



DEPARTMENT (Cluster)
Technical Services
DIRECTORATE (Unit)
Water and Sanitation
DIVISION
Water & Sanitation

PROCUREMENT DOCUMENT : INFRASTRUCTURE

Documents are to be obtained, free of charge, in electronic format, from the National Treasury's eTenders website or the eThekweni Municipality website

Contract No: 32547-5W

Contract Title: Mobeni 2 Reservoir: The reinstatement of the collapsed reservoir, upgrades to the existing reservoir complex, embankments and associated works: Ward 64

Est. CIDB Grade/ Class: 7 or Higher CE

CLARIFICATION MEETING AND QUERIES

Clarification Meeting: Compulsory Clarification Meeting

Meeting Location, Date, Time: Rm 301, 3rd Floor, Water & Sanitation H/Q, 3 Prior Road. To proceed to site thereafter (110 Alamein Avenue) on 15 October 2025 at 10h00

Queries can be addressed to: Name: Leisel Bowes
Tel: 031-311 8656

The Employer's Agent's Representative: eMail: Leisel.bowes@durban.gov.za. All email queries must be submitted by 23 October 2025 and consolidated questions and answers to be uploaded on the website on 30 October 2025.

TENDER SUBMISSION

Delivery location: The Tender Offer (hard copy) shall be delivered to:

The Tender Box in the foyer of the Municipal Building,
166 KE Masinga Road, Durban

Tenderers are to also make an **electronic submission** via the eThekweni Municipality **JDE System (SSS Module) (see Tender Data: C.2.13)**.

JDE Queries Lindo Dlamini: Tel: 031-322-7133 / 031-322-7153

Contact: Email: supplier.selfservice@durban.gov.za

Closing Date/ Time: Friday, 07 November 2025 at 11h00

Tender Offers submitted via any means other than that stated in the Tender Data will be deemed invalid

Issued by:

ETHEKWINI MUNICIPALITY

Director/Head: Water & Sanitation

Date of Issue: 03/10/2025

Document Version 01/07/2025

FOR OFFICIAL USE ONLY

Tenderer Name:			VAT Registered: Yes No
	Price (excl)	VAT	Price (incl)
Submitted: R	R	R	R
Corrected: R	R	R	R

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PART T1: TENDERING PROCEDURES

T1.1.1: TENDER NOTICE AND INVITATION TO TENDER

Tenders are hereby invited for the works to the reinstatement of the collapsed Mobeni 2 reservoir, reinforced embankments, improved stormwater drainage, inlet and outlet pipework and associated works: Ward 64.

Subject	Description	Tender Data
Employer	The Employer is the eThekweni Municipality as represented by: Deputy Director/Head: Water & Sanitation	C.1.1.1
Tender Documents	Documentation is to be downloaded from the National Treasury's eTenders website or the eThekweni Municipality Website : https://www.etenders.gov.za/ https://www.durban.gov.za/pages/business/procurement	C.1.2
CIDB Eligibility	It is <u>estimated</u> that Tenderers should have a CIDB contractor grading designation of 7 or Higher CE .	C.2.1.2
Clarification Meeting	Rm 301, 3rd Floor, Water & Sanitation H/Q, 3 Prior Road. To proceed to site thereafter (110 Alamein Avenue) on 15 October 2025 at 10h00	C.2.7
Seek Clarification	Queries relating to these documents are to be addressed to the Employer's Agent's Representative whose contact details are: Name: Leisel Bowes Tel: 031-311 8656 eMail: Leisel.bowes@durban.gov.za. All email queries must be submitted by 23 October 2025 and consolidated questions and answers to be uploaded on the website on 30 October 2025.	C.1.4
	The last day for the submission of queries relating to this tender shall be <i>[insert date 5 days before closure]</i> at 17h00.	C2.8
Submitting a Tender Offer	The Tender Offer (hard copy) shall be delivered to: The Tender Box in the foyer of the Municipal Building, 166 KE Masinga Road, Durban An electronic submission , via the eThekweni Municipality JDE System (SSS Module) , is also to be made. Refer to Part T1.1.2 and Tender Data: C.2.13. Notwithstanding the electronic submission , a tender offer will only be deemed valid if the "hard copy" submission has been made.	C.2.13
Closing Time	The Tender Offer (hard copy) shall be delivered, and the electronic submission completed, both on or before Friday, 07 November 2025 , at or before 11h00 .	C.2.15
Evaluation of Tender Offers	The 90/10 Price Preference Point System , as specified in the SCM Policy: Section 52: Preferential Procurement will be applied in the evaluation of tenders. Tender Data: C.3.11: Evaluation of Tender Offers details the awarding of Preference Points, and other related evaluation requirements.	C.3.11

Requirements for sealing, addressing, delivery, opening, and assessment of tenders are stated in the Tender Data

Applicable CIDB B.U.I.L.D. Programme Standards	
CIDB Standard for Indirect Targeting for Enterprise Development through Construction Works Contracts	Yes
CIDB Standard for Developing Skills through Infrastructure Contracts	No

T1.1.2: INFORMATION REGARDING THE ETHEKWINI JDE SYSTEM

This Part (T1.1.2) is for information purposes only. Compliance requirements are stated in **Part T1.2: Tender Data**.

1) General

eThekwini Municipality Bids, Tenders and Quotations (hereafter referred to as Tenders) are going to be submitted using the JDE System.

This JDE System will be used for:

- Viewing of available (open) Tenders,
- Downloading procurement documentation for Tenders,
- Uploading completed and signed Tender documentation,
- Completion and submission of Tenders electronically,
- Viewing the Tender opening schedule.

2) Registrations

To be granted access to the **JDE System** prospective service providers must be registered on the **National Treasury's Central Supplier Database (CSD)**, the **eThekwini Municipality Supplier Portal**, and the **eThekwini Municipality JDE System**.

National Treasury: Central Supplier Database

- Registration can be made on <https://secure.csd.gov.za> .
- Service Providers will be issued a "MAAA" number when registered.

eThekwini Municipality Supplier Portal

- Registration can be made on <https://www.durban.gov.za> by following these links:
>Business >Supply Chain Management (SCM) >Accredited Supplier & Contractor Database.

eThekwini Municipality JDE System

- Service providers requiring access must send an email to supplier.selfservice@durban.gov.za
The following information is required:
 - Copy of the **Director's ID**.
- On receipt of this email, the SCM Unit will respond with the login credentials and a link to the **JDE System**.

3) Assistance with using the JDE System

The following SCM Official(s) can be contacted in connection with any queries regarding the use of the **JDE System**:

- Lindo Dlamini Tel: 031 322 7153 or 031 322 7133
 Email: supplier.selfservice@durban.gov.za

4) Viewing of available tenders

By following link <https://rfq.durban.gov.za/jde/E1Menu.maf> prospective Service Providers will be able to view available (open) Tender opportunities without signing into the system. However, Service Providers will not be able to respond to a Tender without being signed into the system using a JDE User ID and Password.

5) Tender documentation

By accessing the **JDE System** (using <https://rfq.durban.gov.za/>) and viewing any available Tenders, prospective Service Providers will be able to download the relevant Tender documentation.

The Tender documentation consists of the **TENDER** and **CONTRACT Parts**, as described in the INDEX, and will include any drawings and other information (if applicable). Referred to or included in the documentation are the **Standard Conditions of Tender (and associated Tender Data)**, and the **Conditions of Contract (and associated Contract Data)** which will govern the tendering and contract processes respectively.

6) Submission of tender offers

Reference is to be made to the **Tender Data: C.2.13** that specifies compliance requirements.

Tender Offers are to be delivered, in “hard copy” format, to the Delivery Location as stated in the **Tender Data**.

In addition to the above, **Tender Offers are also to be SUBMITTED ELECTRONICALLY** (uploaded) on the eThekweni Municipality JDE System (Supplier Self Service (JDE-SSS) Module). Notwithstanding the **electronic submission**, a tender offer will only be deemed valid if the “hard copy” submission has been made.

Bidders are responsible for resolving all access rights and submission queries on the JDE System before the tender closing date/ time, as stated in the **Tender Data: C.2.15**.

7) Viewing the Tender opening schedule

Users on the **JDE System** will be able to view the **Tender Opening Schedule** for each closed Tender. The tender opening schedule will also be made available on the eThekweni Municipal website at URL: <https://www.durban.gov.za/pages/business/publication-of-received-bids>

T1.1.3: NOTES TO TENDERERS

These “**Notes to Tenderers**” are intended to provide guidance to Tenderers regarding tendering obligations and requirements. Compliance requirements are stated in the relevant parts of the **Tender Data: T1.2**.

eThekwini Supply Chain Management Policy (SCMP)

The requirements as stated in the Employer’s SCM Policy include, but are not limited to, the following:

1) Section 14(4): ETM Supplier Database

The eThekwini Supply Chain Management Policy requires suppliers/ service providers/ contractors to be registered on the eThekwini Municipality’s Supplier Database (Vendor Portal).

In the event of the Tenderer not being registered on the eThekwini Municipality’s Supplier Portal, the Tenderer must register on the internet at www.durban.gov.za by following these links:

- Business
- Supply Chain Management (SCM)
- Accredited Supplier and Contractor’s Database.

The following is to be noted:

- The information for registration as in the possession of the eThekwini Municipality will apply.
- It is the Tenderer’s responsibility to ensure that the details submitted to the Municipality are correct.
- Tenderers are to register prior to the submission of tenders.

2) Section 20(1)(d)(i): Audited Financial Statements

Audited Financial Statements (prepared for auditing) are required to be submitted if the value of the tender offer exceeds R10 million (incl. VAT). See **Returnable Form T2.2.4.: MBD 5** and **Returnable Form T2.2.5: Contracts awarded by Organs of State** in the past 5 years.

3) Section 20(1)(d)(iii): Contracts Awarded during the past 5 Years.

Tenderers are to include with their submission a listing of any contracts awarded to the Tenderer during the past 5 years, including particulars of any material non-compliance or dispute concerning the execution of the contracts. Tenderers are referred to **Returnable Form T2.2.5.: MBD 5**

4) Section 20(1)(d)(ii), Section 28(1)(c) and Section 29(10): Municipal Fees

Tenderers are to refer to **Returnable Form T2.2.10: Declaration of Municipal Fees** to certify that they have no undisputed commitments for municipal services towards any municipality. Prior to an award, a Tenderer’s municipal rates and taxes cannot be in arrears. Should a Tenderer be in arrears with respect to municipal services and has formalised an agreement with the respective municipality to offset the arrears, the agreement must be in place at time of tender closing.

