate precautions shall be taken. The use of ropes, wire ropes or chains, without suitable padding, is expressly forbidden. Balks of timber shall be used to support the components on soil, concrete or other hard surface and to separate items from each other. When loading onto vehicles, precautions shall be taken to support and chock the

components to prevent movement. Components shall be firmly lashed or chained with padded lashing, supported on sawdust bags. The area of padded surfaces shall be adequate to prevent damage to the coating.
In order to protect the internal coating system of pipes, specials and valves, open ends are to be completely blanked off by sturdy blank flanges, not just plastic sheet alone, and are to be clearly marked:

"DO NOT REMOVE UNTIL FINAL INSTALLATION"

Plastic sheeting alone will not be acceptable.

Items will be inspected on arrival at the Contractor's end-delivery point and any repairs necessary shall be at the cost of the Contractor. Such repairs shall comply with all requirements of this Specification. Should the Engineer decide that there is severe damage to the coatings due to handling and transportation, the Contractor shall return the equipment to his workshops for recoating.

7 FINISHING COATS

7.1 Colours

In general, the colours as recommended in SANS code of practice 0140 part III for identification colour marking shall apply. Identification colours shall be painted completely or in bands as required in clause 6.1. of SANS code of practice 0140 part III as directed by the Engineer, with particular emphasis on pipework.

Individual Supplier's usual colours will be considered for proprietary items.

The following system and/or safety colours are preferred and cannot be changed without the Engineer's agreement in writing:

Item	Colour	Specification SANS 1091
Electric Motors	Light Beige	G29
Fan cowlings for TEFC motors	Signal Red	A11
Pumps/control valves for raw water	Apple green	H29
" For chemtreated water	Middle blue	F07
Pumpset coupling guard	Signal Red	A11
Pipework for raw water	Brilliant Green	H10
" for treated water	Verdigris green	E22
Baseplates	Black	
Overhead travelling cranes	Golden Yellow	B49
Sheave block for EOT crane	Golden yellow / black chevron	B49
Isolating valves for raw water	Brilliant green	H10
" for chemtreated water	Arctic Blue	P28
Handwheels for all valves	Golden Yellow	B49
Low voltage panels (in and outdoor)	Light orange	B26
MV panels (in and outdoor)	Electric Orange	G12
UPS	Light orange	B26
LV distribution kiosk/mini sub	Light stone	C37
Standby electric equipment	Signal red	A11

Protruding equipment and/or hazardous overhead structures shall be painted with golden yellow/black chevrons to attract attention.

Other external final colours of the main plant and any other equipment which have not been specified shall be decided by the Engineer after discussion with the Contractor.

7.2 Appearance:

Particular attention shall be given to the exterior finish of all visible plant. Special consideration shall be given to produce a neat arrangement convenient and easily accessible for cleaning. Baked enamel finishes with chromium plated, stainless steel or brass trim when applicable are preferred.

All damaged coatings of installed equipment shall be made good to the original Specification. Full additional finishing coats may, if justified, be required by the Engineer.

8 INSPECTION

8.1 Inspection by the Contractor

The minimum inspection to be carried out by the Contractor shall be that which is necessary to ensure compliance with all clauses of this Specification, since he will be held responsible for non-compliance in any respect and shall be required to repair any defect to the satisfaction of the Engineer.

8.2 Inspection by the Engineer

The Engineer has the right to inspect any item covered in the Contract in accordance with clause 35 of the General Conditions of Contract, and may appoint either the SANS or other alternate inspection body to act on his behalf.

It is required that due notice be given to the Engineer of impending cleaning and first coat operation in regard with the painting of the main equipment, as well as for witnessing final coating thickness and pinhole detection tests.
All the tests shall be carried out by the Contractor at his own expense and in the presence of the Engineer or his appointed Representative and to his complete satisfaction. The Employer reserves the right to appoint the SANS or other inspectorate to inspect the epoxy linings on his behalf and at his own expense over and above the Contractor's routine inspection.

LK VALVE INSTALLATION

PARTICULAR SPECIFICATION

LK VALVE INSTALLATIONS

Revision 1.0: May 2017

GIBB
People • Expertise • Excellence

PARTICULAR SPECIFICATION: LK VALVE INSTALLATIONS

CONTENTS

1 SCOPE

This Specification covers valve installations on medium pressure pipelines of bore generally up to 1 000 mm but may also be used for pipelines of greater bore, for transporting and controlling cold water (at a temperature not exceeding 50 °C) or sewage under working pressures as specified but not exceeding 4,0 MPa. It includes for butterfly valves of bore up to 2 000 mm.

Interpretations of and variations to this specification are set out in the Specification Data.

2 NORMATIVE REFERENCES

2.1 Supporting specifications

Where this specification is required for a project, the following specifications shall, inter alia, form part of the Contract Document:

- Specification Data;
- SANS 1200 Series of Standardized Specifications;
- SANS 1200 A or SABS 1200 AA, as applicable;
- SANS 1200 L;
- Standards listed in Appendix A, and
- the following specifications may form part of the Contract:

SANS 1200 D or SANS 1200 DA, as applicable;

- SANS 1200 DB;
- SANS 1200 G or SABS 1200 GA, as applicable;
- SANS 1200 LB.

3 DEFINITIONS AND ABREVIATIONS

3.1 Definitions

The definitions set out in the applicable of the specifications listed in 2.1, and the following shall apply:

Anti-vacuum air valve

A valve that admits large quantities of air at low induction pressure to prevent the formation of vacuum in a flexible wall pipeline when a break occurs or a negative pressure is induced by water hammer.

Double office air valve

A valve that releases and admits air at low pressure during filling or emptying a pipeline, and has a small lever controlled orifice to release air under high pressure.

Lot Except where otherwise defined in (and within the limits of the scope of) an SANS or BS specification listed in Appendix A, a lot is not less than one nor more than ten valves of the same size, design and method of operation from one manufacturer submitted at any one time for inspection and testing.

Reflux valve

A valve that minimizes reflux action and reduces water hammer in rising mains. It may be of one of the following types:

- Single sloping swing door for valves of nominal bore up to 400 mm;
- Double sloping swing doors for valves of nominal bore greater than 400 mm and up to 800 mm;
- Multiple sloping swing doors for valves of nominal bore greater than 800 mm;
- Tilting disc for all valves of nominal bore up to 1 200 mm in rising mains where low hydraulic resistance is a requirement; or
- Recoil type for valves of nominal bore up to 600 mm in rising mains in situations where abnormally rapid reversal of flow is likely to occur.

Single large office air valve

A valve that admits and releases large volumes of air at low pressure during draining or filling the pipeline.

Single small office air valve

A valve that releases small volumes of air under high pressure during operation of a pipeline.

Sleeve-type jet dispersion valve

A valve that controls a scour outlet of a high pressure pipeline.

3.2 Abbreviations

The abbreviations set out in the specifications listed in 2.1 and the following shall apply:

MFB	Metropolitan Fire Board
BSP	British Standard Pipe Thread
ISO	International Standards Organization
ANSI	American National Standards Institute

3.3 Explanation of terms

3.3.1 Materials.

In the context of this Specification the term materials covers both the basic materials used in the manufacture and fabrication of a valve, and the valve itself as a finished product that is to be installed and commissioned .

3.3.2 Compliance with standard valve specifications.

Each valve of nominal bore greater, or for use at a working pressure higher than those covered by the applicable details of SANS 191 or SANS 664 or SANS 665 shall, for quality of materials and fabrication workmanship, be deemed to comply generally with the same standards in such a manner that the valve is designed for a life of 40 years and the manufacturer would be prepared to guarantee its satisfactory performance for 5 years, if called upon to do so.

4 *REQUIREMENTS*

4.1 Materials - The valves

4.1.1 Gate valve or resilient seal valve

a) **General**

Except as otherwise specified in 4.1.2 in the case of a valve for the control of sewage, a gate valve or resilient seal valve shall be of the non-rising spindle type, and of the nominal bore, class, gate type, and working pressure scheduled, shall comply with SANS 191 (for a cast steel valve) or SANS 664 (for a waterworks pattern valve) or SANS 665 (for a general purpose type valve), as relevant in terms of Table 1 below, the relevant requirements of 4.1.2 to 4.1.4, and the Specification Data.

Table 1 - Gate valve details

1	2	3	4	5	6
Class	Nominal bore mm	Pressure MPa		Body etc. materials	Quality of valve - applicable specification subject to 3.3.2
		Working	Operating & Differential		
10	50 to 600	1,0	As per SD* or schedule, but not exceeding 1,0	Cast iron	SANS 664
				Cast iron	SANS 665
16	50 to 600	1,6	As per SD* or schedule, but not exceeding 1,6	Cast iron	SANS 664
	exceeding 600 up to 1 000			Cast iron	SANS 665
25	50 to 1 000	2,5	As per SD* or schedule, but not exceeding 2,5	Cast iron	SANS 665
	50 to 350			Cast steel	SANS 191
	exceeding 350 up to 1 000			Cast steel	See SD*
40	50 to 350	4,0	As per SD* or schedule, but not exceeding 4,0	Cast iron	SABS 191
	exceeding 350 up to 1 000			Cast steel	See SD*

*Specification Data.

b) **End connections**

A valve shall be provided with double flanged or double spigoted or double socketed end connections, as billed. Unless otherwise billed, it shall be supplied complete with all jointing material such as insertions, rings, packing's, bolts, nuts and washers etc. as necessary for the type of connection billed.

In the case of flanged valves, the flanges of classes 10 and 16 valves and nominal bore up to 600 mm shall conform to SANS 664. The flanges of larger valves of classes 10 and 16 and all valves of classes 25 and 40 shall conform with BS EN 1092 and, except where blank flanges are billed, shall be drilled in accordance with the relevant requirements of SANS 1123. Where the flange size falls beyond the range of BS EN 1092, mating dimensions shall be in accordance with ISO standard TC 5 with thicknesses adequate to withstand closed-end test pressures. Tapped holes are unacceptable. The front face of all flanges shall be fully machined and, in the case of valves of classes 25 and 40 and nominal bore 450 mm and more, the back of each

flange shall be spot faced.
Flanged valves shall be supplied complete with bolts, nuts and gaskets for joining up to adjacent mating flanges. Bolts shall be of sufficient length for at least two screw threads to protrude outside nuts when assemblies are fully tightened.

Where a valve of nominal bore up to 450 mm is to be installed in a chamber, unless adequate provision for removal of the valve has been made in the pipe layout for the chamber, one end connection shall be such that a removable type coupling can be fitted, and the coupling shall be provided. In the case of a valve of nominal bore greater than 450 mm the end connections shall comprise one flanged adaptor, one plain ended spacer pipe of length not less than the valve diameter, and one removable type coupling as a separate item.

Where a valve is to be used as a replacement in a pipeline fitted with flanges drilled to BS 10, the appropriate bolt circle diameter, number of bolts, and size of bolt holes shall be as specified in the Specification Data.

c) **Manner of operation**

- Unless otherwise specified in the Specification Data, a valve shall be closed by turning the spindle in a direction that is clockwise when seen from above the spindle
- A valve shall be so designed that it can be opened or closed against whichever is the lower of the billed working pressure or the applicable differential pressure given in column 4 of Table 1, with an effort on a hand wheel not exceeding 250 N in the case of valves of bore up to 300 mm, and not exceeding 400 N in the case of larger valves, unless otherwise stated in the bill or required in terms of the Specification Data.
- Except where a hand wheel is billed, a valve of nominal bore not exceeding 300 mm for a working pressure not exceeding 1,6 MPa, shall be fitted with a cap.
- A valve of nominal bore 300 mm or more for use at a working pressure greater than 1,6 MPa but not exceeding 2,5 MPa, shall be fitted with a ball bearing spindle thrust collar, and close machined channel guides and shoes, and machined spur gearing having an advantage of

Nominal bore, mm	**Mechanical advantage**
300	2:1
375	2,5:1
450 and greater	3:1

- Where so billed, a valve of nominal bore exceeding 300 mm shall be fitted with a by-pass valve (cast integrally with the body of the main valve or attached, as billed) of bore area 10 % to 15 % of that of the main valve and arranged to operate in the manner set out in the Specification Data.

- A valve of nominal bore exceeding 300 mm for use at a working pressure greater than 2, 5 MPa but not exceeding 4,0 MPa may, subject to bullet two and bullet four above, be fitted with a hand wheel or shall be fitted with an actuator that complies with 4.1.3 (c)(i), and is of the type (and uses the pressure supply) specified in the Specification Data.

d) **Design**

i) **Lugs**

The lugs on the gate and the spindle of a valve of nominal bore exceeding 300 mm shall be machined.

ii) **Gland packing**

A gate valve of nominal bore exceeding 400 mm shall have a gland that is so designed that it can be repacked under working pressure without shutting off the water supply.

iii) **Auxiliary requirements**

- The design of the valve guides and gate shall be such that pressure may be applied to the gate from either side.

- The design of the guides of a valve of nominal bore not exceeding 300 mm shall be such that it can be installed in any position.

- Unless otherwise shown on the drawings or billed, the design of the guides for a valve of nominal bore exceeding 300 mm shall be such that the valve can be installed in an upright position.

- In addition to complying with bullet one and bullet two or three above, as relevant, a valve shall be provided with such inspection holes, drains, and other auxiliary requirements as are specified in the Specification Data.

iv) **Valve trim**

Except where a gun metal/bronze or stainless steel trim (Type B or Type C of SANS 664 or Tables 1(a) or 1(c) of SANS 665, as applicable), is billed, each valve shall have an all iron trim.

v) **Seat rings**

A valve of nominal bore 300 mm and larger shall have seat rings that are pinned position

4.1.2 Wedge gate (slide valve) for sewage control

A gate valve for the control of sewage shall be of the wedge gate type, suitable for the working pressure billed, and comply with 3.1 (except as required in terms of bullet one to eight below) and capable of operating in the manner required in terms of the Specification Data:

- The valve shall be of flanged type and shall have a rising spindle;
- the wedge gate shall be constructed of ANSI 316 stainless steel or as approved ;
- the spindle shall be constructed of EN 45 B (BS 970) stainless steel or as approved;
-
- the body and traverse seal shall be made of nitrate rubber or as approved;
- a resilient body seal shall ensure drop tightness from zero to maximum working pressure in either direction;
- the internal body contours shall be such that deposits are flushed out during valve closure;
- built-in scrapers that clean the valve blade shall be fitted to both sides of the body; and
- the body shall have a straight through passage such that no valve pockets or clean doors are necessary.

4.1.3 Butterfly valve

a) **General**

A butterfly valve for working pressures not exceeding 2,5 MPa (PN 25) shall comply with the relevant requirements of BS 5155, and 4.1.3 (b) to 4.1.3 (c)(iii), as applicable, and capable of operating in the manner required in terms of the Specification Data. A butterfly valve for working pressures exceeding 2,5 MPa shall be manufactured from the same materials, and be of the same quality as a valve that complies with BS 5155 and 4.1.3 (b) to 4.1.3 (c)(iii), as applicable, shall comply with the requirements of, and capable of operating in the manner required in terms of the Specification Data.

Where a butterfly valve has a preferred flow direction from a control point of view

(see 4.1.3 (c)(i)) a suitable arrow shall be cast on the body.

b) **End connections**

A valve shall be provided with double flanged or wafer end connections, as billed.

The flanges shall conform to BS EN 1092 and, except where blank flanges are billed, shall be drilled in accordance with the relevant requirements of SANS 1123. Flanges shall be thickened at points where tapped holes are necessary. The front face of all flanges shall be fully machined and, in the case of valves of PN ratings greater than 16 and nominal bore greater than 450 mm, the back of each flange shall be spot faced.

Where a valve of nominal bore up to 450 mm is to be installed in a chamber, one end connection shall be such that a removable type coupling can be fitted, and the coupling shall be provided. In the case of a valve of nominal bore greater than 450 mm the end connections shall comprise one flanged adaptor, one plain-ended spacer pipe of length not less than the valve diameter, and one removable type coupling as a separate item.

Where a valve is to be used as a replacement in a pipeline fitted with flanges drilled to BS 10, the appropriate bolt circle diameter, number of bolts, and size of bolt holes shall be as specified in the Specification Data.

c) **Manner of operation**

i) **General**

Except that where the design and construction details of a valve are such that it has a preferred flow direction (such as the need for the seal retaining ring to be on the downstream side for adjustment), a butterfly valve shall be suitable for flow in either direction, and shall be suitable for use as a regulating valve in that when tested for disc leakage at a pressure equal to the operating pressure (see Column 4 of Table 1), there shall be no sign of leakage or weeping past the gate, and when tested for disc efficiency the leakage rate shall not exceed the appropriate value given for gate efficiency (mutatis mutandis), in SANS 665. Also, when operating at maximum velocity, there shall be no gate flutter.

ii) **Actuator operated.**

Where a butterfly valve is billed to be operated by an actuator using a designated power source, the actuator shall not be an integral part of the main body but shall be a separate unit bolted to the main body in such a manner that water leaking past the main shaft seal is prevented from entering the actuator.
The actuator shall comply with Section II of AWWA C 504, and shall be capable of withstanding opening and closing torques that are at least 30 % in excess of those necessary under the working conditions and using the source of power specified in the Specification Data.