5) Section 21.2: Tender Validity

Tenders are to remain valid for twelve (12) months after the expiry of the original tender validity period unless the Municipality is notified, in writing, of anything to the contrary.

6) Section 28(2)(d), Section 28(2)(h) and Section use 29(12): Certifications and Registrations

CIDB Registration and Status, B-BBEE Certificates, and Tax Compliance Status PINs must be valid at tender closing, and before final award.

The Tenderer's Tax Compliance Status, CIDB Registration and Status (if required), and B-BBEE Level Status (if required), will be verified using the National Treasury Central Supplier Database (CSD). Tenderers are referred to **Returnable Form T2.2.1.: Compulsory Enterprise Questionnaire**.

It is the Tenderer's responsibility to ensure that their data on the CSD is kept updated and correctly reflects the status of the tendering entity.

7) **Section 28(2)(e): Joint Ventures (JV)**

Each party of a JV must submit separate Tax Compliance Status PINs.

Also, and unless otherwise stated, the requirements for a single entity submission in terms of documentation requirements, will apply to each member of a JV making a submission.

As proof that a JV has been formalised, or that the parties to the JV agree to formalise the JV should they be successful in being recommended for the award of this tender, Tenderers are referred to **Returnable Form T2.2.14: Joint Venture Agreements**.

8) **Section 49.1.2: Complaints and Objections (Appeals)**

A non-refundable tariff, as per the approved Council tariffs, is payable by the Complainant to the Municipality. Proof of the payment of the Fee must be attached to the Complaint.

CIDB

Regulation 25(8)

- 9) It should be noted that this contract is not part of a **Targeted Development Programme (TDP)**. The CIDB provisions in relation to a Contractor's **Potentially Emerging (PE) status** do not apply. Tenderers are referred to **CIDB Inform Practice Note #32: "Application of the Potentially Emerging (PE) Status"**.

B.U.I.L.D. Programme

- 10) A programme to accelerate transformation in the construction industry, increase the capacity of the construction industry to deliver infrastructure and support the growth of emerging contractors, was launched on 14 March 2024 by the Deputy Minister of Public Works and Infrastructure and the Construction Industry Development Board.

Details of the B.U.I.L.D. Programme were published in a Government Gazette in 2020 (GG 43726) and B.U.I.L.D. has gradually been phased in at various levels of government and the private sector. The CIDB, a public entity with the mandate to promote improved performance in construction, oversees the programme and manages the B.U.I.L.D Fund.

The B.U.I.L.D programme determines that public sector entities which implement construction projects, that meet certain minimum requirements, must include developmental goals to the deliverables defined in the tenders. Contractors are required to include these goals in the plans and pricing when they submit their tender bids.

PART T1: TENDERING PROCEDURES

T1.2: TENDER DATA

T1.2.1 STANDARD CONDITIONS OF TENDER

The conditions of tender are the **Standard Conditions of Tender** as contained in **Annex C** of the CIDB Standard for Uniformity in Construction Procurement as published in Government Gazette No 42622, Board Notice 423 of 8 August 2019, as duplicated below.

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

Annex C

STANDARD CONDITIONS OF TENDER

C.1 General		<i>2) Conflicts of interest in respect of those engaged in the procurement process include direct, indirect or family interests in the tender or outcome of the procurement process and any personal bias, inclination, obligation, allegiance or loyalty which would in any way affect any decisions taken.</i>
C.1.1 Actions		
C.1.1.1	The employer and each tenderer submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in C.2 and C.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.	C.1.1.3 The employer shall not seek, and a tenderer shall not submit a tender, without having a firm intention and the capacity to proceed with the contract.
C.1.1.2	The employer and the tenderer and all their agents and employees involved in the tender process shall avoid conflicts of interest and where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Tenderers shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process at the start of any deliberations relating to the procurement process or as soon as they become aware of such conflict and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate.	C.1.2 Tender Documents The documents issued by the employer for the purpose of a tender offer are listed in the <i>Tender Data</i> . C.1.3 Interpretation C.1.3.1 The <i>Tender Data</i> and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these conditions of tender. C.1.3.2 These conditions of tender, the <i>Tender Data</i> and tender schedules which are required for tender evaluation purposes, shall form part of any contract arising from the invitation to tender.
<i>Note:</i> <i>1) A conflict of interest may arise due to a conflict of roles which might provide an incentive for improper acts in some circumstances. A conflict of interest can create an appearance of impropriety that can undermine confidence in the ability of that person to act properly in his or her position even if no improper acts result.</i>		

C.1.3.3 For the purposes of these conditions of tender, the following definitions apply: a) conflict of interest means any situation in which: i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfil his or her duties impartially; ii) an individual or tenderer is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or iii) incompatibility or contradictory interests exist between an employee and the tenderer who employs that employee. b) comparative offer means the price after the factors of a non-firm price and all unconditional discounts it can be utilised to have been taken into consideration; c) corrupt practice means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process; d) fraudulent practice means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels;	c) no acceptable tenders are received; d) there is a material irregularity in the tender process.
C.1.4 Communication and employer's agent Each communication between the employer and a tenderer shall be to or from the employer's agent only, and in a form that can be readily read, copied and recorded. 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 name and contact details of the employer's agent are stated in the Tender Data.	C.1.5.2 The decision to cancel a tender invitation must be published in the same manner in which the <i>original</i> tender invitation was advertised.
C.1.5 Cancellation and Re-Invitation of Tenders C.1.5.1 An employer may, prior to the award of the tender, cancel a tender if- a) due to changed circumstances, there is no longer a need for the engineering and construction works specified in the invitation; b) funds are no longer available to cover the total envisaged expenditure;	C.1.5.3 An employer may only with the prior approval of the relevant treasury cancel a tender invitation for the second time. C.1.6 Procurement procedures C.1.6.1 General Unless otherwise stated in the Tender Data, a contract will, subject to C.3.13, be concluded with the tenderer who in terms of C.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. C.1.6.2 Competitive negotiation procedure C.1.6.2.1 Where the Tender Data require that the competitive negotiation procedure is to be followed, tenderers shall submit tender offers in response to the proposed contract in the first round of submissions. Notwithstanding the requirements of C.3.4, the employer shall announce only the names of the tenderers who make a submission. The requirements of C.8 relating to the material deviations or qualifications which affect the competitive position of tenderers shall not apply. C.1.6.2.2 All responsive tenderers or at least a minimum of not less than three responsive tenderers that are highest ranked in terms of the evaluation criteria stated in the Tender Data shall be invited to enter into competitive negotiations based on the principle of equal treatment, keeping confidential the proposed solutions and associated information. Notwithstanding the provisions of C.2.17, the employer may request that tenders be clarified, specified and fine-tuned in order to improve a tenderer's competitive position provided that such clarification, specification, fine-tuning or additional information does not alter any fundamental aspects of the offers or impose substantial new requirements which restrict or distort competition or have a discriminatory effect.

C.1.6.2.3 At the conclusion of each round of negotiations, tenderers shall be invited by the employer to revise their tender offer based on the same evaluation criteria, with or without adjusted weightings. Tenderers shall be advised when they are to submit their best and final offer.

C.1.6.2.4 The contract shall be awarded in accordance with the provisions of C.3.11 and C.3.13 after tenderers have been requested to submit their best and final offer.

C.1.6.3 Proposal procedure using the two stage-system

C.1.6.3.1 Option 1

Tenderers shall in the first stage submit technical proposals and, if required, cost parameters around which a contract may be negotiated. The employer shall evaluate each responsive submission in terms of the method of evaluation stated in the **Tender Data**, and in the second stage negotiate a contract with the tenderer scoring the highest number of evaluation points and award the contract in terms of these conditions of tender.

C.1.6.3.2 Option 2

C.1.6.3.2.1 Tenderers shall submit in the first stage only technical proposals. The employer shall invite all responsive tenderers to submit tender offers in the second stage, following the issuing of procurement documents.

C.1.6.3.2.2 The employer shall evaluate tenders received during the second stage, in terms of the method of evaluation stated in the **Tender Data**, and award the contract in terms of these conditions of tender.

C.2 Tenderer's obligations

C.2.1 Eligibility

C.2.1.1 Submit a tender offer only if the tenderer satisfies the criteria stated in the **Tender Data** and the tenderer, or any of his principals, is not under any restriction to do business with employer.

C.2.1.2 Notify the employer of any proposed material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used by the employer as the basis in a prior process to invite the tenderer to

submit a tender offer and obtain the employer's written approval to do so prior to the closing time for tenders.

C.2.2 Cost of tendering

C.2.2.1 Accept that, unless otherwise stated in the **Tender Data**, the employer will not compensate the tenderer 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 complies with requirements.

C.2.2.2 The cost of the tender documents charged by the employer shall be limited to the actual cost incurred by the employer for printing the documents. Employers must attempt to make available the tender documents on its website so as not to incur any costs pertaining to the printing of the tender documents.

C.2.3 Check documents

Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.

C.2.4 Confidentiality and copyright of documents

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.

C.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.

C.2.6 Acknowledge addenda

Acknowledge receipt of addenda to the tender documents, which the employer may issue, and if necessary apply for an extension to the closing time stated in the **Tender Data**, in order to take the addenda into account.

C.2.7 Clarification meeting

Attend, where required, a clarification meeting at which tenderers may familiarize themselves with aspects of the proposed work, services or

	supply and raise questions. Details of the meeting(s) are stated in the <i>Tender Data</i> .
C.2.8 Seek clarification Request clarification of the tender documents, if necessary, by notifying the employer at least five (5) working days before the closing time stated in the <i>Tender Data</i> .	C.2.12.1 Unless otherwise stated in the <i>Tender Data</i> , submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted as well as a schedule that compares the requirements of the tender documents with the alternative requirements that are proposed.
C.2.9 Insurance Be aware that the extent of insurance to be provided by the employer (if any) might not be for the full cover required in terms of the conditions of contract identified in the <i>Contract Data</i> . The tenderer is advised to seek qualified advice regarding insurance.	C.2.12.2 Accept that an alternative tender offer must be based only on the criteria stated in the <i>Tender Data</i> or criteria otherwise acceptable to the employer. C.2.12.3 An alternative tender offer must only be considered if the main tender offer is the winning tender.
C.2.10 Pricing the tender offer	C.2.13 Submitting a tender offer
C.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 fourteen (14) days before the closing time stated in the <i>Tender Data</i> .	C.2.13.1 Submit one tender offer only, either as a single tendering entity or as a member in a joint venture to provide the whole of the works identified in the <i>Contract Data</i> and described in the scope of works, unless stated otherwise in the <i>Tender Data</i> . C.2.13.2 Return all returnable documents to the employer after completing them in their entirety, either electronically (if they were issued in electronic format) or by writing legibly in non-erasable ink.
C.2.10.2 Show VAT payable by the employer separately as an addition to the tendered total of the prices.	
C.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 <i>Contract Data</i> .	C.2.13.3 Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the <i>Tender Data</i> , with an English translation of any documentation in a language other than English, and the parts communicated electronically in the same format as they were issued by the employer.
C.2.10.4 State the rates and prices in Rand unless instructed otherwise in the <i>Tender Data</i> . The conditions of contract identified in the <i>Contract Data</i> may provide for part payment in other currencies.	C.2.13.4 Sign the original and all copies of the tender offer where required in terms of the <i>Tender Data</i> . The employer will hold all authorized signatories liable on behalf of the tenderer. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer.
C.2.11 Alterations to documents Do 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.	
C.2.12 Alternative tender offers	C.2.13.5 Seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY". Each package shall state on the outside the employer's address and identification details

	stated in the <i>Tender Data</i>, as well as the tenderer's name and contact address.
C.2.13.6 Where a two-envelope system is required in terms of the <i>Tender Data</i>, place and seal the returnable documents listed in the <i>Tender Data</i> in an envelope marked "financial proposal" and place the remaining returnable documents in an envelope marked "technical proposal". Each envelope shall state on the outside the employer's address and identification details stated in the <i>Tender Data</i>, as well as the tenderer's name and contact address.	C.2.16.1 Hold the tender offer(s) valid for acceptance by the employer at any time during the validity period stated in the <i>Tender Data</i> after the closing time stated in the <i>Tender Data</i>.
	C.2.16.2 If requested by the employer, consider extending the validity period stated in the <i>Tender Data</i> for an agreed additional period with or without any conditions attached to such extension.
	C.2.16.3 Accept that a tender submission that has been submitted to the employer may only be withdrawn or substituted by giving the employer's agent written notice before the closing time for tenders that a tender is to be withdrawn or substituted. If the validity period stated in C.2.16 lapses before the employer evaluating tender, the contractor reserves the right to review the price based on Consumer Price Index (CPI).
C.2.13.7 Seal the original tender offer and copy packages together in an outer package that states on the outside only the employer's address and identification details as stated in the <i>Tender Data</i>.	C.2.16.4 Where a tender submission is to be substituted, a tenderer must submit a substitute tender in accordance with the requirements of C.2.13 with the packages clearly marked as "SUBSTITUTE".
C.2.13.8 Accept that the employer will not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.	
C.2.13.9 Accept that tender offers submitted by facsimile or e-mail will be rejected by the employer, unless stated otherwise in the <i>Tender Data</i>.	
C.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 and in the form required, may be regarded by the employer as non-responsive.	C.2.17 Clarification of tender offer after submission 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.
C.2.15 Closing time	<i>Note: Sub-clause C.2.17 does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the Employer elect to do so.</i>
C.2.15.1 Ensure that the employer receives the tender offer at the address specified in the <i>Tender Data</i> not later than the closing time stated in the <i>Tender Data</i>. Accept that proof of posting shall not be accepted as proof of delivery.	C.2.18 Provide other material
C.2.15.2 Accept that, if the employer extends the closing time stated in the <i>Tender Data</i> for any reason, the requirements of these conditions of tender apply equally to the extended deadline.	C.2.18.1 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.
C.2.16 Tender offer validity	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.		
C.2.18.2	Dispose of samples of materials provided for evaluation by the employer, where required.		
C.2.19	Inspections, tests and analysis		
	Provide access during working hours to premises for inspections, tests and analysis as provided for in the Tender Data .		
C.2.20	Submit securities, bonds and policies		
	If requested, submit for the employer's acceptance before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the conditions of contract identified in the Contract Data .		
C.2.21	Check final draft		
	Check the final draft of the contract provided by the employer within the time available for the employer to issue the contract.		
C.2.22	Return of other tender documents		
	If so instructed by the employer, return all retained tender documents within twenty-eight (28) days after the expiry of the validity period stated in the Tender Data .		
C.2.23	Certificates		
	Include in the tender submission or provide the employer with any certificates as stated in the Tender Data .		
C.3	The employer's undertakings		
C.3.1	Respond to requests from the tenderer		
C.3.1.1	Unless otherwise stated in the Tender Data , respond to a request for clarification received up to five (5) working days before the tender closing time stated in the Tender Data and notify all tenderers who collected tender documents.		
C.3.1.2	Consider any request to make a material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used to prequalify a tenderer to submit a tender offer in terms of a previous procurement process and deny any such request if as a consequence:		
		a)	an individual firm, or a joint venture as a whole, or any individual member of the joint venture fails to meet any of the collective or individual qualifying requirements;
		b)	the new partners to a joint venture were not prequalified in the first instance, either as individual firms or as another joint venture; or
		c)	in the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.
C.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 three (3) working 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 collected tender documents.
C.3.3	Return late tender offers		
			Return tender offers received after the closing time stated in the Tender Data , unopened, (unless it is necessary to open a tender submission to obtain a forwarding address), to the tenderer concerned.
C.3.4	Opening of tender submissions		
C.3.4.1	Unless the two-envelope system is to be followed, 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.		
C.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, number of points claimed for its BBBEE status level and time for completion for the main tender offer only.		
C.3.4.3	Make available the record outlined in C.3.4.2 to all interested persons upon request.		

C.3.5 Two-envelope system C.3.5.1 Where stated in the Tender Data that a two-envelope system is to be followed, open only the technical proposal of valid tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the Tender Data and announce the name of each tenderer whose technical proposal is opened. C.3.5.2 Evaluate functionality of the technical proposals offered by tenderers, then advise tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who score in the functionality evaluation more than the minimum number of points for functionality stated in the Tender Data, and announce the score obtained for the technical proposals and the total price and any points claimed on BBBEE status level. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for functionality. C.3.6 Non-disclosure 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. C.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. C.3.8 Test for responsiveness C.3.8.1 Determine, after opening and before detailed evaluation, whether each tender offer properly received: a) complies with the requirements of these Conditions of Tender, b) has been properly and fully completed and signed, and c) is responsive to the other requirements of the tender documents.	C.3.8.2 A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the Employer's opinion, would: a) detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work, b) significantly change the Employer's or the tenderer's risks and responsibilities under the contract, or c) affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified. Reject a non-responsive tender offer and not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation. C.3.9 Arithmetical errors, omissions and discrepancies C.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. C.3.9.2 Check the highest ranked tender or tenderer with the highest number of tender evaluation points after the evaluation of tender offers in accordance with C.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 quantities or schedules of prices; or (ii) the summation of the prices. C.3.9.3 Notify the tenderer of all errors or omissions that are identified in the tender offer and either confirm the tender offer as tendered or accept the corrected total of prices. C.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 resulting from the product of the unit rate and the quantity, the line-item total

shall govern and the rate shall be 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.

C.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.

C.3.11 Evaluation of tender offers

The Standard Conditions of Tender standardize the procurement processes, methods and procedures from the time that tenders are invited to the time that a contract is awarded. They are generic in nature and are made project specific through choices that are made in developing the **Tender Data** associated with a specific project.

Conditions of tender are by definition the document that establishes a tenderer's obligations in submitting a tender and the employer's undertakings in soliciting and evaluating tender offers. Such conditions establish the rules from the time a tender is advertised to the time that a contract is awarded and require employers to conduct the process of offer and acceptance in terms of a set of standard procedures.

The CIDB Standard Conditions of Tender are based on a procurement system that satisfies the following system requirements:	
Requirement	Qualitative interpretation of goal
Fair	The process of offer and acceptance is conducted impartially without bias, providing simultaneous and timely access to participating parties to the same information.
Equitable	Terms and conditions for performing the work do not unfairly prejudice the interests of the parties.
Transparent	The only grounds for not awarding a contract to a tenderer who satisfies all requirements are restrictions from doing business with the employer, lack of capability or capacity, legal impediments and conflicts of interest.
Competitive	The system provides for appropriate levels of competition to ensure cost effective and best value outcomes.
Cost effective	The processes, procedures and methods are standardized with sufficient flexibility to attain best value outcomes in respect of quality, timing and price, and least resources to effectively manage and control procurement processes.

The activities associated with evaluating tender offers are as follows:

- Open and record tender offers received
- Determine whether or not tender offers are complete
- Determine whether or not tender offers are responsive
- Evaluate tender offers
- Determine if there are any grounds for disqualification
- Determine acceptability of preferred tenderer
- Prepare a tender evaluation report
- Confirm the recommendation contained in the tender evaluation report .