An actuator shall be supplied complete with hand wheel that can be installed horizontally at a height that provides for reasonable operation in the situation shown on the drawings. The hand wheel shall comply with the relevant requirements of SANS 664, and, in addition, it shall be fitted with an accurate indicator to show clearly the fully open and closed positions and the intermediate open positions, with acceptably embossed markings.

iii) **Design**

- Main shaft

A butterfly valve of nominal bore not exceeding 450 mm shall be suitable for installation with the main shaft in any position. A butterfly valve of nominal bore exceeding 450 mm shall be suitable for installation with the main shaft horizontal or vertical, as billed or shown on the drawings.

The main shaft shall be so offset from the centerline of the disc that it does not pass through the seal.

- Disc and seat

The disc shall be of a single casting and of a hydrofoil section such that the maximum combined stresses in the disc do not exceed 20% of the minimum yield stress of the material used, when the unbalanced (differential) pressure specified in Table 4 (5.1.2 (a)) is applied to either side of the disc.

The profiles of seats shall be smooth and continuous and shall provide adequate "lead-in" for the resilient seal during closure of the disc.

Seals and seats shall be so designed that they are prevented from becoming loose or permitting the passage of water under seals or seats during all conditions of operation and test.
A replaceable stainless steel or bronze or rubber seat shall be fixed to the body, and a resilient rubber or neoprene seal, that can be replaced and adjusted on Site, shall be fixed to the edge of the disc.

- Bearings and seals

Self-lubricating sleeve type bearings shall be fitted in the hubs of the valve body. Other lubricating points, if any, shall be fitted with nipples or grease-gun lubrication.

Each valve shall be fitted with at least one adjustable thrust bearing set to hold the disc securely concentric with the body seat or seal.

In the case of valves of nominal bore greater than 1 000 mm and PN

ratings greater than 16, the seal shall comprise an approved fully contained rubber "0" ring. The shape of the groove shall comply with DIN 2514.

4.1.4 Fire hydrant

a) **General**

A fire hydrant shall be of the underground or above-ground or pillar type, as billed, shall comply with the relevant requirements of Part 1 of SANS 1128, and 4.1.4 (a) to 4.1.4 (d). Where an underground type is billed, it shall be provided with a Class 16 gate, rising spindle and captive stopper.

A fire hydrant shall be supplied complete with all jointing material such as insertions, bolts, nuts, and washers and, in the case of an underground hydrant, a flanged closure pipe of such length that the hydrant can be installed at the depth below the cover of the hydrant chamber specified in SANS 1200 L.

An above-ground type valve shall be Class 16, flanged, of the pattern billed, or shown on the drawings, and comply with 4.1.1 (c), as relevant, except that it shall be anti-clockwise opening.

b) **End connections**

The inlet end connection of a hydrant shall be flanged as specified in 4.1.1 (b). Its outlet end and components shall be as specified in Part 1 of SANS 1128, be compatible with one another and, in the case of extensions to exiting installations, with the Employer's existing firefighting equipment as described in the Specification Data.

The single or double (as billed) outlet connection of an underground hydrant shall be a screw or bayonet type, as billed. In the case of a bayonet type the outlet size between hooks shall be 108 mm or 120 mm, as billed.

The outlet connection and the separate outlet coupling of an above-ground hydrant shall have a 65 mm instantaneous connection integrally cast with the body or other connection, as billed. The inlet of the adaptor shall be of the type billed.

c) **Method of operation**

The operating device on a hydrant valve shall be of the fixed wheel or tamper proof key type, as billed.

d) **Design**

Except where another design is shown on the drawings, or other requirements are specified in the Specification Data, the design of a fire hydrant shall comply with the relevant requirements of SANS 1128. A blank cap shall be provided with each fire hydrant.Air valve for a water main

4.1.5 Air Valve

a) **Water main**

An air valve for use on a water main shall be of the type and pattern billed, and shall comply with Table 2 for the relevant range of working pressures.

1	2	3	4
Working pressure MPa	**Type**	**Pattern**	**Ball diamet**
up to 0,7	Single, small orifice	float	50
up to 1,6			80
up to 2,5			100
2,5-4,0		lever	100-200
2,5-4,0		float	100-200
up to 4,0	Double (or multiple) orifice	2 (or more) floats	100-200
up to 4,0	Double (or multiple) orifice	1 leverand 1 (or more)	100-200

Unless otherwise billed or specified in the Specification Data, each air valve shall be supplied, as applicable with

- an isolating cock for working pressures up to 1,6 MPa; or
- for working pressures up to 2,5 MPa, a screw down type isolating valve fitted with a bronze spindle (with or without bevel gears) and spindle cap or hand wheel (as billed) or for operation in the manner specified in the Specification Data, or
- For working pressures above 2, 5 MPa, a flanged isolating gate valve that complies with the relevant requirements of 4.1.1.

b) **Sewer rising main**

Subject to the requirements of 4.1.5 (d) (ii) and 4.1.5 (e) (ii), an air valve for use on a sewer rising main shall comply with 4.1.5 (a).

c) **End connections**

An air valve shall be supplied complete with end connections (and all necessary jointing material, nuts, bolts, etc.) billed or shown on the drawings. The end connections shall comply with 4.1.1 (b), mutatis mutandis.

d) **Manner of operation**

i) **Water main**

An air valve shall be capable of operating automatically under the operating pressure and conditions specified in the Specification Data. In the case of a single small orifice air valve, it shall be capable under the same circumstances, of automatically releasing, air entrapped in the pipeline.

ii) **Sewer rising main**

The operation of an air valve on a sewer rising main shall be such that the sewage does not come into contact with the balls or valve seats. To achieve this, a large stainless steel float shall be fitted with a rod that is suitably sleeved into the body of the valve in such a manner that

- when the air is expelled and the level rises in the float chamber, the rod pushes the ball upwards until it seats firmly in the large orifice; and
- as gas and air accumulates in the valve body, the water level is depressed , the float drops and the small orifice comes into operation to release the air pressure that is in the valve body.

e) **Design**

i) **Water main**

The body for all types of air valve for use on a water main shall have been successfully tested to not less than twice the working pressure, and shall, for working pressures up to 2, 5 MPa, be manufactured from cast iron that conforms with the relevant requirements of BS EN 1561 for Grade 14, and for working pressures exceeding 2, 5 MPa, be manufactured from cast steel. The balls and seating shall be manufactured from materials that are compatible with the body and with themselves, and are such that the seating wears faster than the ball. Where dissimilar metals are used for the balls and seating, the metals shall be such that the potential difference exceeds
0,3 volts.

Each double or multiple orifice air valves shall be

- flanged; and
- fitted with a suitable drain cock to release the pressure inside the valve when the isolating valve is closed during the time when the float is sealing the large orifice ; and
- provided with cast iron shield plates so designed as to prevent the entry of dirt when the large orifice is open.

ii) **Sewer rising main**

The valve body shall be constructed of close-grained cast iron, and shall be so contoured that there are no corners or rough surfaces to which solids may adhere. The head casting shall be specially strengthened and dimensioned to receive a vertical vent pipe, if required subsequently.

Two wash-down sludge plugs for cleaning and inspection shall be provided.

Operating mechanisms shall be of high quality ANSI 316 S16 stainless steel or as approved, and shall be totally enclosed. The large and small or if ice sealing components may be manufactured from vulcanite and polyurethane elastomer, or such other materials as are approved.

The seat profiles of the large and small orifices shall be such that the valve is gas-tight at atmospheric pressure.

The valve seats shall be readily accessible for cleaning and inspection on removal of the cover bolts.

The stainless steel float shall be so shaped as to allow a substantial margin of stability in the handling of sewage gases.

Comprehensive back-washing facilities shall be provided for all sealing surfaces of the operating mechanism, and facilities shall be provided for complete flushing of the air chamber and passage- ways by high pressure sprays of water.

An isolating valve of the type billed shall be provided.

4.1.6 **Pressure relief valve**

a) **General**

A pressure relief valve shall be of the nominal bore and class, and shall operate at the pressure(s) billed. For quality of materials and construction workmanship, it shall comply with the requirements of SANS 191 or, SABS 664, and of 3.3.2 and 4.1.1, as applicable, in addition to complying with 4.1.7 (b) to 4.1.7 (d).

b) **End connections**

End connections shall be fitted with a right angled outlet flanged connection that is drilled and complies with 4.1.1 (b)

c) **Manner of operation**

A pressure relief valve shall be so designed and fabricated that it performs in the manner and fulfills the requirements set out in the Specification Data. The spring of a spring loaded valve shall be reliable in operation.
The valve shall have been tested and be guaranteed, for precision adjustment of the specified set pressure.

d) **Design**

The body shall be of CI or bronze, as billed.

The valve spindle shall be made of EN 56 B to BS 970 (or as approved stainless steel.

The valve nozzle, disc, disc holder and guide shall be made of monel (or as approved).

The spring shall be made of plated high quality carbon steel. The disc and nozzle sealing surfaces shall be precision lipped to ensure perfect valve tightness.

4.1.7 Control valve

a) **General**

A control valve shall be of the diaphragm or other approved type, and of the nominal bore, class, and working pressure billed. In the case of a diaphragm type of nominal bore within the range 50 mm to 300 mm for class 10 or 16; it shall comply with the relevant requirements of BS 5156. A control valve of nominal bore greater than 300 mm or of a class higher than 16 shall, for quality of materials and construction workmanship comply with the requirements of SANS 191 or SANS 664, and of 3.3.2 and 4.1.1, as applicable. In addition, all valves shall comply with 4.1.8 (b) to 4.1.8 (d).

A control valve shall have a hydraulically operated, pilot controlled diaphragm type single seat globe or other approved valve. A globe valve of nominal bore within the range

50 mm to 450 mm for class 10 or 16 or 25 shall comply with the relevant requirements of BS 5152.

b) **End connections**

A control valve shall be supplied with the end connections billed or shown on the drawings. The end connections shall comply with 4.1.1 (b), mutatis mutandis.

c) **Manner of operating**

A control valve shall be so designed that no surface water can be drawn into the pilot system or main valve at any time and that it performs in the manner and fulfills the requirements set out in Specification Data.

d) **Design**

A control valve shall be so designed that it shuts without inducing water hammer, and is capable of operating smoothly at low flows. It shall be fitted with single removable bronze seats and discs of synthetic rubber of rectangular cross section. The discs shall be retained on three sides by disc retainers.

All necessary repairs shall be possible without removing the valve from the pipeline. A valve shall have external packing glands or stuffing boxes.

4.1.8 Rate of flow control valve

a) **General**

A rate of flow control valve shall be of the diaphragm or other approved type, and of the nominal bore, class, and working pressure billed. For quality of materials and construction workmanship it shall comply with the requirements of SANS 191 or SANS 664, and of 3.3.2 and 4.1.1, as applicable.

Except where the design of the valve is such that the valve, differential pressure powers the diaphragm, a thin edged orifice plate shall be supplied to provide actuating differential pressure. (NOTE: This shall be installed in an orifice flange located downstream of the valve.)

Pilot control shall be by means of a double acting diaphragm or other approved valve that complies with 4.1.8 (a).

b) **End connections**

A control valve shall be supplied with the end connections billed or shown on the drawings. The end connections shall comply with 4.1.1 (b), mutatis mutandis.

c) **Manner of operation**

Subject to the limits and tolerances specified in the Specification Data, a rate of flow control valve shall be so designed that, regardless of fluctuations in the up-steam pressure, it maintains the specified constant rate of flow at the downstream pressure specified in the Specification Data, shuts without water hammer, and is capable of operating smoothly at low flows.

The pilot control shall be designed to close when the actuating differential pressure increases beyond the spring setting.

d) **Design**

A control valve shall be so designed that it shuts without inducing water hammer, and is capable of operating smoothly at low flows. A globe type valve shall be fitted with a single removable bronze seat and disc of synthetic rubber of rectangular cross section. All necessary repairs shall be possible without removing the valve from the pipeline.

Where a larger stem stroke is required to reduce sensitivity under operating conditions, the valve shall be fitted with a V-port instead of a disc.

A valve shall have no external packing glands or stuffing boxes.
Valves shall be manufactured to conform to the requirements of BS 1655 and BS 5793 as applicable or as approved.

High quality valves consisting only of a stainless steel body and an elastomeric liner are an acceptable alternative design.
Where specified in the Specification Data, the pilot control valves shall be fitted with an electrically operated solenoid valve.

4.1.9 Check valve

a) **General**

A check valve shall be suitable for the working pressure, and of the nominal bore and class billed. Unless specifically billed as a diaphragm type valve, it shall be a gate type valve that complies with the relevant requirements of SABS 144 or SABS 191 or SANS 664, and of 3.3.2 and 4.1.1, as applicable, in addition to complying with 4.1.9 (b) to 4.1.9 (d).

b) **End connections**

A check valve shall be supplied with the end connections billed or shown on the drawings. The end connections shall comply with 4.1.1 (b), mutatis mutandis.

c) **Manner of operating**

A check valve shall hold the pressure constant over the demand range and pressure conditions, be of the no-slam type, and fulfill the requirements set out in the Specification Data.

d) **Design**

The door on the body shall be fitted with a bronze face closing on a corresponding bronze seating in the body.

The door suspension lugs shall be hinged on a stainless steel EN 57 B (conforming to BS 970) spindle supported in trunnion bearings.

In the case of a diaphragm type valve, it shall comply with 4.1.8 (a) and 4.1.8 (d). In the case of a wafer type spring check valve, it shall have discs and resilient seats of either 316, stainless steel or other acceptably corrosive resistant material.

4.1.10 Pressure-reducing and pressure-sustaining valve

a) **General**

A pressure-reducing and a pressure-sustaining valve shall be suitable for the working pressure, and of the nominal bore and class billed. It shall comply with the relevant requirements of SANS 191 or SANS 664, and of 3.3.2 and 4.1.1, as applicable, in addition to complying with 4.1.10 (b) to 4.1.10 (d).

A pressure-reducing shall have a pilot-control that is a direct-acting adjustable, spring loaded, normally open diaphragm valve.

A pressure-sustaining valve shall have a pilot-control that is a direct-acting, adjustable spring- loaded, normally closed diaphragm valve.

b) **End connections**

A pressure-reducing and pressure-sustaining valve shall be supplied with the end connections billed or shown on the drawings. The end connections shall comply with 4.1.1 (b), mutatis mutandis.

c) **Manner of operation**

The pressure-reducing or pressure-sustaining valve shall maintain the specified constant downstream pressure, regardless of fluctuations in demand within the range, and at the inlet and maximum downstream pressures specified in the Specification Data.

When the upstream pressure becomes equal to the spring setting of the pressure-sustaining control, the valve shall throttle to maintain the specified constant inlet pressure.

If the downstream pressure is greater than the upstream pressure, the valve shall close automatically to prevent return flow.

The pressure-reducing pilot shall close when the downstream pressure exceeds the spring setting. The pressure-sustaining pilot shall open when the upstream pressure exceeds the spring setting. The control system shall include a fixed orifice ejector and an adjustable-opening speed control.

4.1.11 Sleeve-type jet dispersion valve

a) **General**

A sleeve-type jet dispersion valve shall be of the sliding sleeve, inverted cone, jet dispersing type with acceptable reduction drive and hand wheel operation. It shall be suitable for installation horizontally or at an angle of 45°

b) **End connections**

The valve shall have flanges of the same thickness and drilling as those of the outlet valve that is to be controlled.

c) **Manner of operating**

The valve shall be operated by a stainless screwed spindle, a hand wheel, and a thrust head mounted on a trunnion for horizontal mounting or cast into a wall, in which case the sleeve lever linkage shall be operated with a watertight gland.

Where the gland is cast into the wall, the lever operating linkage shall be designed to accommodate movement restraints that may be due to casting in.

Where so required in terms of the Specification Data valve operation controls shall be integral with the valve body.

A valve and control shall be so designed that its operation is dependable when exposed to the weather and sunlight, and when non-operative for extended periods of time.

A valve shall close by clock-wise rotation of a hand wheel on which arrows and the words "TO OPEN" and "TO CLOSE" shall be cast to indicate the direction of closing and opening.

d) **Design**

The valve body shall be of cast-steel with a shrunk-on stainless steel sleeve on the portion of the body that does not contain the water ports and on which the sleeve slides. The water port web edges on which the sleeve slides shall have machined weld-deposited stainless steel faces to prevent moisture getting between the facing and the webs and causing corrosion. The sliding sleeve shall be of cast-steel with two (i.e. front and rear) renewable annular zinc-free bronze sliding surfaces and a stainless steel seal seating on to a renewable rubber ring. This end rubber sealing ring in the cone of the valve body shall be out of the water-way and positively secured in position by stainless securing elements, and the rubber seal shall be readily replaceable on Site.

The back rubber water seal shall also be replaceable on Site and carried either in the sliding sleeve or, in the case of seals that rely on water pressure for water tightness, shall be carried on the valve body.

A valve shall be so designed and constructed that it is drop-tight when closed.

Operating gear and linkage shall be of corrosion resistant materials.

All lubricating points shall be provided with nipples for grease gun lubrication.

4.1.12 Other types of valve

Other types of valves shall comply with the requirements of the Specification Data.

4.1.13 Body marking and facilities for handling and mounting

a) **Body marking**

The following information shall be legibly and indelibly cast or embossed on each valve

- the size or nominal bore of the valve ;
- the class or working pressure of the valve .

b) **Lifting eyes**

Each valve of mass 75 kg and more shall be furnished with acceptably robust lifting eyes so placed as to be suitable for lifting the valve in a horizontal or vertical position, as appropriate.

c) **Mounting feet**

Unless otherwise stated in the Specification Data, the body of a socketed or a double-socketed type valve of nominal bore up to 600 mm, and of every valve of nominal bore greater than 600 mm shall be furnished with two robust mounting feet, one on either side of the gate. The feet shall be designed for direct grouting or for bolting as shown on the drawings, billed or specified in the Specification Data.

d) **Protection against damage during transit to, and on site**

The body ends shall be sealed in the manner specified in SANS 665, and the jointing surfaces shall be protected against damage before dispatch to the Site and while being moved, stored, handled and installed on Site.

4.1.14 **Protection against corrosion**

a) **General**

i) **Prevention of electrolysis**

- Between metals used to fabricate valve. Where the construction of the valve is such that it is impossible to avoid dissimilar metals of which the potential difference exceeds 0,3 volts, suitable insulation materials shall be used on the contact faces between such dissimilar metals.
-
- Valve in cathodically protected pipeline of large diameter. Where a pipeline of nominal diameter 450 mm or more is being given cathodic protection, the Contractor shall ensure that such cathodic protection measures are also applied to any valves that he installs in the pipeline.

ii) **Where protection not required**

Except where specifically billed and required in terms of the Specification Data, internal corrosion protection shall not be provided on cast iron valves.

- of nominal bore up to 300 mm; and
- of nominal bore greater than 300 mm that are to be used, in terms of the Specification Data, for the conveyance of non-aggressive water.

iii) **External corrosion protection scheduled**

Where corrosion protection of the outside surface of a valve is designated or billed, the valve shall, after proper cleaning, be given whichever of the following treatments is billed:

- Bitumen/coal tar coat. A cold applied approved mineral bitumen or coal tar coat that complies with BS 78 and is of dry film thickness not less than 300 IJm.

- Bituminous aluminum. Coated in accordance with the relevant requirements of SANS 802 with bituminous aluminum to provide a dry film thickness of not less than 300 IJm.

- Galvanised. Galvanised in accordance with the relevant requirements of SANS 121 or SANS 32, as appropriate.

- Zinc (or aluminum) spray plus epoxy. The external metal surfaces shall be grit blast cleaned to at least SIS Standard SA 3 and zinc (or aluminum, as billed) spray coated to a thickness of at least 150 1-1m in accordance with the requirements of SANS ISO 2063. The zinc coating shall be further protected with one prime coat and two coats of an approved high build epoxy tar paint that complies with the relevant requirements of SANS 801, to a total film thickness of not less than 280 IJm

- Epoxy painted. The external metal surfaces shall be grit blasted to SIS Standard SA 3 and an approved epoxy paint that complies with the relevant requirements of SANS 801 applied immediately as a primer followed by two further coats not less than 6 h and not more than 24 h after the previous coat to provide a total film thickness of not less than 250 IJm.

- Sintered epoxy. Clean as for bullet four and five above, and a solvent-free sintered epoxy powder applied in one coat by the use of arc-spray machines to provide a dry film thickness of not less than 450 IJm.

b) **Internal corrosion protection of large valves**

The vulnerable internal metal surfaces of a valve shall be given corrosion protection if the valve has a cast steel body or has a cast iron body and is to be installed to control aggressive water and provided also that a particular internal corrosion protection is billed and is identified in the Specification Data. Such protection shall comply with whichever of bullet one to five below is billed or identified in the Specification Data or with such other specification as is acceptable as a means of providing adequate protection of the valve against corrosion caused by water of the composition set out in the Specification Data, and is approved as being equal to that billed. Internal protection may be applied before the valve has been tested at the

manufacturer's works in terms of 5.1.2 (a).

- Zinc (or aluminum) spray plus epoxy. The exposed internal cast steel surfaces shall be grit blast cleaned to at least SIS Standard Sa 3 and zinc, or aluminum, as applicable, spray coated to a thickness of at least 150 IJm in accordance with the requirements of SANS ISO 2063. The zinc (or aluminum) coating shall be further protected with one prime coat and two coats of an approved non-toxic and non-tainting high build epoxy tar paint that complies with the relevant requirements of SANS 801, to a total film thickness of not less than 280 IJm.

- Epoxy painted. The exposed internal cast steel surfaces shall be grit blasted to SIS Standard SA 3 and an approved non-toxic and non-tainting epoxy paint that complies with the relevant requirements of SANS 801 applied immediately as a primer followed by two further coats not less than 6 h and not more than 24 h after the previous coat to provide a total film thickness of not less than 260m.

- Sintered epoxy. Clean as for bullet one and two above and apply a solvent-free, non-toxic and non-tainting sintered epoxy powder in one coat by the use of arc-spray machines to provide a dry film thickness of not less than 450 m.

- Plastic coated. Clean as for bullet one and two above and apply an approved plastic coating of thickness not less than 50 mm to all internal surfaces except plug or disc faces.

- Nickel plating. The exposed internal surfaces of cast steel shall be nickel plated in accordance with the recommendations of an approved manufacturer.

4.1.15 Marking to identify for contract

Before dispatch from the manufacturer's works the body of each valve shall be clearly marked to identify it with the drawings or billed in the manner required in terms of the Specification Data, and in such a way that the marks remain until the valve is installed.

4.1.16 Concrete

The concrete used for pedestals, or bedding or other supports shall be of the strength specified, billed or given on the drawings, and shall comply with the relevant requirements of SANS 1200 G or SANS 1200 GA as applicable.

4.1.17 Bedding

Bedding materials and procedures shall be of the class billed or given on the drawings, and shall comply with the relevant requirements of SANS 1200 LB.

4.2 Plant

The terms of Clause 4 of SANS 1200 L shall apply where relevant.

4.3 Methods and procedures

4.3.1 Setting of valves and associated specials

a) **General**

i) Unless otherwise shown on the drawings or required in terms of the Specification Data, gate valves, fire hydrants and air valves shall be set upright and butterfly valves shall be set with the main shafts horizontal. Other valves shall be set as shown on the drawings or ordered.

ii) Each valve, complete with associated specials, shall be correctly set, placed in position, bedded as specified in SANS 1200 LB to the class appropriate to the pipeline, or where so billed, supported on concrete as specified in 4.3.2 and 4.3.3, and as the work proceeds, properly jointed to their respective pipes.

iii) In the case of a valve inside a chamber:

- the removable type coupling (provided in terms of 4.1.1 (b) or 4.1.3 (b), as applicable) shall be fitted on one side of the valve;
- a clear space of width at least 450 mm or the nominal bore of the valve, whichever is the larger, shall be provided on both sides and above a valve;
- a clear space of at least 300 mm shall be provided under a valve.

iv) In urban, industrial and similar areas, each valve and associated specials shall, subject to 5.2.2, be located in the position shown on the drawings or as otherwise directed, and pipe lengths shall be so arranged that the closure piece when coupling a valve into a pipeline is not less than 500 mm in length.

v) In open country areas, where so approved before pipe laying commences, a valve may be located to suit the pipe lengths.

vi) An underground type fire hydrant shall be installed at a level that ensures that the top of the threaded outlet is not more than 400 mm nor less than 50 mm below the level at which the top of the hydrant cover is to be set. A double-

flanged distance piece shall be used when necessary to ensure compliance with this requirement.

vii) In the case of an air valve, a double-flanged distance piece of suitable length shall be used when necessary to ensure compliance with any depth requirement given on the drawings.

4.3.2 Jointing

a) **Flanges**

In the jointing of valves with flanges, special care shall be taken to align, grade, and level the valves to avoid straining of the flanges. All bitumen and paint shall be removed from the face of each flange immediately before jointing.

Insertion pieces that comply with the applicable requirements of Sub clause 3.8.3 of SANS 1200 L and that have accurately cut holes for bolts shall be placed to form a continuous one-piece ring between the flanges. Bolts shall be tightened up evenly in opposite pairs to ensure uniform bearing on the insertion. Care shall be taken to avoid damage to the internal surface of the valves during assembly of the pipeline and installing of the valve(s).

b) **Other end connections**

Each end of the valve shall be thoroughly cleaned by brushing and wiping immediately before being jointed. All rubber rings and seals shall be carefully inspected after being placed in position and before the joint is closed to ensure that they have not suffered any cuts, tears, or other damage, and are not in any other way defective. Only the lubricant recommended by the manufacturer shall be used for sleeve-type couplings and rubber insertion rings of AC pipes. Grease derived from petroleum products shall not be used for connections to PVC pipe joints. Connections to an uPVC pipeline shall be made in accordance with the manufacturer's instructions. Connections to an AC pipeline shall be made in accordance with the manufacturer's instructions.

4.3.3 Keeping valves clean

Every reasonable precaution shall be taken to prevent the entry of foreign matter and water into the valve(s). At the close of each day's work or at any time when work is suspended for a significant period, the open en of the last laid valve shall be plugged, capped, or otherwise tightly closed until laying is recommenced.

4.3.4 Anchor/thrust blocks and pedestals

When billed, terminal valves, under major valves, and where otherwise directed, anchor/thrust blocks and pedestals shall be constructed (and reinforced, if any) to the dimensions ordered or shown on the drawings. Anchor/thrust blocks and pedestals shall be constructed of strength concrete of grade 20 MPa

The concrete shall be well punned round the base or mounting lugs, as applicable and, if in trenches, against the undisturbed faces and bottom of the trench. Backfilling behind or under thrust faces will not be permitted. Excess excavation shall be replaced with strength concrete of grade 20 MPa at the Contractor's expense unless an item is billed to cover payment for over break. Care shall be taken to leave the bolts on the valve accessible. No anchor/thrust blocks and pedestals shall be concreted until the approval of the Engineer has been obtained.

4.3.5 Holding down bolts, straps, clamps, etc.

Where and as billed the Contractor shall supply and install holding down bolts, straps, clamps, or other devices that are shown on the drawings for anchoring the valve to the valve pedestal or other concrete structure, as applicable.

All bolts, straps, clamps, etc., shall be protected against corrosion by use of approved protective materials.

4.3.6 Making good damage

a) **Before satisfactory completion of initial test (see 5.1.4 (a))**

Each valve shall be thoroughly cleaned and carefully examined for damage and defects in the valve and corrosion protection, if any, immediately before installing. Should any damaged or defective valve be installed, it shall be removed and replaced at the Contractor's expense and to the satisfaction of the Engineer. Should any damaged or defective corrosion protection be disclosed the affected area shall be thoroughly cleaned and then re-protected as specified in 4.1.14 at the Contractor's expense and to the satisfaction of the Engineer.

b) **After acceptance**

Except where the Contractor is barred by special requirements in the Specification Data from working on an accepted valve in a pipeline that is being operated by the Employer, the Contractor shall liaise with the Engineer in regard to acceptable arrangements for carrying out his responsibilities in terms of 4.3.6 (b) and 5.1.4 (b) until the end of the defects liability period.

4.3.7 Commissioning

After installation, the Contractor shall commission each valve under normal conditions of flow, and he shall satisfy himself that each valve performs in the manner, and fulfils the requirements over the full range of operating conditions specified in the Contract.

5 COMPLIANCE WITH REQUIREMENTS

5.1 Testing

5.1.1 Test certificate

The Contractor shall make suitable arrangements with the manufacturer to ensure receipt by the Engineer of a manufacturer's test certificate in which it is certified that all valves in the lot have been inspected and tested for compliance with the 5.1.2 and the applicable specification. The actual pressures used during the tests and the result of each test shall be stated in the certificate.

5.1.2 Test requirements

a) **At manufacturer's works**

Before dispatch to the site, valves shall be tested at the manufacturer's works in accordance with the requirements of Table 4 below, as applicable.

The proof tests required in terms of columns 3 and 4 of Table 4 shall be carried out on samples selected in terms of the sampling procedure specified in the applicable standard specification. Where, in terms of 4.1.14 (a)(ii), the exposed surfaces of the inside of a valve are to receive identified treatment for protection against corrosion, the valve may be tested as set out above before treatment, and again after it has been dismantled, treated and re-assembled.

Table 4- Test requirements

1	2	3	4	5	6	7
Class and Working pressure MPa	Nominal bore mm	Proof test on sample to check design of valve at		Gate efficiency and performance test on each valve at	Applicable standard specification for tests	
		Test Pressure MPa				
		On body	On gate for drop tightness	Operating & differential	Gate	Others
10 1,0	50 to 600 exceeding 600 to 1000	2,0	1,5	As stated in SO or billed, but not exceeding 1,0	SANS 664 SANS 665	See 5.1.3
16 1,6	50 to 60 exceeding 600 up to 1000	3,2	2,4	As stated in SO or billed, but not exceeding 1,6	SABS 664 SANS 665	See 5.1.3
25 2,5	50 to 1000 50 to 350 exceeding 350 up to 1000	5,0	3,8	As stated in SO or billed, but not exceeding 2,5	SANS 665 SANS 191 Specification Data	See 5.1.3
40 4,0	50 to 350 exceeding 350 up to 1000	8,0	6,0	As stated in SO or billed, but not exceeding 4,0	SANS 191 Specification Data	See 5.1.3

On site

In addition to the test requirements of 5.1.1 and 5.1.2 (a), each valve shall be:

- inspected for flaws or damage on delivery to the Site, and again immediately before installation.
- subjected to commissioning tests as specified in 5.1.4 and 5.1.5, as applicable.

5.1.3 **Applicable test specifications for other than gate valves**

Except where otherwise specified in an applicable standard specification listed below, each valve of whatever type shall be inspected and have its body tested as specified in SANS 191 or SANS 664 or SANS 665, as applicable, for the specified class or working pressure given in Column 5 of Table 4.

Type of valve	Applicable standard Specification for tests
Butterfly Fire hydrant	BS 5155 SABS 1128
Air valve Diaphragm Globe	Specification Data BS 5156 BS 5152

5.1.4 **Commissioning (or field) test on site**

a) **Initial test**

After installation and compliance with 4.3.5, each valve (and actuator if installed) shall be subjected to a commissioning (or field) test in the presence of the Engineer to prove the ability of the valve (and actuator if installed) to operate in the manner and over the full range of normal flow and operating conditions specified in the Contract.

b) **Maintenance checks**

After the commissioning test has been completed to the satisfaction of the Engineer, the Contractor shall, from time to time during the Defects Liability Period make such checks and adjustments to mechanisms as are necessary, in the opinion of the Engineer.

5.1.5 **Testing by-pass valve arrangements**

By-pass valve arrangements shall be subjected to and pass the tests ordered at the same pressure as the main valve that is by-passed by such arrangements.

5.2 Tolerances

5.2.1 **Manufacture**

a) **Body dimensions**

The dimensions of the body of each valve and its component parts shall comply with the relevant tolerance requirements of Table 3 below and of the applicable standard specification for the valve (see Table 1).

1				2
Face-to-face dimension, mm				Tolerance, mm
		Up to and including	200	± 1
Above	200	up to and including	400	±2
Above	400	up to and including	600	±3
Above	600	up to and including	800	±4
Above	800	up to and including	1000	±5

b) **Flanged and couplings**

Flanges shall be subject to the following tolerances:

Outside diameter of flange	±2mm
Thickness of flange	± 1 mm
Diameter bolt circle	±1mm

Couplings shall be subject to the tolerances specified in the appropriate standard specification.