C.3.11.1 General

The employer must appoint an evaluation panel of not less than three persons conversant with the proposed scope of works to evaluate each responsive tender offer using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the <i>Tender Data</i>.	C.3.14 Prepare contract documents
C.3.12 Insurance provided by the employer If requested by the proposed successful tenderer, submit for the tenderer's information the policies and / or certificates of insurance which the conditions of contract identified in the <i>Contract Data</i>, require the employer to provide.	C.3.14.1 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 and c) other revisions agreed between the employer and the successful tenderer. C.3.14.2 Complete the schedule of deviations attached to the form of offer and acceptance, if any.
C.3.13 Acceptance of tender offer Accept the tender offer; if in the opinion of the employer, it does not present any 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, under Business Rescue as provided for in chapter 6 of the Companies Act No. 2008, bankrupt or being wound up, has his/her affairs administered by a court or a judicial officer, has suspended his/her 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 <i>Tender Data</i>; and f) is able, in the opinion of the employer, to perform the contract free of conflicts of interest.	C.3.15 Complete adjudicator's contract Unless alternative arrangements have been agreed or otherwise provided for in the contract, arrange for both parties to complete formalities for appointing the selected adjudicator at the same time as the main contract is signed. C.3.16 Registration of the award An employer must, within twenty-one (21) working days from the date on which a contractor's offer to perform a construction works contract is accepted in writing by the employer, register and publish the award on the cidb Register of Projects. C.3.17 Provide copies of the contracts Provide to the successful tenderer the number of copies stated in the <i>Tender Data</i> of the signed copy of the contract as soon as possible after completion and signing of the form of offer and acceptance. C.3.18 Provide written reasons for actions taken Provide upon request written reasons to tenderers for any action that is taken in applying these conditions of tender but withhold information which is not in the public interest to be divulged, which is considered to prejudice the legitimate commercial interests of tenderers or might prejudice fair competition between tenderers.

T1.2.2 TENDER DATA

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

C.1: GENERAL

C.1.1 The employer:

The Employer for this Contract is the **eThekwini Municipality** as represented by:
Deputy Head: **Water & Sanitation**

C.1.2 Tender documents:

The Tender Documents issued by the Employer comprise:

- 1) This procurement document.
- 2) The **Conditions of Contract** identified in Section C1.2.1.1. Tenderers/ Contractors are required to obtain their own copies.
- 3) The **Specifications** identified in Section C3.3.1. Tenderers/ Contractors are required to obtain their own copies.
- 4) **Drawings**, if applicable, issued separately from this document, or bound in Section C3.4 (as an Annexure).
- 5) In addition, Tenderers are advised, in their own interest, to obtain their own copies of the following acts, regulations, and standards referred to in this document as they are essential for the Tenderer to get acquainted with the basics of construction management, the implementation of preferential construction procurement policies, and the participation of targeted enterprise and labour.
 - The Employer's Supply Chain Management Policy (as at advertising date).
 - The Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the Construction Regulations (2014).
 - The Construction Industry Development Board Act No 38 of 2000 and the Regulations issued in terms of the Act (July 2013).
 - SANS 1921:2004 – Construction and Management Requirements for Works Contract, Parts 1-3.
 - CIDB Standard for Developing Skills Through Infrastructure Contracts, published in Gazette Notice No. 48491 of 28 April 2023.
 - CIDB Standard for Indirect Targeting for Enterprise Development through Construction Works Contracts, published in Gazette Notice No. 36190 of 25 February 2013.
 - Any other eThekwini Policy documents referenced in the Tender Documents.

Electronically downloaded documentation is obtainable from the National Treasury's **eTenders Website** or the **eThekwini Municipality Website** at URL:

- <https://www.etenders.gov.za/>
- <https://www.durban.gov.za/pages/business/procurement>

C.1.4 Communication and employer's agent:

The Employer's Agent is:

Naidu Consulting (Pty) Ltd

The Employer's Agent's Representative is:

Name: Leisel Bowes

Tel: 031-311 8656

eMail: Leisel.bowes@durban.gov.za. All

email queries must be submitted by 23

October 2025 and consolidated questions

and answers to be uploaded on the website
on 30 October 2025.

The Tenderer's contact details, as indicated on **Returnable Document T2.2.1: Compulsory Enterprise Questionnaire**, shall be deemed as the only valid contact details for the Tenderer for use in communications between the Employer's Agent and the Tenderer during tender evaluation.

C.1.6 Procurement procedures:

The following Sections of the **Standard Conditions of Tender** are not applicable to this tender:

- **C.1.6.2: Competitive negotiation procedure**, and
- **C.1.6.3: Proposal procedure using the two-stage system**.

C.2: TENDERER'S OBLIGATIONS

C.2.1 Eligibility:

Entities may only submit one (1) tender offer, either as a single tendering entity or as a partner of a joint venture. Should a tendering entity submit more than one (1) tender, all submissions by that tendering entity, including submissions where the entity is a partner of a joint venture, will be deemed not to be eligible.

- (a) the Tenderer does not comply with the legal requirements as stated in the Employer's current SCM Policy;
- (b) the Tenderer cannot provide proof that he is in good standing with respect to duties, taxes, levies and contributions required in terms of legislation applicable to the work in the contract;

C.2.1.1 Eligibility: General

A Tenderer will not be eligible to submit a tender if:

- (a) In the event of a Compulsory Clarification Meeting:
 - i) the Tenderer fails to attend the Compulsory Clarification Meeting, or
 - ii) the Tenderer fails to have **Returnable Document T2.2.2: Certificate of Attendance at Clarification Meeting / Site Inspection** signed by the Employer's Agent or their representative.
- (b) the Tenderer does not comply with the legal requirements as stated in the Employer's current SCM Policy;
- (c) the Tenderer cannot provide proof that he is in good standing with respect to duties, taxes, levies and contributions required in terms of legislation applicable to the work in the contract;
- (d) At the time of tender closing, the Tenderer is not registered on the **National Treasury Central Supplier Database (CSD)** and the **eThekweni Municipality Supplier Portal**. In the case of a Joint Venture, this requirement will apply individually to each party in the Joint Venture. Tenderers are to reference **Returnable Document T2.2.1: Compulsory Enterprise Questionnaire** (section 1.5) and **Returnable Document T2.2.12: "CSD Registration Report"**.
- (e) In the case of Joint Venture (JV) submissions, two or more JV entities have common directors/ shareholders or common entities tendering for the same works.
- (f) The following documentation is to be completed in full, signed, and returned with the tender submission. Failure to comply will result in the tender offer being deemed non-responsive:
 - T2.2.1: Compulsory Enterprise Questionnaire.
 - T2.2.5: MBD 4: Declaration of Interest.

- T2.2.6: MBD 5: Declaration for Procurement Above R10 Million (if applicable).
- T2.2.7: MBD 6.2: Declaration for Local Production and Content (if applicable).
- T2.2.8: MBD 8: Declaration of Bidder's Past SCM Practices.
- T2.2.9: MBD 9: Certificate of Independent Bid Determination.
- T2.2.10: Declaration of Municipal Fees

(g) The certificates listed in the **Tender Data: C.2.23: Certificates** are to be included with the tender submission. Failure to comply will result in the tender offer being deemed non-responsive. These include:

- T2.2.1: Compulsory Enterprise Questionnaire
 - SARS Tax Compliance Status – PIN Issued.
- T2.2.6: MBD 6.1: Preference Points Claim
 - B-BBEE Status Level of Contribution Certificate (if applicable).
- T2.2.12: Central Supplier Database (CSD) Report.
- T2.2.13: CIDB Registration and Status.

C.2.1.2 Eligibility: CIDB

Tenderers are to reference the provisions of **Tender Data: C.2.23: Certificates** and **Returnable Document: T2.2.13: Verification of CIDB Registration and Status** with respect to CIDB registration.

Only those Tenderers who are registered (as "Active") with the CIDB (at time of tender closing), in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25(1B) or 25(7A) of the Construction Industry Development Regulations, for a **CE** class of construction work, are eligible to have their tenders evaluated.

Joint ventures are eligible to submit tenders provided that:

- (a) Every member of the joint venture is registered (as "Active") with the CIDB (at time of tender closing),
- (b) The lead partner has a contractor grading designation in the **CE** class of construction work and has a grading designation of not lower than one level below the required grading designation, and
- (c) The combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations (2013) is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a **CE** class of construction work or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations.

C.2.1.3 Eligibility

a) Tenderer's Experience

Tenderers are to complete and sign **Returnable Form T2.2.15: Eligibility: Experience of Tenderer**.

Only those Tenderers that can demonstrate experience and submit the associated documentation/ information, will be eligible to have their tenders evaluated in terms of Clause C.3.11.

- **Table 1: The Experience Requirements** are specified on this table.
- **Table 2: The Documentation/ Information** that is required to be included in this submission is specified on this table (which includes the Notes below the table).
- Tenderers must submit experience gained as **Main Contractors**.
- **Guidance** on the completion of the **Experience Submission Form** is provided on the first page of **Returnable Form T2.2.15**.

Tenderers are to indicate the documentation that has been included in the tender submission, in support of each experience submission, in the relevant column on Page **52**.

Should there be insufficient evidence for verification of the information submitted for any specific experience submission, that experience submission will be deemed invalid.

Table 1: Experience Requirement
A minimum of three (3) reinforced concrete water retaining structures with a minimum capacity ten (10) Mℓ or greater, including all pipework and ancillaries, within the past fifteen (15) years, each project with a minimum value of R15 million or more. Where current contracts are submitted, the progress expressed in terms of the expenditure shall be a minimum of 60%.

	Table 2: Documentation / Information Requirements	
<u>Note:</u> an “X” in this table indicates that the associated documentation should be provided, if applicable.	Works as Main Contractor	
	Current Contracts	Completed Contracts
Letter of Award. (Issued by the Client/Employer)	X	X
Most recent Payment Certificate and Invoice. (A summary breakdown of quantities is to accompany these documents.)	X	
Final Payment Certificate and Invoice. (A summary of the breakdown of the quantities is to accompany these documents.)		X
Completion Certificate. (Issued by the Client/Employer/Employer's Agent.)		X
Scope of Work. (The Overall contract Scope-of Work is to be indicated.)	X	X
Client confirmation. (Contact details of the Employer/Client/Employer's Agent is to include name, position, phone and email.)	X	X

b) Proposed Staffing

The CVs submitted by the tenderer is to be accompanied by a sworn affidavit from the proposed individual. The affidavit is to be accompanied with a signed copy of the individual's Identification Document. The sworn affidavit shall confirm the proposed personnel is either in the tenderer's company's employment or will be available to take up full-time employment on the project.

Documentation for key personnel is to be submitted in line with **form T2.2.16: “Experience of Key Personnel”** for at least each of the personnel outlined in **Table 3** below.

Table 3: Experience of Key Personnel
If for circumstances beyond the control of the successful tenderer at the commencement of the contract, the proposed personnel are no longer available, the successful tenderer will be required to propose alternate personnel who meets the minimum requirements below. Failure to do so could result in termination of their contract. Non submission of affidavits from the proposed personnel will render the Tender invalid and will not be considered further.
Contracts Engineer
- The tenderer's CV is to be/have: - Qualification in Civil Engineering as a Technician (N. Dip)/Technologist(B-Tech)/Engineer (BSc/BEng) - Registered with SACPCMP as PrCM or ECSA as a Pr Techni/Pr Tech Eng/Pr Eng - Minimum ten (10) years' experience as a Contract's Engineer - Successfully completed the construction of a minimum of four (4) reinforced concrete water retaining structures with a minimum capacity of ten (10) Mℓ or greater - Successful completion of a minimum four (4) civil projects with either one or more of the following: - Reinforced Earth Embankments - Stormwater Infrastructure - Continuously Welded steel pipelines (water) - Repair/Improvement/reinstatement of reinforced concrete civil structures with a minimum project value of R 20 million.
Construction Manager
- The tenderer's CV is to be/have: - Qualification in Civil Engineering as a Technician (N. Dip)/Technologist(B-Tech)/Engineer (BSc/BEng) - Minimum seven (7) years' experience as a Construction Manager - Successfully completed the construction of a minimum of three (3) reinforced concrete water retaining structures with a minimum capacity of ten (10) Mℓ or greater. - Successful completion of a minimum one (1) civil project with either one or more of the following: - Reinforced Earth Embankments - Stormwater Infrastructure - Continuously Welded steel pipelines (water) - Repair/Improvement/reinstatement of reinforced concrete civil structures with a minimum project value of R 20 million.
Concrete Foreman
- The tenderer's CV is to be/have: - minimum ten (10) years reinforced concrete experience. - successfully completed the construction, from commencement to completion, of a minimum of three (3) reinforced concrete water retaining structures with a minimum value of R 20 million and a minimum capacity of ten (10) Mℓ or greater.
Civil Foreman
- The tenderer's CV is to be/have: - Minimum ten (10) years civil construction experience i.e. stormwater, earthwork reinforcement, bulk water pipeline installation - Successfully completed the construction, from commencement to completion of a minimum of two (2) civil (i.e. stormwater/earthwork reinforcement and or bulk water pipeline installation) construction works projects with a minimum value of R 10 million

C.2.2.2 The cost of the tender documents:

Replace this paragraph with the following:

"Documents are to be downloaded, free of charge, from the **National Treasury's eTenders website** or the **eThekwini Municipality's Website**."

C.2.6 Acknowledge addenda:

Add the following paragraphs:

“Addenda will be published on the **eThekwini Municipality website** as stated in **Tender Data: C.1.2**. Tenderers are to ensure that this website is consulted for any published addenda pertaining to this tender up to three days before the tender closing time as stated in the **Tender Data**.”

“Acknowledgement of receipt of the addenda will be by the return of the relevant completed, dated, and signed portion of the addenda, to the physical or email address as specified on the addenda.

Failure of the Tenderer to comply with the requirements of the addenda WILL result in the tender submission being made non-responsive.”

C.2.7 Clarification meeting:

Rm 301, 3rd Floor, Water & Sanitation H/Q, 3 Prior Road. To proceed to site thereafter (110 Alamein Avenue) on 15 October 2025 at 10h00

In the event of a Compulsory Clarification Meeting, Tenderers must sign the attendance register in the name of the tendering entity. The Tenderer's representative(s) at the clarification meeting must be able to clearly convey the discussions at the meeting to the person(s) responsible for compiling the entity's tender offer.

C.2.12 Alternative tender offers:

No alternative tender offers will be considered.

C.2.13 Submitting a tender offer:

The signed Tender Offer (“hard copy”) is to be sealed in an envelope, addressed to the City Manager, marked with the **identification details** and be delivered to the **delivery address**, both as stated below.

The **Tender Offer** (hard copy) is to be delivered to the following **delivery address**:

The Tender Box in the foyer of the Municipal Building, 166 KE Masinga Road, Durban

Identification details to be shown on the hard copy package are:

- Contract No. : **32547-5W**
- Contract Title : **Mobeni 2 Reservoir: The reinstatement of the collapsed reservoir, upgrades to the existing reservoir complex, embankments and associated works: Ward 64**

Tender Offers are also to be **SUBMITTED ELECTRONICALLY** (uploaded) on the eThekwini Municipality **JDE System** (Supplier Self Service (SSS Module)). For information pertaining to the JDE System, Tenderers are referred to **Section T1.1.2**.

Notwithstanding the **electronic submission**, a tender offer will only be deemed valid if the “hard copy” submission has been made.

The Tender documentation, issued by the eThekwini Municipality (refer to **Tender Data: C.1.2**), is to be printed in its entirety. Printing should be done on white A4 paper, with printing on only one side of the paper. (It is suggested that the Tender documentation is not stapled, or punched for filing, prior to scanning, as this could affect the scanning process.)

After completion and signature (using **BLACK INK**), the entire Tender document is to be scanned to a single PDF (**P**ortable **D**ocument **F**ormat) document, at a resolution of 300 DPI (dots per inch). The PDF document is to be uploaded via the (Tender specific) upload option on the JDE System (SSS Module).

- Tenderers must ensure that the hard copy and electronic submission are the same, failing which

the submission will be deemed invalid.

- Tenderers are responsible for resolving all access rights and submission queries on the JDE System before the tender closing date/ time (**Tender Data: C.2.15**).

Tender Offer delivery, and the electronic submission on the JDE System, are both to be completed on or before the closing date/ time stated in the **Tender Data: C.2.15**.

The submission of Tender Offers via any means other than that stated above will not be accepted, and those that are will be deemed invalid.

C.2.15 Closing date and time:

The closing time is:

- **Date : Friday, 07 November 2025**
- **Time : 11h00**

The **delivery of the hard copy AND** the completion of the requirements on the **JDE System (SSS Module)** are to be completed prior to the Tender **closing date and time** as stated above. Any Tender Offer submitted thereafter will not be considered.

C.2.16 Tender offer validity:

The Tender Offer validity period is 120 Days from the closing date for submission of tenders.

In terms of the SCM Policy (Cl.21.2) tenders must remain valid for acceptance for a period of twelve (12) months after the expiry of the original validity period, unless the Municipality is notified in writing of anything to the contrary by the tenderer.

C.2.23 Certificates:

Refer to **T2.1: “List of Returnable Documents”** for a listing of certificates that must be provided with the tender. All certificates must be valid at the time of tender closing.

Tenderers are to include a printout of the required documents/ certificates at the back of their tender submission.

SARS Tax Compliance Status – PIN Issued

Reference is to be made to **Returnable Document T2.2.1: Compulsory Enterprise Questionnaire**.

B-BBEE Status Level of Contribution Certificate

Tenderers are referred to **Returnable Document T2.2.6: MBD 6.1: Preference Points Claim** for the B-BBEE Certificate requirements.

The Amended Construction Sector Code (Government Gazette No.41287) is applicable to the B-BBEE compliance measurement of all entities that fall within the Construction Sector. The requirements for measurement and verification of entities are contained in the “Amended Code Series CSC000: Framework for Measuring Broad Based Black Economic Empowerment in the Construction Sector”, as published in Notice 931 of 2017, Government Gazette No.41287 of 01/12/2017.

An EME Contractor with a Total Annual Revenue of less than R3 million may present an affidavit OR a certificate issued by the CIPC OR an authorised B-BBEE verification certificate by a SANAS accredited Verification Agency.

Any B-BBEE Certificate where the entity has been assessed using **Generic Codes** will not be accepted.

Central Supplier Database (CSD)

Reference is to be made to **Returnable Document T2.2.12: CSD Registration Report**.

The entities **CSD Registration Report**, obtained from the National Treasury Central Supplier Database (CSD), is to be included in the tender submission (<https://secure.csd.gov.za>).

The date of the report, as indicated at the top right of each page, should be on or after the date of advertising of this tender.

Separate **CSD Registration Reports** are required for each party to a Joint Venture.

CIDB Registration (if applicable)

Reference is to be made to **Returnable Document T2.2.13: Verification of CIDB Registration and Status**.

Tenderers are to include with their submission a printout of their **CIDB Registration**, obtained from the CIDB website (<https://portal.cidb.org.za/RegisterOfContractors/>).

The date of obtaining the CIDB printout(s) is to be indicated on the printout, and the Tenderer's registration with the CIDB must be reflected as "Active" as at the date of tender closing.

Separate **CIDB Registration printouts** are required for each party to a Joint Venture. The **Joint Venture Grading Designation Calculator** printout should be included when making a submission as a Joint Venture:
(<https://registers.cidb.org.za/PublicContractors/JVGradingDesignationCalc>)

C.3: THE EMPLOYER'S UNDERTAKINGS

C.3.1.1 Respond to requests from the tenderer:

Replace the words "five working days" with "three working days".

C.3.2 Issue addenda:

Add the following paragraph:

"Addenda will be published on the **eThekweni Municipality Website** (refer to **Tender Data: C.1.2**).

C.3.4 Opening of Tender Submissions:

Tenders will be opened immediately after the closing time for tenders. The public reading of tenders will take place in the SCM Boardroom, 6th Floor, Engineering Unit Building, 166 KE Masinga Road, Durban.

The tender opening schedule will also be made available on the eThekweni Municipal website at URL: <https://www.durban.gov.za/pages/business/publication-of-received-bids>

C.3.9 Arithmetical errors, omissions and discrepancies:

Add the following Clause:

"C.3.9.5 Reject a tender offer if the Tenderer does not accept the correction of the arithmetical error

in the manner described in C.3.9.4.”

C.3.11 Evaluation of Tender Offers:

Eligibility

Tenders will be checked for compliance with the ELIGIBILITY requirements, as specified in the **Tender Data: C.2.1**. Tenders not in compliance will be deemed non-responsive.

Preference Point System

The procedure for the evaluation of responsive tenders is **PRICE AND PREFERENCE**, in accordance with the Employer's **SCM Policy: Section 52: Preferential Procurement**.

The provisions of the SCM Policy: **Section 52.5: Broad-Based Black Economic Empowerment** shall apply.

Price Points

The **90/10** preference points system, for requirements with a Rand value above R50,000,000 (all applicable taxes included), will be applied. The Formula used to calculate the **Price Points (max. 90)** will be according to that specified below.