5.2.2 **Installation**

A valve shall be installed and located in a pipeline within the tolerances specified for the pipeline in terms of SANS 1200 L.

5.2.3 **Commissioning**

After commissioning each valve shall perform in the manner, and within the limits and tolerances required in terms of the Specification Data.

6 *Void*

7 *Void*

8 *MEASUREMENT AND PAYMENT*

8.1 Basic principles

8.1.1 **General**

a) Except as provided for in (c) below, the various operations involved in the installation of a valve will be dealt with as an extra-over the payment for supplying, laying, bedding, etc. of the pipeline in which (or onto which) the valve is installed/attached, i.e. no deduction from the overall length of the pipeline will be made for valves (see Sub clause 8.2.1 of the SANS 1200 L).

b) Generally the supply and delivery of a valve will be billed separately form the operations necessary to install and bed or support, and to commission such a valve.

c) In the case of short pipe runs (see Sub clause 8.2.5 of SANS 1200 L), where the quantity of valves and specials are, for instance, of a similar magnitude to or more than those of the stated lengths of straight pipes, the operations of installing, setting and bedding each valve will be regarded as, and scheduled separately from the operations of laying and bedding etc.the adjoining length(s) of the pipe(s) or specials.

8.2 Billed Items

8.2.1 Supply and deliver valve

(type, size, working pressure, and other relevant data in terms of Clauses 4.1.1 to 4.1.10 of Specification LK, as applicable, stated)

Unit: ..... number (No.)

A separate item will be billed for each type, size, etc. of valve and each type of end connection or coupling.

NOTE: All valves may be listed in a separate Bill "X" (that includes couplings and may include specials), a summary of which is to be carried to an item in the main bill.

The rate, which shall be subject to 8.1, shall cover the cost of providing, delivering, and offloading the valve on Site as directed.

8.2.2 Install, bed and field-test small valve (of nominal bore of up to 300 mm)

(type, size, working pressure, etc., as relevant, stated)

Unit: ..... Number (No.)

Separate items will be billed for each group of valves (depending on mass and location or circumstances, or both, of installation) , and for each type and size of valve .

The rate, which shall be subject to 8.1, shall cover the cost of providing packing, bolts, etc. for flanges, if any, and of taking delivery, handling, installing, bedding, and field testing the valve , complete with couplings together with the cost of any additional cutting, turning and jointing of pipes required to locate the valve exactly.

In the case of an underground type fire hydrant, the rate shall cover also the cost of the supply, (except where billed under 8.2.1), fitting and installation of the necessary flanged distance piece(s) regardless of any variation in their total length(s) caused by variations from the specified minimum depth or depth of cover over the main pipeline that arise from the Contractor's manner of laying that pipeline.

NOTE: Unless specific provision is made in the bill, no separate payment will be made for the supply and fitting of any additional joints and jointing materials which may be required for the connection of shortened pipe lengths.

8.2.3 **Provide and deliver removable type couplings**

(details stated)

Unit: ..... number (No.)

Separate items may be billed for each size and type of removable coupling required in terms of Clauses 4.1.1 (b) and 4.1.3 (b) of Specification LK.

The rate shall cover the cost of supplying and delivering to Site the coupling complete with all necessary rings, packing's, bolts (of sufficient length for at least two screw threads to protrude outside nuts when assemblies are fully tightened), washers and nuts.

8.2.4 **Install, bed and test, medium and large valve**

(nominal bore more than 300 mm) (type, size, working pressure, etc., as relevant, stated)

Unit: ..... number (No.)

The rate, which shall be subject to 8.1, shall cover the cost of the provision of each valve, and the cost of the handling, fixing, and bedding and, except where separately billed, of testing and of commissioning the valve.

No extra payment over and above the rate will be made in respect of any additional cutting, turning and jointing of pipes required for the location of a valve, special, etc., where a precise position is given on the drawings. In such an event, unless specific provision is made in the bill, no separate payment will be made for the supply and fitting of any additional joints and jointing materials which may be required for the connection of shortened pipe lengths.

8.2.5 **Test and/or commission valve(s)**

Unit: ..... number (No.)

(Only applicable to a single or group of large valve(s) or isolated valve(s) or power operated valve(s) testing or commissioning, (or both), of which is a separate operation to installation, and billed separately). Separate items may be billed for the initial test (Clauses 5.1.4.1 of Specification LK) and for the maintenance checks in terms of Clause 5.1.4.2 of Specification LK.

The rate shall cover all costs of labour, material, equipment, and specialist supervision for whatever numbers of visits are required to commission and prove the valve(s) to the satisfaction of the Engineer.

8.2.6 **Concrete valve pedestals (concrete strength or mix stated)**

Unit: .....number or cubic metre (No.) or (m3)
Where valve pedestals are the same size and shape they will be billed by number, the size being stated, or they will be billed by volume and the number will be stated. In either case dimensions or reference to a drawing will be given.

Where so billed the volume of a pedestal will be calculated from the dimensions stated, specified or given on the drawings. Steel reinforcement, if required, will be measured separately in terms of Sub clause 8.3 of SANS 1200 GA, as applicable.

8.2.7 **Holding down bolts, nuts, and washers, complete with straps/clamps, etc.**

Unit: .....Sum or No

Where all holding down bolts, straps/clamps and other anchoring devices are detailed on the drawings, they may be measured as a sum or by number of sets of similar size, design and complexity. Where details are not given at tender stage holding down bolts will be measured by mass (number stated) and straps/clamps separately by mass.

The rate shall cover the cost of provision of the bolts, nuts, washers, straps, clamps, etc. or sets of clamps complete with nuts, etc., as applicable, and the cost of boxing out pockets where required, casting or grouting in, and anchoring the valve securely in position, and corrosion protection.

APPENDIX A. APPLICABLE STANDARDS

References is made to the applicable edition (see Sub clause 2.2 of SANS 1200 A or SANS 1200 AA, as applicable) of the following standards:

ANSI 316

AWWAC 504

BS10 :	Flanges and bolting for pipes, valves and fittings
BS 78:	Cast iron spigot and socket pipes (vertically cast) and spigot and socket fittings
BS 970:	Wrought steels for mechanical and allied engineering purposes
BS 1655:	Specification for flanged automatic control valves for the process control industry (face- to-face dimensions)
BS 5152:	Cast iron globe and globe stop and check valves for general purposes
BS 5155:	Cast iron and carbon steel butterfly valves for general purposes
BS 5156:	Screw down diaphragm valves for general purposes
BS 5793:	Industrial-process control valves
BS EN 1092:	Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories. Steel flanges
BS EN 1561:	Founding. Grey cast irons
SANS 32:	Internal and/or external protective coatings for steel tubes
SANS 121:	Hot dip galvanized coatings on fabricated iron and steel articles - Specification and test methods
SANS 144:	Metallic oxide coatings - Measurement of coating thickness - microscopical method
SANS 191:	Cast steel gate valves
SANS 664:	Cast Iron Gate valves for waterworks
SANS 665:	Cast Iron Gate valves for general purposes
SANS 801:	Epoxy-tar paints
SANS 802:	Bituminous aluminum paint
SANS 1123:	Steel pipe flanges
SANS 1128:	Firefighting equipment Part 1 Components of underground and above ground systems

SANS 1200A :	Civil engineering construction : General
SANS 1200AA :	Civil engineering construction :General (small works)
SABS 1200 D:	Civil engineering construction: Earthworks
SABS 1200 DA:	Civil engineering construction: Earthworks (small works)
SABS 1200 G:	Civil engineering construction: Concrete (Structural)
SABS 1200 GA:	Civil engineering Construction: Concrete (small works)
SABS 1200 L:	Civil engineering construction: Medium-pressure pipelines
SABS 1200 LB:	Civil engineering construction: Bedding (pipes)

SANS ISO 2063:	Metallic and other inorganic coatings -Thermal spraying -Zinc, aluminum and their alloys
SIS 05 59 00:	Pictorial surface preparation standards for painting steel surfaces

CONTENTS

PART A

GENERAL OCCUPATIONAL HEALTH AND SAFETY PROVISIONS

1. INTRODUCTION

In terms of the Construction Regulation 4(1) (*a*) of the Occupational Health and Safety Act, No. 85 of 1993, ORTDM, as the Client, is required to compile a Health & Safety Specification for any intended construction project and provide such specification to any prospective tenderer.

This Construction Health and Safety Specification (CHSS) has as an objective to ensure that Principal Contractors / Contractors entering into a Contract with ORTDM achieve an acceptable level of occupational health and safety performance. This document forms an integral part of the Contract and Principal and other Contractors should make it part of any Contracts that they may have with Contractors and/or Suppliers.

Compliance with this construction health and safety specification does not absolve the Principal Contractor / Contractor from complying with minimum legal requirements and the Principal Contractor / Contractor remains responsible for the health & safety of his employees and those of his Mandataries.

2. SCOPE

This Construction Health And Safety Specification shall be applicable to all projects commissioned by ORTDM (Client) involving "Construction Work" as defined in the Occupational Health And Safety Act 85 of 1993 (As Amended) and applicable regulations regardless of size and value of works.

The construction health and safety specification will provide the requirements that Principal Contractors and other Contractors will have to comply with in order to reduce the risks associated with construction work that may lead to incidents causing injury and/or ill health, to a level as low as reasonably practicable.

3. LEGAL REQUIREMENTS

All Principal Contractors / Contractors entering into a contract with the ORTDM shall, as a minimum requirement but not limited, comply with the following legislation:

- Occupational Health & Safety Act and Regulations (Act 85 of 1993)
- Compensation for Occupational Injuries & Diseases Act (Act 130 of 1993)
- Construction Regulations, 2014 (Government Gazette 37305).

4. STRUCTURE AND RESPONSIBILITIES

OVERALL SUPERVISION AND RESPONSIBILITY FOR OH&S

The Chief Executive Officer of the Principal Contractor / Contractor, in terms of Section 16(1) of the Act, shall ensure that the Employer (as defined in the Act) complies with the Act.

Annexure 2 "Legal Compliance Audit" may be used for this purpose.

Every Principal Contractor / Contractor when appointing Contractors (Sub-contractors) in terms of

Construction Regulations 5(3), (5), (9), (10) and (12) shall do so in terms of section 37(2) of the Occupational Health And Safety Act 85 of 1993 (As amended).

Every Principal Contractor / Contractor shall appoint designated competent employees and/or other competent persons as required by the Act and Regulations.

Below is a list of identified possible (not limited to these) appointments / designations required depending on the size and nature of the project where applicable.

Designation / Appointment	**Ref. Section/Regulation in OHS Act.**
Asbestos Stripping/Demolishing Supervisor	(Asbestos Regulations)Batch Plant
Supervisor	(Construction Regulation 18(1)
Construction Vehicles/Mobile Plant/Machinery	(Construction Regulation 18(1)
Supervisor	(Construction Regulation 21)
Demolition Supervisor	(Construction Regulation 12)
Drivers/Operators Of Construction Vehicles/Plant	(Construction Regulation 21)
Electrical Installation And Appliances Inspector	(Construction Regulation 22)
Emergency/Security/Fire Coordinator	(Construction Regulation 27)
Excavation Supervisor	(Construction Regulation 11)
Explosive Powered Tool Supervisor	(Construction Regulation 19)
Fall Protection Supervisor	(Construction Regulation 8)
First Aider	(General Safety Regulation 3)
Fire Equipment Inspector	(Construction Regulation 27)
Formwork & Support Work Supervisor	(Construction Regulation 10)
Hazardous Chemical Substances Supervisor	(Hcs Regulations)
Incident Investigator	(General Admin Regulation 29)
Ladder Inspector	(Gen. Safety Reg. 13a)
Lifting Equipment Inspector	(Construction Regulation 20)
Materials Hoist Inspector	(Construction Regulation 17)
OH&S Committee	(OHS Act Section 19)
OH&S Officer	(Construction Regulation 6(6)
OH&S Representatives	(OHS Act Section 17)
Person Responsible For Machinery	(General Mach. Regulation 2)
Scaffolding Supervisor	(Construction Regulation 14)
Stacking & Storage Supervisor	(Construction Regulation 26)
Structures Supervisor	(Construction Regulation 9)
Suspended Platform Supervisor	(Construction Regulation 15)
Tunnelling Supervisor	(Construction Regulation 13)
Vessels Under Pressure Supervisor	(VUP Regulations)
Working on/next to Water Supervisor	(Construction Regulation 24)
Welding Supervision	(General Safety Regulation 9)

The appointments shall be in writing on Principal Contractor's / Contractor's letterhead and the responsibilities clearly stated together with the period for which the appointment/designation is valid. This information shall be communicated and agreed with the appointees.

Copies of appointments/designations shall be submitted to the ORTDM together with concise CV's of the appointees. ORTDM reserves the right to approve / disapprove an appointee and any changes in appointed / designated personnel shall be brought to the attention of ORTDM before the appointee assumes responsibility.

The Principal Contractor / Contractor shall, provide ORTDM with an organogram of all appointed / designated personnel and contractors and keep an up to date copy on site at all times.

In terms of Construction Regulation 6(6), or when instructed by ORTDM or an Inspector of the Department of Labour, the Principal Contractor /Contractor shall appoint a full-time or part-time competent Occupational Health And Safety Construction Officer (SHE Officer). This appointment shall

be subject to approval by ORTDM*.*

5. DESIGNATION OF OH&S REPRESENTATIVES (SECTION 18 OF THE OHSACT)

Where the Principal Contractor / Contractor employs more than 20 persons (including the employees of other Contractors), the Principal Contractor / Contractor shall ensure that Occupational Health and Safety Representatives are appointed in terms of the General Administrative Regulations and section 17 of the Act. OH&S Representatives shall be designated in writing and the designation must include the area of responsibility of the person and term of the designation.

6. DUTIES AND FUNCTIONS OF THE OH&S REPRESENTATIVES (SECTION 19 OF THE ACT)

The Principal Contractor / Contractor shall ensure that the designated SHE Reps conduct weekly inspections of their respective areas of responsibility using a checklist and report thereon to the Principal Contractor.

7. APPOINTMENT OF OH&S COMMITTEE (SECTION 20 OF THE OHASA ACT)

The Principal Contractor / Contractor shall establish an Occupational Health & Safety Committee consisting of all the designated SHE Reps and other co-opted persons.

Members of this committee shall be appointed in writing and shall meet at least monthly and the meeting Agenda shall contain the following but not limited to:

- Opening & Welcome
- Present/Apologies/Absent
- Minutes of previous Meeting
- Matters Arising from the previous Minutes
- OH&S Reps Reports
- Incident Reports & Investigations
- Incident /Injury Statistics
- Other Matters
- Endorsement of registers and other statutory documents by a representative of the Principal Contractor
- Close/Next Meeting.

8. HAZARD IDENTIFICATION AND RISK ASSESSMENT (CONSTRUCTION REGULATION 7)

RISK ASSESSMENTS

Part B contains a list of Risk Assessment headings that have been identified by ORTDM as possibly applicable to the abovementioned construction work. It is, by no means, exhaustive and is offered as assistance to Principal Contractor / Contractor intending to tender.

DEVELOPMENT OF RISK ASSESSMENTS

Every Principal Contractor / Contractor performing Construction Work shall, before the commencement of any Construction Work or work associated with the aforesaid Construction Work and during such work, cause a Risk Assessment to be performed by a competent person, appointed in writing, and the Risk Assessment shall form part of the OH&S Plan and be implemented and maintained as contemplated in Construction Regulation 5(1).

THE RISK ASSESSMENT SHALL INCLUDE, AT LEAST:

- the identification of the risks and hazards to which persons may be exposed to
- the analysis and evaluation of the risks and hazards identified
- a documented plan of safe work procedures to mitigate, reduce or control the risks and hazards that have been identified
- a monitoring plan
- a review plan.

Based on the Risk Assessments, the Principal Contractor / Contractor shall develop a set of site-specific Safe Work Procedures (SWP's) that will be applied to regulate the OH&S aspects of the construction.

The Risk Assessments, together with the site-specific SWP's shall be submitted together with the Occupational Health and Safety Plan to ORTDM before site hand over.

Despite the Risk Assessments listed in Annexure 7, the Principal Contractor / Contractor shall conduct a baseline Risk Assessment and the aforesaid listed Risk Assessments must be incorporated into the base-line Risk Assessment. The baseline Risk Assessment shall further include Safe Working Procedures (SWP's) and the applicable Method Statements based on the Risk Assessments.