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

90/10 Procurement System

$$P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where: P_s = Points scored for comparative price of bid under consideration
 P_t = Comparative price of bid under consideration
 $P_{\min}$ = Comparative price of lowest acceptable bid

Preference Points

Reference is to be made to **Returnable Form: T2.2.6: MBD 6.1: Preference Points Claim**.

Broad-Based Black Economic Empowerment (SCM Policy Section 52.5)

A maximum of 10 tender evaluation Preference Points will be derived from points claimed for their B-BBEE Status Level of Contributor, as indicated on their B-BBEE Status Level Verification Certificates, on **Returnable Form: T2.2.6: MBD 6.1**, in accordance with the table below.

90/10 Preference Points System				
B-BBEE Level Contributor	Preference Points		B-BBEE Level Contributor	Preference Points
1	10		5	4
2	9		6	3
3	7		7	2
4	6		8	1
Non-Compliant: 0				

C.3.13 Acceptance of tender offer:

In addition to the requirements of **Tender Data: C.3.13** of the **Standard Conditions of Tender**, tender offers will only be accepted if:

- (a) The Tenderer's municipal rates and taxes are not in arrears, or they have made arrangements to meet outstanding municipal fee obligations.
- (b) The Tenderer's tax compliance status has been verified, or they have made arrangements to meet outstanding tax obligations.
- (c) If applicable, the Tenderer is **registered**, and **"Active"**, with the **Construction Industry Development Board** in an appropriate contractor grading designation.
- (d) The Tenderer or any of its directors/ shareholders are **not listed on the Register of Tender Defaulters**, in terms of the Prevention and Combating of Corrupt Activities Act of 2004, as a person prohibited from doing business with the public sector.
- (e) The Tenderer has not:
 - i) Abused the Employer's Supply Chain Management System; or
 - ii) Failed to perform on any previous contract and has been given a written notice to this effect.
- (f) The Employer is reasonably satisfied that the Tenderer has in terms of the Construction Regulations (2014), issued in terms of the Occupational Health and Safety Act (1993), the **necessary competencies and resources to carry out the work safely**.

The Municipality does not bind itself to accept the lowest or any tender. It reserves the right to accept the whole or any part of a tender to place orders. Bidders shall not bind the Municipality to any minimum quantity per order. The successful Tenderer(s) shall be bound to provide any quantities stipulated in the specification.

The municipality has a firm intention to proceed with the work, subject to funding being identified. Notwithstanding the **Standard Conditions of Tender: C.1.1.3** of, the municipality reserves the right to award or not award the tender based on the municipalities available budget.

C.3.15 Complete adjudicator's contract:

Refer to the Conditions of Contract and the Contract Data.

C.3.17 Copies of contract:

The number of paper copies of the signed contract to be provided by the Employer is ONE (1). Tenderers are referred to the requirements as stated in the **Tender Data: C.2.13**.

T1.2.3 ADDITIONAL CONDITIONS OF TENDER

T1.2.3.1 Appeals

In terms of Regulation 49 of the Municipal Supply Chain Management Regulations persons aggrieved by decisions or actions taken by the Municipality, may lodge an appeal within 14 days of the decision or action, in writing, to the Municipality. All appeals (clearly setting out the reasons for the appeal) and queries with regard to the decision of award are to be directed to:

The City Manager
Attention Ms S. Pillay eMail: Simone.Pillay@durban.gov.za
P O Box 1394
DURBAN, 4000

Any objection will only be processed upon receipt of a non-refundable administration fee of **R1,814.00** (including VAT), as stipulated in the Municipality's current SCM Policy. An objection will only be considered upon receipt of proof of payment of this fee which must be paid into the following bank account as a real-time payment:

EThekweni Metropolitan Municipality
Nedbank
Account Number: 110-782-1118
Reference Number: Use the Contract Number

T1.2.3.2 Prohibition on awards to persons in the service of the state

Clause 44 of the Supply Chain Management Regulations states that the Municipality or Municipal Entity may not make any award to a person:

- (a) Who is in the service of the State;
- (b) If that person is not a natural person, of which a director, manager, principal shareholder or stakeholder is a person in the service of the state; or
- (c) Who is an advisor or consultant contracted with the municipality or a municipal entity.

Should a contract be awarded, and it is subsequently established that Clause 44 has been breached, the Employer shall have the right to terminate the contract with immediate effect.

T1.2.3.3 Code of Conduct and Local Labour

The Tenderers shall make themselves familiar with the requirements of the following policies:

- Code of Conduct;
- The Use of CLOs and Local Labour.

PART T2: RETURNABLE DOCUMENTS

T2.1 LIST OF RETURNABLE DOCUMENTS

T2.1.1 General

The Tender Submission Documentation must be submitted in its entirety. All forms must be properly completed and signed as required.

The Tenderer is required to complete and sign each and every Schedule and Form listed below to the best of their ability as the evaluation of tenders and the eventual contract will be based on the information provided by the Tenderer.

Failure of a Tenderer to complete the Schedules and Forms to the satisfaction of the Employer will inevitably prejudice the tender and may lead to rejection on the grounds that the tender is non-responsive.

T2.1.2 Returnable Schedules, Forms and Certificates

Entity Specific

T2.2.1	Compulsory Enterprise Questionnaire	30
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T2.2.4	MBD 5: Declaration for Procurement Above R10 Million	34
T2.2.5	Contracts Awarded by Organs of State in the past 5 years	35
T2.2.6	MBD 6.1: Preference Points Claim Form (SCM Policy Section 52.5)	36
T2.2.7	MBD 8: Declaration of Bidder's Past SCM Practices	39
T2.2.8	MBD 9: Certificate of Independent Bid Determination	41
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T2.2.10	Contractor's Health and Safety Declaration	45
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T2.2.13	Joint Venture Agreements (if applicable)	49
T2.2.14	Record of Addenda to Tender Documents	50
T2.2.15	Eligibility: Experience of Tenderer	51
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Contract Part: The Tenderer is required to complete following forms:

C1.1.1	Form of Offer	65
C1.2.2.2	Data to be Provided by Contractor	68
C2.2	Bill of Quantities	78

T2.2.1 COMPULSORY ENTERPRISE QUESTIONNAIRE

Ref	Description	Tenderer to Complete	
1.1	Name of enterprise		
1.2	Name of enterprise's representative		
1.3	Email address of representative		
1.4	Contact numbers of representative	Tel:	Cell:
1.5	National Treasury Central Supplier Database Registration number	MAAA	
1.6	VAT registration number, if any:		
1.7	CIDB registration number, if any:		
1.8	Department of Labour: Registration number		
1.9	Department of Labour: Letter of Good Standing Certificate number		

2.0 Particulars of sole proprietors and partners in partnerships (attach separate pages if more than 4 partners)			
	Full Name	Identity No.	Personal income tax No. *
2.1			
2.2			
2.3			

3.0 Particulars of companies and close corporations	
3.1	Company registration number, if applicable:
3.2	Close corporation number, if applicable:
3.3	Tax Reference number, if any:
3.4	South African Revenue Service: Tax Compliance Status PIN:

4.0	MBD 4, MBD 6, MBD 8, and MBD9 issued by National Treasury <u>must be completed for each tender and be included as a tender requirement.</u>

Tenderers are to include, at the back of their tender submission, a printout of their SARS "Tax Compliance Status – PIN Issued" certificate.

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise:	
i) authorizes the Employer to verify the Tenderer's tax clearance status from the South African Revenue Services that it is in order.	
ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004.	
iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption.	
iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the Tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest.	
v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.	

NAME (Block Capitals):

Date

SIGNATURE:

Reference is to be made to the **Tender Data: C.2.1.1(a) and C.2.7.**

T2.2.3 MBD 4: DECLARATION OF INTEREST

MSCM Regulations: “**in the service of the state**” means to be:

- (a) a member of:
 - (i) any municipal council.
 - (ii) any provincial legislature.
 - (iii) the national Assembly or the national Council of provinces.
- (b) a member of the board of directors of any municipal enterprise.
- (c) an official of any municipality or municipal enterprise.
- (d) an employee of any national or provincial department, national or provincial public enterprise 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 enterprise.
- (f) an employee of Parliament or a provincial legislature.

“**Shareholder**” means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.

- 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 and/or take an oath declaring his/her interest.
- 3 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

3.1 Name of enterprise

Name of enterprise’s representative

3.2 ID Number of enterprise’s representative

3.3 Position enterprise’s representative occupies in the enterprise

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 / sole proprietors / partners in partnerships, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below. In the case of a joint venture, information in respect of each partnering enterprise must be completed and submitted.

3.8 Are you presently in the service of the state?

Circle Applicable

YES NO

If yes, furnish particulars:

.....

3.9 Have you been in the service of the state for the past twelve months?

YES	NO

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

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

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

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

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

If yes, furnish particulars:

.....

4 The names of all directors / trustees / shareholders / members / sole proprietors / partners in partnerships, their individual identity numbers and state employee numbers must be indicated below. In the case of a joint venture, information in respect of each partnering enterprise must be completed and submitted

Full Name	Identity No.	State Employee No.	Personal income tax No.
Use additional pages if necessary			

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals):

Date

.....

SIGNATURE:

.....

.....

**T2.2.4 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.

Circle Applicable	
YES	NO
1.0 Are you by law required to prepare annual financial statements for auditing? 1.1 If YES, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.	
2.0 Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days? 2.1 If NO, this serves to certify that the bidder has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days. 2.2 If YES, provide particulars. 	
3.0 Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract? 3.1 If YES, provide particulars. SEE Returnable Document T2.2.5	
4.0 Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic? 4.1 If YES, provide particulars. 	

If required by 1.1 above, Tenderers are to include, at the back of their tender submission, a printout of their audited annual financial statements.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and, if required, that the requested documentation has been included in the tender submission.

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.5 CONTRACTS AWARDED BY ORGANS OF STATE IN THE PAST 5 YEARS

In terms of SCM Policy Section 20(1)(d)(iii), Tenderers are to provide details of Works undertaken for the Government or Public Sector entities/ Organs of State in the past 5 Years, including particulars of any material non-compliance or dispute concerning the execution of such contract.

Material non-compliance or dispute (Yes or No)													
Date Completed													
Value of Work													
Consulting Engineer/Engineers representative													
Employer													
Contract Number													

I, the undersigned, who warrants that they are authorised to sign on behalf of the entity, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.6 MBD 6.1: PREFERENCE POINTS CLAIM)

(SCMP 52.5: Broad-Based Black Economic Empowerment)

This form serves as a claim form for preference points for **Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution**. Reference is to be made to the Tender Data: C.3.11.

1.0 GENERAL CONDITIONS

- 1.1 The relevant **Preference Points System 90/10** applicable to this bid is stated in the **Tender Data: C.3.11**.
- 1.2 Failure on the part of a bidder to fill in and/ or sign this form, and submit a B-BBEE Verification Certificate from a Verification Agency accredited by the South African Accreditation System (SANAS), or a Registered Auditor approved by the Independent Regulatory Board of Auditors (IRBA), or sworn affidavits in the case of Exempted Micro Enterprises or Qualifying Small Enterprises, together with the bid, will be interpreted to mean that preference points for **B-BBEE Status Level Of Contribution** are not claimed.
- 1.3 The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

2.0 ADJUDICATION USING A POINT SYSTEM

- 2.1 The bidder obtaining the highest number of total points will be recommended for the award of the contract.
- 2.2 Preference points shall be calculated after prices have been brought to a comparative basis taking into account all factors of non-firm prices and all unconditional discounts.
- 2.3 Points scored will be rounded off to the nearest 2 decimal places.
- 2.4 In the event that two or more bids have scored equal total points, the successful bid must be the one scoring the highest number of preference points for B-BBEE.
- 2.5 However, when functionality is part of the evaluation process and two or more bids have scored equal points including equal preference points for B-BBEE, the successful bid must be the one scoring the highest score for functionality.
- 2.6 Should two or more bids be equal in all respects the award shall be decided by the drawing of lots.

3.0 POINTS AWARDED FOR PRICE

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

90/10 Procurement System

$$P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where: P_s = Points scored for comparative price of bid under consideration
 P_t = Comparative price of bid under consideration
 $P_{\min}$ = Comparative price of lowest acceptable bid

4.0 POINTS ALLOCATED FOR B-BBEE STATUS LEVEL OF CONTRIBUTION

- 4.1 Preference points must be claimed by a bidder for attaining the **B-BBEE Status Level of Contribution** in accordance with the applicable table below:

90/10 Preference Points System	
B-BBEE Level Contributor	Preference Points
1	10
2	9
3	7
4	6
5	4
6	3
7	2
8	1
Non-Compliant	0

- 4.2 All bidders must submit **B-BBEE Status Level of Contribution Certificates**, issued by either verification agencies accredited by the South African Accreditation System (SANAS), or by registered auditors approved by the Independent Regulatory Board for Auditors (IRBA), or sworn affidavits in a case of an Exempted Micro Enterprise (EME) or a Qualifying Small Enterprise (QSE).
- 4.3 Any enterprise with an annual Total Revenue of R 10 million or less qualifies as an Exempted Micro-Enterprise.
- 4.4 Exempted Micro-Enterprises are deemed to have B-BBEE Status of "Level Four Contributor" having a B-BBEE procurement recognition of 100% in terms of the Codes of Good Practice.
- 4.5 An Exempted Micro Enterprise (EME) with at least 51% black ownership qualifies as a Level 2 contributor with BBBEE level of 125% in terms of the Codes of Good Practice.
- 4.6 An Exempted Micro Enterprise with 100% black ownership qualifies as a Level 1 contributor with BBBEE level of 135% in terms of the Codes of Good Practice.
- 4.7 An Exempted Micro Enterprise that is regarded as a specialized enterprise with at least 75% black beneficiaries qualifies as a Level 1 contributor with BBBEE level of 135% in terms of the Codes of Good Practice.
- 4.8 An Exempted Micro Enterprise that is regarded as a specialized enterprise with at least 51% black beneficiaries qualifies as a Level 2 contributor with BBBEE level of 125% in terms of the Codes of Good Practice.
- 4.9 A Qualifying Small Enterprise (QSE) with at least 51% black ownership qualifies as a Level 2 contributor.
- 4.10 A QSE with 100% black ownership qualifies as a Level 1 contributor.
- 4.11 A QSE that is regarded as a specialized enterprise with at least 51% black beneficiaries qualifies as a Level 2 contributor with BBBEE level of 125% in terms of the Codes of Good Practice.
- 4.12 A QSE with less than 51% black ownership is required to submit a BBBEE level verification certificate issued by a BBBEE verification professional.
- 4.13 A Trust, consortium or joint venture:
- must submit a B-BBEE status level certificate in order to qualify for points;
 - may qualify for points as an unincorporated entity provided, that they submit their consolidated scorecard is prepared for separate tender; and
 - where no consolidated scorecard exists, the weighted average (in accordance with participation percentages) must be used and rounded off to the nearest status level.
- 4.14 Gazetted Sector Codes supersede Generic Codes.

5.0 SUB-CONTRACTING

- 5.1 B-BBEE points must not be awarded to a tenderer who intends sub-contracting more than 25% of the value of the contract to an enterprise that does not qualify for at least the points that such contractor qualifies for, unless the intended sub-contractor is an EME who has the ability and capability to execute the contract.
- 5.2 A person awarded a contract may not sub-contract more than 25% of the value of the contract to an enterprise that does not have an equal or higher B-BBEE status level, unless the intended sub-contractor is an EME who has the ability and capability to execute the contract.
- 5.3 A person awarded a contract in relation to a designated sector may not sub-contract in such a manner that the **Local Production and Content** of the overall value of the contract is reduced to below the prescribed minimum threshold.

6.0 BID DECLARATION

- 6.1 Bidders who wish to claim points in respect of **B-BBEE Status Level of Contribution** must complete the following:

B-BBEE Status Level of Contribution	Tenderer's Preference Points Claim (maximum of 10 points)

Points claimed must be in accordance with the relevant table reflected in paragraph 4.1 and must be substantiated by means of a B-BBEE Status Level of Contribution Certificate issued by a verification agency accredited by the South African Accreditation System (SANAS), or by registered auditors approved by the Independent Regulatory Board for Auditors (IRBA), or sworn affidavits in a case of an Exempted Micro Enterprise (EME) or a Qualifying Small Enterprise (QSE).

Tenderers are to include, at the back of their tender submission, their B-BBEE Status Level of Contribution Certificate.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and, if required, that the requested documentation has been included in the tender submission.

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.7 MBD 8: DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1.0 This Municipal Bidding Document must form part of all bids invited.
- 2.0 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.
- 3.0 The bid of any bidder may be rejected if that bidder, or any of its directors have:
- a) abused the 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) wilfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years.
 - 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).
- 4.0 In order to give effect to the above, the following questions must be completed and submitted with the bid.

- 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 the public 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.

Circle Applicable	
YES	NO

- 4.1.1 If YES, provide 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 12 of 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 YES, provide particulars.

.....

.....

- 4.3 Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?

YES	NO

- 4.3.1 If YES, provide particulars.

.....

.....

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 YES, provide 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

4.5.1 If YES, provide particulars.

.....

.....

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both 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.

NAME (Block Capitals):

.....

SIGNATURE:

.....

Date

.....

T2.2.8 MBD 9: CERTIFICATE OF INDEPENDENT BID DETERMINATION

NOTES

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.

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.

- 1.0 This Municipal Bidding Document (MBD) must form part of all **bids**¹ invited.
- 2.0 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.
- 3.0 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.
- 4.0 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.
- 5.0 In order to give effect to the above, the below **Certificate of Independent Bid Determination** must be completed and submitted with the bid.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid for: Contract **32547-5W**
Mobeni 2 Reservoir: The reinstatement of the collapsed reservoir, upgrades to the existing reservoir complex, embankments and associated works: Ward 64

in response to the invitation for the bid made by: ETHEKWINI MUNICIPALITY

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

I certify, on behalf of:

that:

(continued on next page)

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.
 - (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 consortium³ 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.
 - (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.
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.

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.9 DECLARATION OF MUNICIPAL FEES

Reference is to be made to the **Tender Data: C.2.23 and C.3.13(a).**

I, the undersigned, do hereby declare that the Municipal fees of:

.....
(full name of Company / Close Corporation / partnership / sole proprietary/Joint Venture)

(hereinafter referred to as the TENDERER) are, as at the date hereunder, fully paid or an Acknowledgement of Debt has been concluded with the Municipality to pay the said charges in instalments.

The following account details relate to property of the said TENDERER:

<u>Account</u>	<u>Account Number: to be completed by Tenderer</u>											
Consolidated Account												
Electricity												
Water												
Rates												
JSB Levies												
Other												

- If applicable, a copy of a recent (within the past 3 months) Metro Bill is to be provided.

I acknowledge that should the aforesaid Municipal charges fall into arrears, the Municipality may take such remedial action as is required, including termination of any contract, and any payments due to the Contractor by the Municipality shall be first set off against such arrears.

- Where the Tenderer's place of business or business interests are outside the jurisdiction of eThekweni municipality, a copy of the accounts/ agreements from the relevant municipality are to be provided.
- Where the Tenderer's Municipal Accounts are part of their lease agreement, then a copy of the agreement, or an official letter to that effect, is to be provided.
- Where a Tenderer's place of business or business interests are carried out from premises as part of any other agreement, then a copy of the agreement, or an official letter to that effect, is to be provided.

Tenderers are to include, at the back of their tender submission, copies of the above-mentioned account's, agreements signed with the municipality, lease agreements, or official letters.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and that the requested documentation has been included in the tender submission.

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.10 CONTRACTOR'S HEALTH AND SAFETY DECLARATION

Reference is to be made to Clauses C.2.1(e) and C.2.23 of the Tender Data.

In terms of Clause 5(1)(h) of the OHSA 1993 Construction Regulations 2014 (referred to as "the Regulations" hereafter), a Principal Contractor may only be appointed to perform construction work if the Client is satisfied that the Principal Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act No 85 of 1993 and the OHSA 1993 Construction Regulations 2014.