REVIEW OF RISK ASSESSMENTS

The Principal Contractor / Contractor shall review the Hazard Identification, Risk Assessments and SWP's at each Production Planning and Progress Report meeting as the construction work develops and progresses and each time changes are made to the designs, plans and construction methods and processes.

The Principal Contractor / Contractor shall provide the ORTDM and other Contractors with copies of any changes, alterations or amendments of the abovementioned.

9. THE OCCUPATIONAL HEALTH AND SAFETY FILE

As required by Construction Regulation 5(7), the Principal Contractor / Contractor shall keep and maintain a Site Health And Safety File/s containing the following documents as a minimum:

- Notification of Construction Work (Construction Regulation 3.)
- Copy of OH&S Act and applicable Regulations
- Proof of Registration and good standing with a COID Insurer (Construction Regulation 4 (g)
- Occupational Health & Safety Plan agreed with the Client including the underpinning Risk Assessment/s & Method Statements (Construction regulation 5 (1)
- Copies of OH&S Committee and other relevant Minutes
- Designs / drawings (Construction Regulation 5 (8)
- Legal compliance registers
- A list of Contractors (Sub-Contractors) including copies of the agreements between the parties and the type of work being done by each Contractor (Construction Regulation 9).

10. LEGAL INSPECTION REGISTERS AS FOLLOWS:

The Principal Contractor / Contractor shall conduct all prescribed inspections using legal compliance registers. All registers shall be kept on file/s and ORTDM reserves the right to inspect all legal compliance registers.

- Accident/Incident Register (Annexure 1 of the General Administrative Regulations)
- OH&S Representatives Inspection Register
- Asbestos Demolition & Stripping Register
- Batch Plant Inspections
- Construction Vehicles & Mobile Plant Inspections by Controller
- Daily Inspection of Vehicles and Plant and other Equipment by the Operator/Driver/User

- Demolition Inspection Register
- Designer's Inspection of Structures Record
- Electrical Installations, -Equipment & -Appliances (including Portable Electrical Tools)
- Excavations Inspection
- Explosive Powered Tool Inspection/Maintenance/Issue/Returns Register (incl. cartridges & nails)
- Fall Protection Inspection Register
- First Aid Box Contents
- Fire Equipment Inspection & Maintenance
- Formwork & Support Work Inspections
- Hazardous Chemical Substances Record
- Ladder Inspections
- Lifting Equipment Register
- Materials Hoist Inspection Register
- Machinery Safety Inspection Register (incl. machine guards, lock-outs etc.)
- Scaffolding Inspections
- Stacking & Storage Inspection
- Inspection of Structures
- Inspection of Suspended Platforms
- Inspection of Tunneling Operations
- Inspection of Vessels under Pressure
- Welding Equipment Inspections
- Inspection of Work conducted on or near water
- All other applicable records.

11. OH&S GOALS & OBJECTIVES & ARRANGEMENTS FOR MONITORING & REVIEW OF OH&S PERFORMANCE

The Principal Contractor shall maintain a Compensation Incidence Frequency Rate (CIFR) of at least 8 (See Annexure 3. "Measuring Injury Experience") and report on this to ORTDM on a monthly basis.

12. NOTIFICATION OF CONSTRUCTION WORK (CONSTRUCTION REGULATION 3.)

The Principal Contractor shall, where the Contract meets the requirements laid down in Construction Regulation 3, within 5 working days of appointment, notify the Department of Labour of the intention to carry out construction work and use the form (Annexure A in the Construction Regulations) for the purpose. A copy shall be kept on file.

13. TRAINING, AWARENESS AND COMPETENCE

The Principal Contractor / Contractor shall include training certificates of appointed / designated personnel in the Health and Safety Plan.

14. SITE SPECIFIC INDUCTION TRAINING

The Principal Contractor / Contractor shall develop project specific Health and Safety Induction Training based on the Risk Assessments and ensure that all employees receive induction training. No employees shall be allowed on site unless there is proof of induction training and identification at all times.

15. OTHER TRAINING

All operators, drivers and users of construction vehicles, mobile plant and other equipment shall be in possession of valid proof of training.
All employees in jobs requiring training in terms of the Act and Regulations shall be in possession of valid proof of training.

Failure to adhere to the above mentioned will result in the operator's eviction off site and no delay claims will be entertained by the client.

OH&S Training Requirements: (as required by the Construction Regulations and as indicated by the OH&S Specification & the Risk Assessment/s):

- General Induction (Section 8 of the Act)
- Site/Job Specific Induction (also visitors) (Sections 8 & 9 of the Act)
- Site/Project Manager
- Construction Supervisor
- OH&S Representatives (Section 18 (3) of the Act)
- Operators & Drivers of Construction Vehicles & Mobile Plant (Construction Regulation 21)
- Basic Fire Prevention & Protection (Environmental Regulations 9 and Construction regulation 27)
- Basic First Aid (General Safety Regulations 3)
- Storekeeping Methods & Safe Stacking (Construction Regulation 26)
- Emergency, Security and Fire Coordinator.

16. AWARENESS & PROMOTION

The Principal Contractor / Contractor shall develop and implement a health and safety promotion and awareness scheme for all employees and others affected by work activities. The following are some of the methods that may be used:

- Toolbox Talks
- OH&S Posters
- Videos
- Competitions
- Suggestion schemes
- Participative activities such as OH&S Safety circles.

17. COMPETENCE

The Principal Contractor / Contractor shall ensure that his and other Contractors' personnel appointed are competent and that all training required to do the work safely and without risk to health, has been completed before work commences.

The Principal Contractor / Contractor shall ensure that follow-up and refresher training is conducted as construction work progresses and the work situation changes.

Records of all training shall be kept on the OH&S File for auditing purposes.

18. CONSULTATION, COMMUNICATION AND LIAISON

All occupational health and safety liaison between the Client, the Principal Contractor, other Contractors, the Designer and other concerned parties shall be through the OH&S committee.

In addition to the above, communication may be directly to the Client or his appointed Agent, in writing, as and when the need arises.

Consultation with the workforce on OH&S matters shall be through their Supervisors, OH&S Representatives, the OH&S committee and their elected Trade Union Representatives, if any.

The Principal Contractor / Contractor shall be responsible for the dissemination of all relevant OH&S information to other Contractors e.g. design changes agreed with the Client and the Designer, instructions by the Client and/or his/her Agent, exchange of information between Contractors, the reporting of hazardous/dangerous conditions/situations etc.

19. AUDITS, REPORTING AND CORRECTIVE ACTIONS

MONTHLY AUDIT BY ORTDM (CLIENT) (CONSTRUCTION REGULATION 1(D)

Occupational Health and Safety Audits will be conducted monthly to comply with Construction Regulation 4(1) (*d*) to ensure that the Principal Contractor / Contractor has implemented and is maintaining the agreed and approved OH&S Plan.

OTHER AUDITS AND INSPECTIONS BY O. R. TAMBO DISTRICT MUNICIPALITY

ORTDM reserves the right to conduct other ad hoc audits and inspections as deemed necessary.

CONDUCTING AN AUDIT

A representative of the Principal Contractor / Contractor shall accompany O R Tambo District Municipality's Representative on all Audits and Inspections and may conduct his / her own audit / inspection at the same time.

CONTRACTOR'S AUDITS AND INSPECTIONS

The Principal Contractor / Contractor shall conduct monthly internal audits to verify compliance with his own occupational health and safety management systems and procedures.

INSPECTIONS BY OCCUPATIONAL HEALTH AND SAFETY REPRESENTATIVE'S AND OTHER APPOINTEES

Occupational Health and Safety Representatives shall conduct weekly inspections of their areas of responsibility and report thereon to their foreman or supervisor whilst other appointees shall conduct inspections and report thereon as specified in their appointments e.g. vehicle, plant and machinery drivers, operators and users must conduct daily inspections before start-up.

20. RECORDING AND REVIEW OF INSPECTION RESULTS

All the results of the abovementioned inspections to be in writing, reviewed by the occupational health and safety committee, and endorsed by the chairman of the meeting and kept on file.

21. REPORTING OF INSPECTION RESULTS

The Principal Contractor / Contractor shall provide ORTDM a monthly report in the format as per the attached Annexure 4: "SHE Risk Management Report"

22. INCIDENT REPORTING

REPORTING OF ACCIDENTS AND INCIDENTS (SECTION 24 AND GENERAL ADMINISTRATIVE REGULATION 8 OF THE OHASA ACT)

The Principal Contractor shall report all reportable (in terms of the Act and Regulations) and shall provide ORTDM with copies of all statutory reports required in terms of the Act within 7 days of the incident occurring.

The Principal Contractor shall provide ORTDM with copies of all internal and external accident / incident investigation reports including the reports contemplated above and below within 7 days of the incident occurring.

23. ACCIDENT AND INCIDENT INVESTIGATION (GENERAL ADMINISTRATIVE REGULATION 9)

The Principal Contractor / Contractor shall investigate all accidents / incidents where employees and non-employees were injured to the extent that he / she / they had to be referred for medical treatment

by a doctor, hospital or clinic and results recorded on file.

The Principal Contractor / Contractor shall investigate all minor and non-injury incidents as described in Section 24 (1) (b) & (c) of the Act and keep a record of the results of such investigations including the steps taken to prevent similar incidents in future.

The Principal Contractor / Contractor shall investigate all road traffic accidents and keep a record of the results of such investigations including the steps taken to prevent similar accidents in future.

ORTDM reserves the right to hold its own Investigation into any incident or call for an independent external investigation.

24. EMERGENCY PREPAREDNESS, CONTINGENCY PLANNING AND RESPONSE

The Principal Contractor / Contractor shall appoint a competent person to act as Emergency Controller/Coordinator.

The Principal Contractor / Contractor shall conduct an emergency identification exercise and establish what emergencies could possibly develop. He/she shall then develop detailed contingency plans and emergency procedures, taking into account any emergency plan that ORTDM may have in place.

The Principal Contractor / Contractor shall hold regular practice drills of contingency plans and emergency procedures to test them and familiarize employees with them.

25. FIRST AID (GENERAL SAFETY REGULATION 3)

The Principal Contractor / Contractor shall provide First Aid equipment ***(including a stretcher)*** and have qualified First Aider/s as required by General Safety Regulation 3 of the Occupational Health and Safety Act 85 of 1993 (As amended).

The Contingency Plan of the Principal Contractor / Contractor (See 23. above) shall include the arrangements for speedily and timeously transporting injured / ill person/s to a medical facility or of getting emergency medical assistance to person/s that may require it.

The Principal Contractor / Contractor shall have firm arrangements with his other Contractors in place regarding the responsibility of the other Contractors injured / ill employees.

26. SECURITY

The Principal Contractor / Contractor shall establish site access rules, implement and maintain these throughout the construction period. Access control procedure shall ensure that non-employees do not proceed on to work areas unaccompanied by a senior site responsible person or other.

27. FIRE PREVENTION AND PROTECTION

The Principal Contractor / Contractor shall at all times ensure that:

- The risk of fire is avoided;
- Sufficient & suitable storage of flammables is provided;
- Sources of ignition is obviated wherever flammable or highly combustible material is present in the workplace e.g.:
  - notices prohibiting smoking is displayed and enforced;
  - welding and flame cutting is only allowed under controlled conditions that includes written hot work permits;
  - only spark-free hand and power tools are used;

- no grinding, cutting and shaping of ferrous metals are allowed using electrically driven power tools that produces sparks;
- flameproof switches & fittings are to be used in the flammable atmosphere;
- good housekeeping is maintained to prevent the accumulation of unnecessary combustibles;
- adequate ventilation is maintained;
- adequate and suitable fixed and portable fire appliances is provided and maintained in good working order.

Maintenance Shall Include:

- Regular inspection by a competent person appointed in writing and keeping a register;
- Annual inspection and service by an accredited service provider.

All employees are instructed in the use of the Fire equipment and know how to attempt to extinguish a fire. A sufficient number of employees are appointed and trained to act as Emergency Team to deal with fires and other emergencies.

- Employees are informed regarding emergency evacuation procedures and escape routes
- Emergency escape routes are kept clear at all times
- After evacuation assembly points are demarcated
- Evacuation is practiced to ensure that all are evacuated timeously
- Roll call is held after evacuation to account for all personnel and ensure that no one has been left behind.
- A clearly audible, to all persons on site, siren or alarm is fitted.

28. TOILETS

The provision of Toilets is required in terms of the National Building Regulations and Construction Regulation 28.

Chemical toilets are allowed instead of the water borne sewerage type. Toilets shall be provided at a ratio of 1 toilet per 30 workers.

29. SHOWERS

Regardless of size and nature of a project, the Principal Contractor / Contractor shall provide at least cold water showers or similar facility a ratio of 1 shower per 15 workers.

30. CHANGE ROOMS

Regardless of size and nature of a project, the Principal Contractor / Contractor shall provide screened off changing facility must be provided separately for each sex.

31. EATING FACILITY

Regardless of size and nature of a project, the Principal Contractor / Contractor shall provide and maintain an eating facility sheltered from the sun, wind and rain, etc.

32. LIVING ACCOMMODATION

Where the site is in a remote location and transport home is not readily available, reasonable and suitable living accommodation shall be provided.

33. PERSONAL & OTHER PROTECTIVE EQUIPMENT (SECTIONS 8/15/23 OF THE OHS ACT)

The Principal Contractor / Contractor shall identify the hazards in the workplace and deal with them. Personal Protective Equipment (PPE) should, however, be the last resort and there should always first be an attempt to apply engineering and other solutions to mitigating hazardous situations before

the issuing of PPE is considered.

Where it is not possible to create an absolutely safe and healthy workplace the Contractor shall inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in the hazardous environment.

It is a further requirement that the Contractor maintain the said equipment, that he instructs and trains the employees in the use of the equipment and ensures that the prescribed equipment is used by the employee/s.

Employees do not have the right to refuse to use/wear the equipment prescribed by the employer and, if it is impossible for an employee to use or wear prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition/s for which the equipment was prescribed but an alternative solution has to be found that may include relocating or discharging the employee.

The Contractor may not charge any fee for protective equipment prescribed by him/her but may charge for equipment under the following conditions:

- Where the employee requests additional issue in excess of what is prescribed
- Where the employee has deliberately abused or neglected the equipment leading to early failure
- Where the employee has lost the equipment.

All employees shall be issued with the following PPE on ORTDM projects (where appropriate to the conditions they are working in) and instructed to wear them:

- Protective overalls
- Protective footwear
- Protective headwear
- Eye/face protection
- Hearing protection
- Breathing protection.

34. PUBLIC HEALTH & SAFETY (SECTION 9 OF THE OHS ACT)

The Principal Contractor / Contractor shall be responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimize these dangers. This includes:

- Non- employees entering the site for whatever reason
- The surrounding community
- Passers-by.

Appropriate signage shall be posted to this effect and all employees on site shall be instructed on ensuring that non-employees are protected at all times.

All non-employees entering the site shall receive induction into the hazards and risks and the control measures for these.

PART B – SITE SPECIFIC REQUIREMENTS

35. FALL PROTECTION (CONSTRUCTION REGULATION 8.)

A pre-emptive Risk Assessment shall be required for any work carried above two metres from the ground or any floor level and will be classified as “Work in Elevated Positions”.

As far as is practicable, any person working in an elevated position shall work from a platform, ladder or other device that is at least as safe as if he/she is working at ground level and whilst working in this position be wearing a single belt with lanyard that shall be worn to prevent the person falling from the platform, ladder or other device utilized.

This safety belt shall be, as far as is possible, secured to a point away from the edge over which the person might fall and the lanyard shall be of such a length that the person will not be able to move over the edge.

Alternatively any platform, slab, deck or surface forming an edge over which a person may fall may be fitted with guard rails at two different heights as prescribed in SANS 1085: Code of Practice for the Design, Erection, Use and Inspection of Access Scaffolding.

Where the above mentioned requirement is not practicable, the person shall be provided with a full body harness that shall be worn and attached above the wearer’s head at all times and the lanyard must be fitted with a shock absorbing device.

Where the above-mentioned requirements are not practicable, a suitable catch net shall be erected. Workers working in elevated positions shall be trained to do this safely and without risk to safety and health. Where work on roofs is carried out, the Risk Assessment shall take into account the possibility of persons falling through fragile material, skylights and openings in the roof.

36. STRUCTURES (CONSTRUCTION REGULATION 9)

The Principal Contractor / Contractor shall ensure that:

- Steps are taken to ensure that no structure becomes unstable or collapses due to construction work being performed on it or in the vicinity of it
- No structure is overloaded to the extent where it becomes unsafe
- He/she has received from the designer the following information:
  - Information on known or anticipated hazards relating to the construction work and the relevant information required for the safe execution of the construction work
  - A geo-scientific report (where applicable)
  - The load the structure is designed to bear
  - The methods and sequence of the construction process
- All drawings pertaining to the design are on site and available for inspection.

37. FORMWORK AND SUPPORT WORK (CONSTRUCTION REGULATION 10.)

- Formwork and Support work shall be carried out under the supervision of a competent person designated in writing
- Formwork and Support work Structures shall be so designed, erected, supported, braced and maintained that it will be able to support any vertical or lateral loads that may be applied
- No load is to be imposed onto the structure that the structure is not designed to carry
- Formwork & Support work shall be erected in accordance with the structural design drawings for that Formwork and Support work and, if there is any uncertainty, the designer must be consulted before proceeding with the erection/use of the formwork and support work
- All drawings pertaining to the formwork and support work shall be kept available on site
- A competent person, before use must check all equipment used in the erection of formwork and support work
- The foundation or base upon which formwork and support is erected on shall be able to bear the weight and keep the structure stable

- Employees erecting formwork and support work shall be trained in the safe work procedures for the erection, moving and dismantling
- Safe access (and emergency escape) shall be provided for workers
- A competent person must inspect formwork and support work structures that have been erected before, during and after pouring of concrete or the placing of any other load and thereafter daily until the formwork and support work is stripped.
- The results of all inspections must be recorded in a register kept on site
- The formwork and support work shall be left in place until the concrete has reached sufficient strength to bear its own weight plus any additional weight that may be imposed upon it and not until the designated competent person has authorized its stripping in writing
- Any damaged formwork and support work shall be repaired / rectified immediately
- Deck panels shall be secured against displacement.
- The slipping of persons on release agents on deck panels shall be prevented
- Person's health shall be protected against the use of solvents, oils or other similar substances.

38. EXCAVATIONS (CONSTRUCTION REGULATION 11.)

Where excavations will exceed 1, 5 m in depth the Principal Contractor / Contractor shall submit a Method Statement to ORTDM for approval before commencing with the excavation and ORTDM will issue a permit to proceed once the Risk Assessment and Method Statement are approved.

- Excavation work shall be carried out under the supervision of a competent person who has been appointed in writing.
- Before excavation work begins the stability of the ground shall be evaluated.
- Whilst excavation work is being performed, the contractor shall take suitable and sufficient steps to prevent any person from being buried or trapped by a fall or dislodgement of material.
- No person may be required or permitted to work in an excavation that has not been adequately shored or braced or where:
  - the excavation is in stable material or where;
  - the sides of the excavation are sloped back to at least the maximum angle of repose measured relative to the horizontal plane.
- The shoring or bracing may not be left out unless written permission has been obtained from the appointed competent person and shoring and bracing shall be designed and constructed to safely support the sides of the excavation.
- Where uncertainty exists regarding the stability of the soil the opinion of a competent professional engineer or professional technologist shall be obtained whose opinion will be decisive. The opinion must be in writing and signed by the engineer or technologist as well as the appointed excavator.
- No load or material may be placed near the edge of an excavation if it is likely to cause a collapse of the trench unless suitable shoring has been installed to be able to carry the additional load.
- Any neighbouring building, structure or road that may be affected or endangered by the excavation shall be protected from damage or collapse.
- Every excavation shall be provided with means of access that must be within 6 metres of any worker within the excavation.
- The location and nature of any existing services such as water, electricity, gas etc. shall be established before any excavation is commenced with and any service that may be affected by the excavation must be protected and made safe for workers in the excavation.
- Every excavation including the shoring and bracing or any other method to prevent collapse shall be inspected by the appointed competent person as follows:
  - Daily before work commences
  - After every blasting operation
  - After an unexpected collapse of the excavation
  - After substantial damage to any supports
  - After rain.

The results of any inspections shall be recorded in a register and kept on site.

Every excavation accessible to the public or that is adjacent to a public road or thoroughfare or that

threatens the safety of persons, shall be adequately barricaded or fenced to at least one metre high and as close to the excavation as practicable and provided with warning lights or visible boundary indicators after dark or when visibility is poor.

Upon entering an excavation the requirements of General Safety Regulation 5 shall be observed:

- any confined space may only be entered after the air quality has been tested to ensure that it is safe to breathe and does not contain any flammable mixture or
- the confined space has been purged and ventilated of any hazardous or flammable gas, vapour, dust or fumes the safe atmosphere must be maintained or
- employees shall wear breathing apparatus and wear a safety harness with a rope with the free end of the rope being attended to by a person outside the confined space

An additional person trained in resuscitation shall be in full-time attendance immediately outside the confined space and additional breathing and rescue apparatus shall be kept immediately outside the confined space for rescue purposes. All pipes, ducts etc. that may leak into the confined space to be blanked off sufficiently to prevent any leakage or seepage.

The employer shall ensure that all employees have left the confined space after the completion of work where flammable gas is present in a confined space no work may be performed in close proximity to the flammable atmosphere that may ignite the flammable gas or vapour.

39. DEMOLITION WORK (CONSTRUCTION REGULATION 12.)

Demolition work to be carried out under the supervision of a competent person who has been appointed in writing.

A detailed structural engineering survey of the structure to be demolished shall be carried out and a method statement on the procedure to be followed in demolishing the structure to be developed by a competent person, before any demolition may be commenced.

As demolishing progresses the structural integrity of the structure is to be checked at intervals as determined in the method statement by the appointed competent person in order to prevent any premature collapse.

Steps shall be taken to ensure that where a structure is being demolished:

- no floor, roof or any other part of the structure is overloaded with debris or material that would make it unsafe
- precautions are taken to prevent the collapse of the structure when any frame or support is cut or removed
- shoring or propping is applied where necessary.

No person shall be required or allowed to work under unsupported overhanging material. The stability of any adjacent building, structure or road shall be maintained at all times. The location and nature of any existing services such as water, electricity, gas, etc. shall be established before any demolition is commenced with and any service that may be affected by the demolition must be protected and made safe for workers.

Every stairwell in a building being demolished shall be adequately illuminated.

Convenient and safe means of access shall be provided.

A catch platform or net shall be erected over every entrance to the building or structure being demolished where the likelihood exists of material or debris falling on persons entering and leaving and every other area where the likelihood exists of material or debris falling on persons, shall be fenced or barricaded.

No material may be dropped on the outside of the building unless the area into which it is dropped is fenced off or barricaded.

Waste and debris may only be disposed of from a height in a chute with the following design:

- Adequately constructed and rigidly fastened

- If inclined >45 degrees enclosed on all four sides
- Fitted with a gate or control mechanism to control the flow of material that may not freefall down the chute
- Discharged into a container or a barricaded area.

Demolition equipment may only be used on floors or slabs that are able to support it.

Asbestos related work shall be conducted to the requirements of the Asbestos regulations promulgated under the OHS Act and in particular Asbestos Regulation 21:

- Demolition of asbestos may only be carried out by a registered (with the Department of Labour) Asbestos Contractor;
- All asbestos materials likely to become airborne must be identified;
- A Plan of Work must be submitted for approval to an Approved Asbestos Inspection Authority (AAIA) (approved by the Department of Labour) 30 days prior to commencement of demolishing work unless the Plan was drawn up by an AAIA and a signed (by all parties) copy must be submitted to the Department of Labour 14 days before commencement of the demolishing.

DURING DEMOLITION WORK:

- All asbestos containing material shall be disposed of safely.
- Employees shall be issued with appropriate PPE and the proper use thereof enforced.
- After the demolition has been completed the area/premises shall be thoroughly checked to ensure that all asbestos waste has been removed.
- No person is allowed to:
  - Use compressed air or permit the use of compressed air to remove asbestos dust from any surface or person
  - Smoke, eat, drink or keep food or beverages in an area not specifically designated for this
  - Apply asbestos by spraying.
- Lead related work shall be conducted to the requirements of the Lead regulations promulgated under the OHS Act.
- Where demolition work will involve the use of explosives a method statement must be developed by a competent person in accordance with applicable explosives legislation.

40. TUNNELLING (CONSTRUCTION REGULATION 13)

Definition of Tunnelling: “the construction of any tunnel beneath the natural surface of the earth for the purpose other than the searching for or winning of a mineral.

To be performed in accordance with the Tunnelling Regulations as published under the Mines Health & Safety Act (29 of 1996).

No person shall enter a tunnel that has a height dimension less than 800 mm.

41. ACCESS SCAFFOLDING (CONSTRUCTION REGULATION 14)

Access Scaffolding shall be erected, used and maintained safely in accordance with Construction Regulation 14 and SA Bureau of Standards Code of Practice, SANS 1085 entitled, “The Design, Erection, Use & Inspection of Access Scaffolding.

Detailed consideration shall be given to all scaffolding to ensure that it is properly planned to meet the working requirements, designed to carry the necessary loadings and maintained in a sound condition. It shall also be ensured that there is sufficient material available to erect the scaffolding properly.

Scaffolding may only be erected, altered or dismantled by a person who has adequate training and experience in this type of work or under the supervision of such a person.

42. SUSPENDED PLATFORMS & BOATSWAINS CHAIRS

(CONSTRUCTION REGULATION 15 & 16)

The Principal Contractor / Contractor shall design, erect, use and maintain suspended platforms in accordance with the requirements of Construction Regulation 15.

Boatswains' chairs are to be erected, used, maintained and inspected in accordance with the requirements of Construction Regulation 16.

43. BATCH PLANTS (CONSTRUCTION REGULATION 18)

The Principal Contractor / Contractor shall erect, operate and maintain Batch Plants in accordance with the requirements of Construction Regulation 18.

44. EXPLOSIVE POWERED TOOLS (EPT) (CONSTRUCTION REGULATION 19)

Every explosive powered tools shall be:

- Provided with a guard around the muzzle to confine flying fragments or particles
- A firing mechanism that will prevent the EPT from firing unless it is pushed against the surface and at right angle (where the EPT is fitted with an intermediate piston between the charge and the nail this requirement is waived)
- The Contractor or user shall ensure that:
  - Only the correct type of cartridge is used
  - The EPT is cleaned inspected and cleaned daily before use by an appointed competent person who keeps register with the findings of his inspection and the details of cleaning, service and repairs
  - The safety devices are in good working order before the EPT is use
  - When the EPT is not being used it is stored in an unloaded condition together with the cartridges in a safe/secure place inaccessible to unauthorized persons
  - A warning notice is displayed at the point where the EPT is in use
  - The issue and return of cartridges must be by issue/returns register signed by both issuer and user and empty cartridge cases must be returned with unspent cartridges
  - Users/operators of the EPT have received the necessary training and has been authorized as competent to use/operate the EPT
  - Users/operators must wear the prescribed PPE whilst using/operating the tool;

45. CRANES & LIFTING EQUIPMENT (CONSTRUCTION REGULATION 20)

Cranes and Lifting equipment shall be designed and constructed in accordance with generally accepted technical standards and operated, used, inspected and maintained in accordance with the requirements of Driven Machinery Regulation 8 of the OHS Act:

- to be clearly and conspicuously marked with the maximum mass load (MML) that it is designed to carry safely. When the MML varies with the conditions of use, the a table should be used by the driver/operator;
- each winch on a lifting machine must at all times have, at least, three full turns of rope on the drum when the winch has been run to its lowest limit;
- fitted with a brake or other device capable of holding the MML. This brake or device to automatically prevent the downward movement of the load when the lifting power is interrupted;
- fitted with a load limiting device that automatically arrest the lift when:
  - the load reaches its highest safe position or
  - when the mass of the load is greater than the MML.
- every chain or rope on a lifting machine that forms an integral part of the machine must have;
- a factor of safety as prescribed by the manufacturer of the machine and where no standard is available the factor of safety must be:
  - chains – 4 (four)

- steel wire ropes - 5 (five)
- fibre ropes- 10 (ten).

- every hook or load attaching device shall be designed as such or fitted with a device that will prevent the load from slipping off or disconnecting
- every lifting machine shall be inspected and load tested by a competent person every time it has been dismantled and re-erected and every 12 months after that. The load test shall be in accordance with the manufacturers prescription or to 110% of the MML in addition all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices forming an integral part of a lifting machine must be inspected every 6 months by a competent person;
- all maintenance, repairs, alterations and inspection results shall be recorded in a log book and each lifting machine must have its own log book
- no person may be lifted by a lifting machine not designed for lifting persons unless in a cradle approved by an inspector of the Department of Labour
- every jib crane with an MML of 5 000 kg or more at minimum jib radius shall be provided with a load indicator or a load lifting limiting device.

46. LIFTING TACKLE

- to be manufactured of sound material, well-constructed and free from patent defects;
- to be clearly and conspicuously marked with ID number and MML;
- factor of safety:
  - Natural fibre ropes - 10(ten)
  - Man-made fibre ropes & woven webbing - 06(six)
  - Steel wire ropes – single rope - 06(six)
  - Steel wire ropes – combination slings - 08(eight)
  - Mild Steel chains - 05(five)
  - High tensile/alloy steel chains - 04(four)
- steel wire ropes shall be discarded (not used any further for lifting purposes) when excessive wear and corrosion is evident and must be examined by a competent person every three months for this purpose and the results recorded.

47. OPERATOR

- Every lifting machine operator shall be trained specifically for the type of lifting machine that he/she is operating
- Operators of Jib cranes with a MML of 5 00 kg or more shall be in possession of a certificate of training issued by an accredited (by The Department of Labour) training provider.

48. CRANES (CONSTRUCTION REGULATION 20)

Where tower cranes (TC) are used:

- account must be taken of the effects of wind force on the structure
- account must be taken of the bearing capacity of the ground on which TC is to be erected
- the bases for the TC and tracks for rail mounted TC's must be firm and level
- shall be erected at a safe distance from excavations
- clear space must be provided and maintained for erection, operation, maintenance and dismantling
- TC operators must be competent to carry out the work safely
- TC operators must be in possession of a valid medical certificate testifying that the holder is physically and psychologically fit to work on a TC.

A competent person shall plan all lifting operations where the lift will exceed 2000 kg and the plan submitted to Amatole District Municipality for approval and permission to carry out the lift.

49. CONSTRUCTION VEHICLES & MOBILE PLANT (CONSTRUCTION REGULATION 21)

Construction Vehicles and Mobile Plant shall be inspected by a competent prior to being allowed on a project site and suppliers of hired vehicles, plant and equipment will be required to comply with this specification as well as the OHS Act and Regulations.

Construction Vehicles and Mobile Plant (CV&MP) to be:

- of acceptable design and construction
- maintained in good working order
- used in accordance with their design and intention for which they were designed
- operated/driven by trained, competent and authorized operators/drivers;
- no unauthorized persons to be allowed to drive CV&MP
- operators and drivers of CV&MP must be in possession of a valid medical certificate declaring the operator/drive physically and psychologically fit to operate or drive CV&MP
- provided with safe and suitable means of access
- fitted with adequate signaling devices to make movement safe including reversing
- excavations and other openings must be provided with sufficient barriers to prevent CV&MP from falling into same
- provided with roll-over protection
- inspected daily before start-up by the driver/operator/user and the findings recorded in a register/log book
- CV&MP to be fitted with two head and two tail lights whilst operating under poor visibility conditions
- no loose tools, material etc. is allowed in the driver/operators compartment/cabin nor in the compartment in which any other persons are transported
- CV&MP used for transporting persons must have seats firmly secured and sufficient for the number of persons being transported.

No person may ride on a CV&MP except for in a safe place provided for the purpose. The construction site shall be organized to facilitate the movement of CV&MP so that pedestrians and other vehicles are not endangered. Traffic routes are to be suitable, sufficient in number and adequately demarcated. CV&MP left unattended after hours adjacent to roads and areas where there is traffic movement must be fitted with lights reflectors or barricades to prevent moving traffic coming into contact with the parked CV&MP.

In addition, CV&MP left unattended after hours shall be parked with all buckets, booms etc. fully lowered, the emergency brakes engaged and, where necessary, the wheels locked, the transmission in neutral, the motor switched off and the ignition key removed and stored safely.

Workers employed adjacent to or on public roads shall wear reflective safety vests.

All CV&MP inspection records shall be kept in the OH&S File.

50. ELECTRICAL INSTALLATIONS (CONSTRUCTION REGULATION 22)

The installation of temporary electricity for Construction shall be in accordance with the Construction Regulation 22 and the Electrical Installation Regulations.

The Contractor must ensure that:

- existing services are located and marked before construction commences and during the progress thereof
- where the abovementioned is not possible, workers with jackhammers etc. are protected against electric shock by the use of suitable protective equipment e.g. rubber mats, insulated handles etc.
- electrical installations and -machinery are sufficiently robust to withstand working conditions on site
- temporary electrical installations shall be inspected at least once per week by a competent person and a record of the inspections kept on the OH&S File

- electrical machinery used on a construction site shall be inspected daily before start-up by the competent driver/operator or any other competent person and a record of the inspections kept on the OH&S File
- A competent person appointed in writing shall control all temporary electrical installations.

51. ELECTRICAL & MECHANICAL LOCK-OUT

An electrical and mechanical lock-out procedure shall be developed and implemented. This lock-out procedure is to be adhered to by all Contractors on site.

52. USE & STORAGE OF FLAMMABLES (CONSTRUCTION REGULATION 23)

The Principal Contractor / Contractor to ensure that:

- No person is required or permitted to work in a place where there is the danger of fire or an explosion due to flammable vapors being present unless adequate precautions are taken;
- No flammable is used or applied e.g. in spay painting, unless in a room or cabinet or other enclosure specially designed and constructed for the purpose unless there is no danger of fire or explosion due to the application of adequate ventilation;
- The workplace is effectively ventilated. Where this cannot be achieved:
  - Employees must wear suitable respiratory equipment
  - No smoking or other sources of ignition is allowed in the area
  - The area is conspicuously demarcated as “flammable”
- Flammables stored on a construction site are stored in a well-ventilated, reasonably fire-resistant container, cage or room that is kept locked with access control measures in place and sufficient firefighting equipment installed and fire prevention methods practiced e.g. proper housekeeping;
- Flammables stored in a permanent flammables store are stored so that no fire or explosion is caused i.e.:
  - stored in a locked well-ventilated reasonably fire resistant container, cage or room conspicuously demarcated as “Flammable Store – No Smoking or Naked Lights”
  - the flammables store to be constructed of two-hour fire retardant walls and roof and separated from adjoining rooms or workplaces by means of a two-hour fire retardant fire wall
  - Adequate and suitable fire fighting equipment installed around the flammables store and marked with the prescribed signs
  - All electrical switches and fittings to be of a flameproof design
  - Any work done with tools in a flammables store or work areas to be of a non-sparking nature
  - No Class A combustibles such as paper, cardboard, wood, plastic, straw etc. to be stored together with Flammables
  - The flammable store to be designed and constructed to, in the event of spillage of liquids in the store, to contain the full quantity + 10% of the liquids stored
  - A sign indicating the capacity of the store to be displayed on the door
- Only one day’s quantity of Flammables is to be kept in the workplace
- Containers (including empty containers) to be kept closed to prevent fumes/vapors from escaping and accumulating in low lying areas
- Metal containers to be bonded to earth whilst decanting to prevent build-up of static
- Welding and other flammable gases to be stored segregated as to type of gas and empty and full cylinders.

53. WORKING ON OR NEAR WATER (CONSTRUCTION REGULATION 24)

The Principal Contractor / Contractor shall ensure that, where construction work is being carried out over or in close proximity to water:

- Measures are in place to prevent workers from falling into the water and drowning. These measure to include the availability of lifejackets
- Measures are in place to rescue any worker/ that has fallen into the water

- Measures for the timeous warning of flooding are in place.

54. HOUSEKEEPING (CONSTRUCTION REGULATION 25)

The Principal Contractor / Contractor to ensure that:

- Housekeeping is continuously implemented
- Materials & equipment are properly stored
- Scrap, waste & debris are removed regularly
- Materials placed for use are placed safely and not allowed to accumulate or cause obstruction to free flow of pedestrian and vehicular traffic
- Waste & debris not to be removed by throwing from heights but by chute or crane
- Where practicable, Construction sites are fenced off to prevent entry of unauthorized persons
- Catch platforms or nets are erected over entry and exit ways or over places where persons are working to prevent them being struck by falling objects
- An unimpeded work space is maintained for every employee
- Every workplace is kept clean, orderly and free of tools etc. that are not required for the work being done materials
- As far as is practicable, every floor, walkway, stair, passage and gangway is kept in good state of repair, skid-free and free of obstruction, waste and materials
- The walls and roof of every indoors workplace is sound and leak-free
- Openings in floors, hatchways, stairways and open sides of floors or buildings are barricaded, fenced, boarded over or provided with protection to prevent persons from falling.

55. STACKING & STORAGE (CONSTRUCTION REGULATION 27)

The Principal Contractor / Contractor shall ensure that:

- A competent person is appointed in writing to supervise all stacking and storage on a construction site
- Adequate storage areas are provided and demarcated
- The storage areas are kept neat and under control
- The base of any stack is level and capable of sustaining the weight exerted on it by the stack
- The items in the lower layers can support the weight exerted by the top layers
- Cartons and other containers that may become unstable due to wet conditions are kept dry
- Pallets and containers are in good condition and no material is allowed to spill out
- The height of any stack does not exceed 3X the base unless stepped back at least half the depth of a single container at least every fifth tier or
- The approval of an inspector has been obtained to build the stacks higher with the aid of a machine. (The operator of the machine must be protected against items falling from overhead off the stack and no items may overhang)
- The articles that make up a single tier are consistently of the same size, shape and mass
- Structures for supporting stacks are structurally sound and able to support the mass of the stack
- No articles are removed from the bottom of the stack first but from the top tier first
- Anybody climbing onto a stack can and does do it safely and that the stack is sufficiently stable to support him/her
- Stacks that are in danger of collapsing are broken down and restacked
- Stability of stacks are not threatened by vehicles or other moving plant and machinery
- Stepped back at least half the depth of a single container at least every fifth tier
- Persons climbing onto stacks do not approach unguarded moving machinery or electrical installations.

56. STORAGE OF FLAMMABLES AND HAZARDOUS CHEMICALS (HAZARDOUS CHEMICAL SUBSTANCES REGULATIONS)

See 55 above and 58 below.

57. PORTABLE ELECTRICAL TOOLS & EQUIPMENT

(ELECTRICAL MACHINERY REGULATION 9)

Portable electrical tools and equipment includes every unit that takes electrical power from a 15 amp. plug point and is moved around for use in the workplace i.e. drills, saws, grindstones, portable lights, etc. In addition electrical appliances such as fridges, hotplates, heaters, etc. shall be inspected and maintained to the same standards as portable electrical tools and appliances.

The use, inspection and maintenance of portable electrical tools and equipment must be governed by the following:

- Regular inspections by a competent person appointed in writing
- Inspection results must be recorded in a register
- Only competent authorized persons are allowed to use portable electrical tools and equipment
- The correct protective equipment is worn/used whilst operating portable electrical tools and equipment.

PORTABLE ELECTRICAL TOOLS

Shall be maintained in good condition at all times to prevent an electrical shock to the user. The main source shall incorporate an earth leakage protection device or receive power through a double wound transformer or be double insulated and clearly marked as such. All equipment shall be fitted with a switch to allow for safe & easy starting and stopping.

PORTABLE LIGHTS

- Shall be fitted with a robust non-hygroscopic non-conducting handle
- Live metal parts/parts which may become live must be protected against contact
- The lamp must be protected by a strong guard
- The cable lead-in must withstand rough handling
- It is suggested that a register be kept for each piece of equipment and findings of regular inspections must be entered
- Inspections must concentrate on plug, cord, switch and any obvious faults
- When used in wet/damp/metal container conditions, it must be protected as for portable electrical tools, above.

58. HAZARDOUS CHEMICAL SUBSTANCES

The Principal Contractor / Contractor shall ensure that:

- Employees receive the necessary information & training to be able to use and store HCS safely
- Employees obey lawful instructions regarding:
  - the wearing and use of protective equipment
  - the use and storage of HCS
  - the prevention of the release of HCS
  - the wearing of exposure monitoring and measuring equipment
  - the cleaning up and disposal of materials containing HCS
  - housekeeping, personal hygiene and the protection of the environment
  - the Risk Assessments required in terms of Construction Regulation 7 include employee exposure to HCS and that the necessary steps to protect persons from being detrimentally affected by HCS present or used in the workplace, are taken
  - suppliers provide the necessary information in the form of a Material Safety Data Sheet (MSDS) regarding an HCS required to ensure the safe use and storage of that HCS
  - an up-to-date list is kept on site of HCS's stored and used together with the MSDS's of the said HCS's
  - HCS containers are clearly marked as to the contents and main hazardous category "Flammable" or "Corrosive" and the reference number of the HCS on the list indicated above
  - HCS e.g. Asbestos dust is not cleared by the use of compressed air but is vacuumed
  - No person eats or drinks in a HCS workplace
  - HCS waste is disposed of safely in terms of hazardous waste disposal requirements.

PART C – BASELINE RISK ASSESSMENT

NOTES to TENDERERS:							
1 -This covers 6 AREAS of Risk; each AREA has one or more OBJECTIVES to be scored.							
2 -There are a total of 12 OBJECTIVES so there will be 12 points to add-up to give an overall score.							
3 -Each OBJECTIVE identifies a target objective criterion to be met. MEETING or EXCEEDING this criterion is classified as a LOW RISK. Not quite meeting it is a MEDIUM RISK. Falling far short is a HIGH RISK.							
4 -The scoring of points is done by identifying which of the Scoring Objective statements matches the information given in the submitted tender documents and then applying the score attached to the particular statement.							
5 -The overall score will fall into one of 3 risk ranges (given at the bottom of the spreadsheet) and the overall risk assessment is based on which range the scored Tenderer falls into.							
DETAILS OF RISK ASSESSMENT		RISK ASSESSMENT CRITERIA (ONE score per Objective)					
ASSESSED RISK	**OBJECTIVE**	**'LOW RISK' ASSESSMENT**		**'MEDIUM RISK' ASSESSMENT**		**'HIGH RISK' ASSESSMENT**	
		Scoring Objective	Points	Scoring Objective	Points	Scoring Objective	Points
1. Tenderering Company's Experience: Assessment based on information supplied of successfully completed projects over the last 5 years of similar or relevant scope and value) 2 Objectives to be scored: MAX SCORE: 15 MIN SCORE: 0	1. Two or more previous projects match or exceed scope and value of this contract	More than 2 projects: 2 projects only:	10 6	1 project only:	4	0 Projects:	0
	2. Two or more previous projects match or exceed scope but value up to 25% less than this contract	More than 2 projects: 2 projects only:	5 3	1 project only:	1	0 Projects:	0

2. Key Staff Qualifications and Experience: Assessed risk of failure due to key staff not having sufficient relevant skills, qualifications, training and previous experience (based on information given in CVs) 4 Objectives to be scored: MAX SCORE: 25 MIN SCORE: 0	Site Agent (Construction Manager on Site)						
	1. Has been Site Agent for 2 or more previous projects that match or exceed scope and value of this contract	More than 2 projects: 2 projects only:	4 2	1 project only:	1	0 Projects:	0
	2. Has at least 5 years relevant Site Agent experience	More than 15 years: 8 to 14 years:	8 5	6 or 7 years: 5 years	4 2	Less than 5:	0
	Main Foreman (Construction Supervisor)						
	3.Has supervised 2 or more previous projects that match or exceed scope and value of this contract	More than 2 projects: 2 projects only:	5 2	1 project only:	1	0 Projects:	0
	4. Has at least 5 years relevant Supervisor experience	More than 10 years: 5 to 10 years:	8 5	Only 4 years: Only 3 years:	4 2	Only 2 years: Only 1 or no years:	1 0
3. Tendering Company's Past Performance: Assessment based on Referee's comments on how well Tenderer performed on recent (last 5 years) previous relevant (similar scope and value) contracts in terms of each of the following: skills and capacity, rate of progress, time for	1. Two or more positive Testimonials from relevant Referees on relevant previous Contracts	3 pos testimonials: 2 pos testimonials:	10 5	1 pos PLUS 1 or more marginal: 1 pos testimonial:	4 3	1 or more marginal testimonials: No positive testimonials:	1 0

completion, quality of workmanship, adequacy of plant & equipment, ability to finance the work, contract administration/paperwork. 1 Objective to be scored: MAX SCORE: 10 MIN SCORE: 0							
4. Tenderer's understanding of Scope of Works and ability to plan construction: Assessed risk of failure due to Tenderer not demonstrating sufficient understanding of the Scope of Works and how to plan and execute this contract (assessment based on submitted preliminary programme) 1 Objective to be scored: MAX SCORE: 10 MIN SCORE: 0	1. Tender's Preliminary Programme is considered realistic and adequately shows the main components, critical path activities and compliance with Time for Completion	Programme meets or exceeds objective	10	Programme demonstrates some realistic planning	2	No Programme or programme shows unrealistic or no planning or no understanding	0
5. Tendered Price: Assessed risk of financial failure due to tendered price being unrealistically low or commercial risk if price too high (based on price in relation to other responsive tenders received	1. Price within +/- 10% of Average of Prices received (average excluding outlier prices calculated as below Q1-1.5x(Q3-Q1)) {where Q1 etc = Quartile 1 etc} and above Q3+1.5x(Q3-Q1))	within 10%	10	more than 10%, but within 12,5%	5	More than 12,5% but within 15% More than 15%	1 0

and budget) 2 Objectives to be scored: MAX SCORE: 20 MIN SCORE: 0	2. Price within +/- 10% of budget	within 10%	10	more than 10%, but within 12,5%	5	More than 12,5% but within 15% More than 15%	1 0	
6. Time for Completion: Assessed risk of failure due to inexperience and/or financial difficulty based on Time for Completion being unrealistically short or long (based on Engineer's estimate and Time for Completion in relation to other responsive tenders). Unrealistically short or long Time for Completion indicates Tenderer's inexperience and/or understanding of Scope of Work. 2 Objectives to be scored: MAX SCORE: 20 MIN SCORE: 0	1. Time for Completion not a low outlier with respect to the other Tenderers (Time for Completion longer than Q1-1.5x(Q3-Q1)) {where Q1 etc = Quartile 1 etc})	Time within Quartile 4 range (75 to 100%)	10	Time within Quartile 2 range (26% to 50%):	4	Time is a low outlier:	0	
		Time within Quartile 3 range (51 to 75%):	5	Time within Quartile 1 range (0 to 25%), but not low outlier	2			
	2. Time for Completion not lower than Engineer's estimated minimum satisfactory time for completion	More than 2 months longer than Eng's est: 1 month longer or matches Eng's estimate:	10 8	1 month lower	2	2 months lower more than 2 months lower	1 0	
OVERALL RISK ASSESSMENT SCORE:		LOW RISK RANGE:	100 71	MEDIUM RISK RANGE:	70 30	HIGH RISK RANGE:	29 0	

Risk Rating							
Probability of Occurrence	Probability Rating		Consequence				
			1	2	3	4	5
			Not Significant	Minor	Moderate	Major	Severe
	1	Rare	1	2	3	4	5
	2	Unlikely	2	4	6	8	10
	3	Moderate	3	6	9	12	15
	4	Likely	4	8	12	16	20
	5	Very Likely	5	10	15	20	25

KEY:

Low
Medium
High

EMPr ENVIRONMENTAL MANAGEMENT PROGRAMME

ANNEX 3.7.3 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

PROJECT ENVIRONMENTAL SPECIFICATIONS

PES1 ENVIRONMENTAL CONTROL OFFICER (ECO)

An Environmental Control Officer (ECO) will be appointed to ensure and monitor the implementation of the Environmental Management Plan (EMP). The ECO will have the following responsibilities:

PSA1 To advise the Engineer on the interpretation and enforcement of the Environmental Specifications.
PSA2 To supply environmental information.
PSA3 To undertake inspections as required and submit reports on the Contractor's compliance with the Environmental Specifications; these reports shall be copied to the Project Manager and Project Engineer.
PSA4 To demarcate particular sensitive areas and pass instructions through the Engineer concerning works in these areas.

PES2 CONTRACTOR

The Contractor has the responsibility to:

- Be familiar with the Environmental Specifications contained in this document.
- Comply with the Environmental Specifications contained in this document.
- Notify the ECO and Engineer immediately in the event of any accidental infringements of the Environmental Specifications to enable appropriate remedial action to be taken.
- Notify the ECO and Engineer, at least 10 working days in advance, of any activity he has reason to believe may have significant negative impacts, so that mitigatory measures may be implemented timeously.
- Ensure environmental awareness among his employees and sub-contractors so that they are fully aware of, and understand the Environmental Specifications and the need for them.
- Undertake progressive rehabilitation of all areas affected by construction activities to restore them to their original states, as determined by the Engineer.
- Undertake the required works within the designated working areas.

PES3 ENGINEER

The Engineer is required to:

- Be familiar with the contents of the EMP.
- Monitor the Contractor's compliance with the Environmental Specifications on a daily basis and enforce compliance.
- Communicate to the Contractor the advice of the ECO and the contents of the ECO reports and issue site instructions giving effect to the ECO requirements where applicable.
- Communicate to the ECO any proposed actions, which may have negative impacts on the environment, at least 10 working days in advance.
- Designate all working areas.
- Communicate to the ECO any infringements of the Environmental Specifications and accompany the ECO during site inspections.
- Discuss with the ECO and Project Manager the application of any penalties and other possible enforcement measures when necessary.
- Maintain a record of complaints from the public and communicate these to the Project Manager.
- Facilitate communication between all role-players in the interest of effective Environmental Management.
- Monitor the compliance of the Contractor through the ECO reports.
- Allow for environmental protection works within the project budget.
- Determine the imposition of penalties for the infringement of the Environmental Specifications.

PES4 WORKING AREAS

Construction activities may be conducted only in designated working areas. Limitation of construction activities to specific working areas minimises the impact on the natural environment and facilitates control of the works. Sites should be divided into working areas and "no-go" areas:

Working areas are those areas required by the Contractor to construct the works and as approved by the Engineer. These areas include the area of permanent works, borrow areas and haul roads between site and borrow areas. If necessary, the working areas may be demarcated during the construction period. The Contractor will not be permitted beyond the designated working areas.

"No-go" areas are those areas outside of working areas.

PES 5 PROTECTION OF FLORA, FAUNA, NATURAL FEATURES AND ARCHAEOLOGICAL MATERIAL

Natural features, flora and fauna in the vicinity of the project works should be protected and damage or disturbance prevented or minimised, specifically:

1. No plant species may be removed or damaged unless agreed by the ECO.
2. All fauna (including domestic livestock) within and surrounding the site shall be protected; they shall not be caught or killed.
3. Natural features should not be defaced or painted or otherwise tampered with, even for survey purposes, unless agreed by the ECO. Any features defaced by the Contractor shall be reinstated by the Contractor to the satisfaction of the Engineer.
4. In the event of unearthing any artefacts, which may be of significant archaeological or historical value, excavations are to cease until approval for excavating is given by the Engineer and ECO. Should any graves be unearthed, excavations are to cease immediately, and the Engineer and ECO notified.
5. No "working areas" are to be defined within 10 meters of any gravesites.

PES6 CONSERVATION AND STOCKPILING OF TOPSOIL

1. All areas to be excavated;
   Areas to be occupied by roads, Topsoil shall be excavated from the following areas no longer than five days before the start of construction:
2. Including temporary roads;
3. Areas for the storage of fuels;
4. Areas to be used for batching / mixing of concrete;
5. Areas for stockpiling of construction materials.

Topsoil shall be excavated to the base of the A-Horizon or approximately 150mm, whichever is deeper, and stockpiled in the area designated by the Engineer. Topsoil should be stored in piles □ 1 m in height. This soil is valuable for its humus and seed content and shall be used for rehabilitation purposes. Grass should not be removed prior to stripping of the topsoil. Topsoil should not be mixed with any other material (construction rubble, subsoil's etc) and erosion of the topsoil stockpiles should be prevented.

PES7 REHABILITATION

Once the pipeline is laid in the trench and has been covered with soil and once there is no more vehicular movement over that portion of pipeline corridor, rehabilitation can take place. The Contractor should not wait until the end of the project to begin rehabilitation, but should instead begin rehabilitation in a piecemeal manner (i.e. by the time the pipeline has been fully instated the Contractor will be able to see the results of the rehabilitation programme).

Rehabilitation must include:

1. Shallow ripping of the top layer of soil covering the pipeline corridor;
2. Dressing of the recently ripped surface with the previously stockpiled topsoil; and
3. Seeding the areas with appropriate grass species, which will stabilise the topsoil (approx. 75% cover required).

PES8 GENERAL EROSION CONTROL

No erosion will be tolerated on the site. The Contractor should take all reasonable measures to prevent soil erosion resulting from exposed soil surfaces, a diversion, restriction or increase in the flow of stormwater or river flow caused by the presence of temporary / permanent works, operations and activities. Erosion prevention

Areas affected by construction related activities must be monitored regularly for evidence of erosion. Areas particularly susceptible to erosion are: areas stripped of topsoil, soil stockpiles and steep slopes (gradients > 6 %). In this regard, the contractor is advised to take special precautions when working in the vicinity of the gullies which the pipeline crosses. Where evidence of erosion appears, the construction of contour berms, cut-off drains or planting of grass sods may be necessary.

Where soil erosion does occur the Contractor shall reinstate such areas and areas damaged by the erosion, at his own cost and to the satisfaction of the Engineer and ECO.

PES9 REINSTATEMENT OF TRENCHES AND IMPACTED AREAS

The topsoil shall be replaced on top after backfilling and only lightly compacted e.g. by trampling under foot. Where grass seeding is required it must be carried out within 2 days of topsoil replacement and before lightly compacting the soil.

Care shall be taken to ensure that the surface is finished in a manner, which does not result in the channelling of water or the concentration of flows. Where slope gradients exceed 15% in long-section, anti-erosion berms shall be made which are angled at ±10° across the contours such that they lead water off the disturbed corridor. These berms shall be 300mm high and shall be long enough to lead water off the entire disturbed surface. These berms shall be made immediately after backfilling and before topsoil replacement. Earth berms must be composted and grass seeded if berms are not covered with topsoil.

PES10 GULLY AND DONGA EROSION CONTROL

It is possible that existing erosion gullies or dongas in the landscape may be used for spoiling of rock 100-400 mm diameter in order to arrest erosion. Choice of such sites shall be at the discretion of the Engineer in consultation with the ECO. Spoiling shall be conducted in a manner specified by the Engineer. Only spoiling of rock will be allowed in erosion gullies, as soil will be washed out. Access to such spoil sites must not be permitted to lead to further erosion.

PES11 PREVENTION OF POLLUTION

Pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, waste water containing kitchen waste, detergents, solid waste and litter, etc. The Contractor should ensure that pollution of the ground or water does not occur as a result of any activities on site.

PES12 DUST CONTROL

Dust is regarded as a nuisance when it reduces visibility, soils private property and is aesthetically displeasing. Dust reduces the palatability of grazing grasses and may retard plant growth.

The Contractor shall be responsible for the control of dust arising from his operations and activities. Control measures could include regular spraying of working / bare areas with water, at an application rate that will not result in soil erosion.

PES13 NOISE CONTROL

The Contractor should take reasonable measures to limit noise levels during construction, taking into account the rural setting of the project. If necessary the Contractor should familiarise himself with the legislation pertinent to noise generation.

Vehicles should be fitted with standard silencers, where possible.

PES14 BLASTING

No blasting will be permitted unless the Contractor has satisfied the Project Manager that his proposed blasting methods and controls are such that no damage will be caused to any adjoining structure, pipeline, service or surrounding sensitive environmental areas. The Contractor is advised to take special precautions where local community houses are in close proximity to the site.

The Contractor is to inform the PSC of the days on which blasting is to occur. This notification is to be given at least 48 hours before blasting occurs.

Topsoil may not be used as cover material for blasting. Suitable cover material is to be confirmed with the Engineer.

PES15 TRAFFIC CONTROL

Increased traffic, especially heavy vehicle traffic, has the potential to draw complaints from nearby residents. The Contractor will be expected to address any complaints received.

The Contractor shall comply with all legislation including the applicable local by-laws with regard to road safety and transport. He shall instruct his drivers and plant operators that vehicles will be expected to comply with all road ordinances, such as speed limits, roadworthiness, load securing / covering.

PES16 FIRE PREVENTION AND CONTROL

The Contractor shall take all the necessary precautions to ensure that fires are not started as a consequence of his activities on site. The Contractor, sub-contractors and all employees are expected to be conscious of fire risks. The Contractor shall hold at least one fire prevention talk with staff to create an awareness of the risks of fire. Regular reminders to his staff on this issue are required.

No fires may be made other than for the purpose of cooking, and must be extinguished with water once they have served their purpose. Cooking fires should be contained in a fire drum, in an area approved by the Engineer.
The Contractor shall ensure that there is adequate fire-fighting equipment on site.

The Contractor shall be liable for any expenses incurred by any organisations called to assist with fighting fires and for costs involved in rehabilitation of burnt areas / property / persons, should the fire be the result of the Contractor's activities on site.

PES17 SOCIAL DISRUPTION

The Contractor's employees shall in no way be a nuisance to nearby residents. Any complaints received by the Engineer will be addressed and the relevant persons will be suspended from the project.

The Contractor shall give at least seven days notice to the residents in the vicinity of the construction activities of his intention to begin construction activities in their area. The Engineer may request a representative to be available to discuss issues raised by residents and make information available to them on construction activities.

The Contractor shall ensure that access to property is not unreasonably disrupted.

Where construction activities require the removal of fences from around private land, the occupants shall be warned at least 3 days in advance. These fences / boundary markers shall be reinstated as soon as construction is complete.

PES18 PROTECTION OF THE PUBLIC

The Contractor shall be responsible for the protection of the public, and public property, from any dangers associated with construction activities, and for the safe and easy passage of pedestrians and traffic in areas affected by project activities.

Any obstructions or excavations shall be suitably barricaded and/or demarcated with hazard tape.

PES19 VEHICLES AND ACCESS ROADS

Site vehicles should be permitted only within the demarcated construction sites or on existing roads, as would be required to complete their specific tasks. Vehicles are not permitted on re-vegetated areas and site traffic should be limited to prevent unnecessary damage to the natural environment.

PES20 STOCKPILING OF MATERIALS

The Engineer should approve all stockpiling sites. The stockpiles should be located in demarcated construction sites, or areas such as exhausted borrow pits / quarries. Material stockpiled should be done so in such a way as to minimise the spread of materials and the impact on the natural vegetation. The Contractor should ensure that no materials 'creep' into "no-go" areas.

Areas used for stockpiling should be reinstated upon completion of the project.

PES21 SITE CAMP

Where site camps are to be established the feasibility of removing topsoil from the site, before site establishment, should be investigated. Removed topsoil should then be stockpiled for use in rehabilitation of the site camp.

The site camp shall not be located in an environmentally sensitive area. The site shall be located > 20 m from a watercourse. Runoff from site must be prevented from entering any water bodies; all water requiring discharge should be discharged in a manner approved by the Engineer.

Site camps and surrounds are to be maintained in a clean, tidy and orderly condition at all times.

Tanks for fuels, oils etc should be stored in the site camp and shall be bunded with earth berms to sufficiently contain any possible spills. The earth beneath the tanks should be covered with crusher run (or the likes thereof) and this cover replaced periodically. The Contractor shall remove all oil-, petrol-, and diesel-soaked sand immediately and shall dispose of it as hazardous waste to a registered hazardous waste disposal site.

After completion of the works the Contractor shall restore the area used by him to its former condition, including removal of rubble and foundations. Any compacted ground shall be ripped to loosen soil, topsoil is to be spread evenly over the site and watered to encourage grass cover.

PES22 SANITATION

No staff is to use the river for personal washing, including cleaning of clothes. Toilet facilities, in the form of chemical toilets are to be provided at the site camp and within 200 m of any location where a significant number of workers will be working for an extended period of time.

Contractors shall instruct their staff and sub-contractors that they must use toilets provided and not the veld, bush or streams.

PES23 REFUSE / LITTER

The construction site is to be kept clean and litter free. The Contractor shall provide refuse bins at the work sites and shall be responsible for the disposal of all litter generated by all staff, at an approved landfill site. No burning of refuse is permitted.

PES24 DRINKING AND CONSTRUCTION WATER

Water for drinking and construction purposes should be obtained from local reticulation works, or an approved source. Unless approved by the local authority, water should not be extracted from nearby dams and rivers, and construction activities should not be conducted in or directly adjacent to rivers and dams.

PES25 CONCRETE BATCHING

Concrete batching / mixing plants should be located > 200 m from the nearest watercourse / wetland. The batching site must be bunded with earth berms or sandbags to prevent runoff escaping. Contaminated water should be allowed to soak away in a soak pit. In the event that water with a pH exceeding pH 9 reaches a stream, this would be in contravention of the National Water Act of 1998.

Waste concrete and cement sludge shall be scraped off the site and disposed of in an approved landfill site.

After closure of the batching plant or any area where concrete was mixed, all waste concrete/cement sludge shall be removed together with contaminated soil. The surface shall then be ripped to a depth of 150 mm and the topsoil replaced evenly over the site and watered. Where the site was originally grassed, reseeding may be required.

PES26 EXISTING SERVICES AND INFRASTRUCTURE

The Contractor shall ensure that existing services (road, rail, pipelines, powerlines and telephone services) are not disrupted or damaged, unless required by the contract and with the permission of the Engineer.

C3.5 ANNEXURES

C3.5.1. GEOTECHNICAL INFORMATION

******TO BE ISSUED ON REQUEST******

C5.3 SITE INFORMATION

The following is a brief description of work to be done *Completion of Construction of 3 X 1Ml Reservoirs at Emoyeni, Mamfengwini and Dalaguba*

No.	LM	TOWN	SCHEME NAME	ACTIVITY
1			COMPLETION OF CONSTRUCTION OF 3 X 1ML RESERVOIRS AT EMOYENI, MAMFENGWINI AND DALAGUBA	XXXXX

`C5.4 TENDER DRAWINGS

C.5.6 LIST OF DRAWINGS

DRAWING NO. DRAWING TITLE

DRAWINGS BOUND INTO THIS DOCUMENT

FIG 1	LOCALITY MAP
FIG 2	NAMEBOARDS

DRAWINGS ISSUED IN VOLUME 3 – BOOK OF DRAWINGS

MAMFENGWINI

001-01	RESERVOIR CURRENT STATUS
001-02	SITE LAYOUT
002	HEADWALL DETAILS
100	FLOOR LAYOUT
101	ROOF LAYOUT
102	SECTIONS
103	DETAILS
104	SUBSOIL & HEADWALL DETAILS
105	CHAMBER LADDER & MANHOLE DETAILS
106	BASES, WALL & COLUMNS REINFORCEMENT
107	GROUND FLOOR REINFORCEMENT
108	OUTLET/SCOUR & OVERFLOW CHAMBER REINFORCEMENT
109	ROOF SLAB BOTTOM REINFORCEMENT
110	ROOF SLAB TOP REINFORCEMENT
BS106	BENDING SCHEDULE
BS107	BENDING SCHEDULE
BS108-01	BENDING SCHEDULE
BS108-02	BENDING SCHEDULE
BS109-01	BENDING SCHEDULE
BS109-02	BENDING SCHEDULE
BS110	BENDING SCHEDULE
003-01	RESERVOIR CURRENT STATUS
003-02	SITE LAYOUT
004	HEADWALL DETAILS
200	FLOOR LAYOUT
201	ROOF LAYOUT
202	SECTIONS
203	DETAILS
204	SUBSOIL & HEADWALL DETAILS
205	CHAMBER LADDER & MANHOLE DETAILS
206	BASES, WALL & COLUMNS REINFORCEMENT
207	GROUND FLOOR REINFORCEMENT
208	OUTLET/SCOUR & OVERFLOW CHAMBER REINFORCEMENT

	ROOF SLAB BOTTOM
209	REINFORCEMENT
210	ROOF SLAB TOP REINFORCEMENT
BS206	BENDING SCHEDULE
BS207	BENDING SCHEDULE
BS208-01	BENDING SCHEDULE
BS208-02	BENDING SCHEDULE
BS209-01	BENDING SCHEDULE
BS209-02	BENDING SCHEDULE
BS210	BENDING SCHEDULE

DALAGUBA

005-01	RESERVOIR CURRENT STATUS
005-02	SITE LAYOUT
006	HEADWALL DETAILS
300	FLOOR LAYOUT
301	ROOF LAYOUT
302	SECTIONS
303	DETAILS
304	SUBSOIL & HEADWALL DETAILS
305	CHAMBER LADDER & MANHOLE DETAILS
306	BASES, WALL & COLUMNS REINFORCEMENT
307	GROUND FLOOR REINFORCEMENT
308	OUTLET/SCOUR & OVERFLOW CHAMBER REINFORCEMENT
309	ROOF SLAB BOTTOM REINFORCEMENT
310	ROOF SLAB TOP REINFORCEMENT
BS306	BENDING SCHEDULE
BS307	BENDING SCHEDULE
BS308-01	BENDING SCHEDULE
BS308-02	BENDING SCHEDULE
BS309-01	BENDING SCHEDULE
BS309-02	BENDING SCHEDULE
BS310	BENDING SCHEDULE

STANDARD DRAWINGS

007	FENCE DETAILS
008	WATER METER AND ISOLATION VALVE CHAMBER
009	STANDARD DRAWING - MISCELLANEOUS