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

Declaration by Tenderer

- 1 I, the undersigned, hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHSA 1993 Construction Regulations 2014.
- 2 I hereby declare that my company has the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Employer's Health and Safety Specifications.
- 3 I propose to achieve compliance with the Regulations by one of the following **(Tenderers are to Circle Applicable - Yes or No)**:

(a) From my own competent resources as detailed in 4(a) hereafter.

(b) From my own resources still to be appointed or trained until competency is achieved, as detailed in 4(b) hereafter:

(c) From outside sources by appointment of competent specialist Subcontractors as detailed in 4(c) hereafter:

Circle Applicable	
Yes	No
Yes	No
Yes	No

- 4 Details of resources I propose:

(Note: Competent resources shall include safety personnel such as a construction supervisor and construction safety officer as defined in Regulation 8, and competent persons as defined in Regulations 9, 10, 11, 12, 13, 14, 16, 17, 20, 21, 22, 23(1), 24, 25, 26, 27, 28 and 29, as applicable).

- (a) Details of the competent and qualified key persons from my company's own resources, who will form part of the contract team:

NAMES OF COMPETENT PERSONS	POSITIONS TO BE FILLED BY COMPETENT PERSONS

- (b) Details of training of persons from my company's own resources (or to be hired) who still have to be trained to achieve the necessary competency:

- (i) By whom will training be provided?
(ii) When will training be undertaken?
(iii) Positions to be filled by persons to be trained or hired:

- (c) Details of competent resources to be appointed as subcontractors if competent persons cannot be supplied from own company:

- Name of proposed subcontractor:
Qualifications or details of competency of the subcontractor:

- 5 I, the undersigned, hereby undertake, if this tender is accepted, to provide, before commencement of the works under the contract, a suitable and sufficiently documented Health and Safety Plan in accordance with Regulation 7(1) of the Construction Regulations, which plan shall be subject to approval by the Client.
- 6 I, the undersigned, confirm that copies of this company's approved Health and Safety Plan, the Client's Safety Specifications as well as the OHSA 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Principal Contractor's personnel, the Client's personnel, the Employer's Agent, visitors, and officials and inspectors of the Department of Labour.
- 7 I, the undersigned, hereby confirm that adequate provision has been made in the tendered rates and prices in the Bill of Quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2014, and that I will be liable for any penalties that may be applied by the Client in terms of the said Regulations (Regulation 33) for failure on the Principal Contractor's part to comply with the provisions of the Act and the Regulations.
- 8 I, the undersigned, agree that failure to complete and execute this declaration to the satisfaction of the Client will mean that this company is unable to comply with the requirements of the OHSA 1993 Construction Regulations (2014) and accept that this tender will be prejudiced and may be rejected at the discretion of the Client.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.11 CSD REGISTRATION REPORT

Reference is to be made to **Tender Data: C.2.1.1(b) and C.2.23**.

The **Tender Data: C.2.1: Eligibility**, requires a Tenderer to be registered, at the time of tender closing, on the **National Treasury Central Supplier Database (CSD)** as a service provider.

The date of obtaining the printout is to be printed on the printout.

CSD Registration Reports can be obtained from the National Treasury's CSD website at <https://secure.csd.gov.za/Account/Login>.

The following is an example of the printout obtained from the above website.

Note: the printout will contain more than one page.

	CENTRAL SUPPLIER DATABASE FOR GOVERNMENT		Report Date:	
			Report Ran By:	
CSD REGISTRATION REPORT				
SUPPLIER IDENTIFICATION				
Supplier number		Have Bank Account		
Is supplier active?		Total annual turnover		
Supplier type		Financial year start date		
Supplier sub-type		Registration date		
Legal name		Created by		
Trading name		Created date		
Identification type		Edit by		
Government breakdown		Edit date		
Business status		Restricted Supplier		
Country of origin		Restriction Last Verification Date		
South African company/CC registration number				

Tenderers are to include, at the back of their tender submission, a printout of their CSD Registration Report.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and that the requested documentation has been included in the tender submission.

NAME (Block Capitals):

Date

SIGNATURE:

Reference is to be made to the **Tender Data: C.2.1.2, C.2.23, and C.3.13(c).**

The required class of construction work is specified in the **Tender Data: C.2.1.2.**

CIDB Registrations can be obtained from the CIDB website at:

The following is an example of the printout obtained from the above website using the provided “Print” button. Note: the printout may contain more than one page.



cidb
Construction Industry Development Board

DEVELOPMENT THROUGH PARTNERSHIP

construction industry development board

Contractor Details

CRS Number	Enterprise Status
Contractor Name *	Type of Enterprise
Trading Name	
Current Contractor Grading Designation	Expiry Date
Contractor Grades	
Approved Grade	Class of Work Type
	Active From

Print

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission.**

Date _____

T2.2.13 JOINT VENTURES AGREEMENTS

If this tender submission is to be made by an established Joint Venture, the Joint Venture Agreements and Power of Attorney Agreements are to be attached here.

Should the Joint Venture, at the time of submission, not yet be formalised, this form is to be completed in full and signed by all parties to the proposed Joint Venture.

The Lead Partner of the Joint Venture is to sign the **Form of Offer** in Section **C1.1.1**.

INTENT TO FORM A JOINT VENTURE

Should our submission for CONTRACT: **32547-5W** be successful, a Joint Venture will be established by the parties as listed below, as an unincorporated association, with the purposes of securing and executing the Contract, for the benefit of the Members.

Proposed Joint Venture

Joint Venture Title (name):

Represented by (name):

Tel:

Lead Partner/ Member 1

Entity Name:

Ownership Interest in JV %:

CSD Registration:

CIDB #:

Represented by (name):

Signature:

Partner/ Member 2

Entity Name:

Ownership Interest in JV %:

CSD Registration:

CIDB #:

Represented by (name):

Signature:

Partner/ Member 3

Entity Name:

Ownership Interest in JV %:

CSD Registration:

CIDB #:

Represented by (name):

Signature:

Note: All requirements for Joint Ventures, as stated elsewhere in this procurement document, must be complied with in full.

T2.2.14 RECORD OF ADDENDA TO TENDER DOCUMENTS

Reference is to be made to the **Tender Data: C.2.6.**

I / We confirm that the following communications received from the Employer or his representative before the date of submission of this tender offer, amending the tender documents, have been taken into account in this tender offer.

ADD.No	DATE	TITLE OR DETAILS
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

It is also confirmed that the requirements, as stated on the Addenda, have been complied with.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.15 ELIGIBILITY: EXPERIENCE OF TENDERER

Reference is to be made to the **Tender Data: C.2.1.3**.

Only those Tenderers that can demonstrate experience and submit the associated documentation/ information, in works of a similar nature, within the past 15 years, will be eligible to have their tenders evaluated in terms of **Tender Data: C.3.11**.

- The **Eligibility Criteria Requirement** is as stated on **Table 1: “Experience Requirement”**.
- The **Documentation/ Information** that is required is specified on **Table 2: “Documentation/ Information Requirements”** (which includes the Notes below the table).

It is the responsibility of the Tenderer to ensure that the experience submissions comply with the requirements as stated in the Tender Data: C.2.1.3.

Guidance to Tenderers: Experience Submission Form

Client / Employer Details

- Provide details for whom the works were carried out (works owner).
- Provide **Contact details of the Client** is required to be provided.
The contact details may be used by the Employer to verify the information, pertaining to the experience submission. Should the Employer’s reasonable attempts to make contact with the Client or Main Contractor fail (for whatever reason), that specific experience submission may be considered invalid.

Contract Details

- Provide the **Contract Reference Number** and **Contract Title**.
- Indicate if this contract has been completed or is still in progress.
- Provide **Contract Dates**.
- Provide **Contract Values** - Where works are still in progress, provide the value of works that have been completed as detailed on the most recent payment to the Contractor. If the works are complete, provide the Final Value of the sub-contract or Final Contract Price.

Joint Ventures

In the event of a Joint Venture (JV) tendering for this contract, experience gained by the separate entities making up the JV may be used as experience, provided that the experience complies with the requirements, as stipulated in **Table 1**, and that the required documentation/ information is provided.

(T2.2.15 is continued on the next page)

Confirmation of submission of Information/ Documentation

The Tenderer is to indicate (by marking with an "X" in the shaded column) the documentation that has been included in this tender submission, in support of each experience submission.

		If submitted, mark with an "X"
SUBMISSION #1	Experience Submission Form (completed and signed)	
	Letter of Award	
	Most recent Payment Certificate (with Quantities summary), AND most recent INVOICE (with Quantities summary)	
	Final Payment Certificate (with Quantities summary)	
	Completion Certificate	
	Scope of Work (The Overall contract Scope-of Work is to be indicated)	
	Client confirmation (Contact details of the Employer/Client/Employer's Agent is to include name, position, phone and email.)	
SUBMISSION #2	Experience Submission Form (completed and signed)	
	Letter of Award	
	Most recent Payment Certificate (with Quantities summary), AND most recent INVOICE (with Quantities summary)	
	Final Payment Certificate (with Quantities summary)	
	Completion Certificate	
	Scope of Work (The Overall contract Scope-of Work is to be indicated)	
	Client confirmation (Contact details of the Employer/Client/Employer's Agent is to include name, position, phone and email.)	
SUBMISSION #3	Experience Submission Form (completed and signed)	
	Letter of Award	
	Most recent Payment Certificate (with Quantities summary), AND most recent INVOICE (with Quantities summary)	
	Final Payment Certificate (with Quantities summary)	
	Completion Certificate	
	Scope of Work (The Overall contract Scope-of Work is to be indicated)	
	Client confirmation (Contact details of the Employer/Client/Employer's Agent is to include name, position, phone and email.)	

Note: Should there be insufficient evidence for verification of the information submitted for any specific experience submission, that experience submission WILL be deemed invalid.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission.***

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.15 ELIGIBILITY: EXPERIENCE OF TENDERER SUBMISSION #1

Refer to Clause C.2.1.3 (a) for Eligibility evaluation prompts.

Tendering Firm's experience of successfully completed contracts or current contracts that meet the criteria in Table 1 of C.2.1.3 (a):

Contract Ref no.: Description:			
Month and Year Commenced:		Award Value (VAT Excl.)	
Month and Year Completed:		Value at Completion or to date (VAT Excl.)	
Name of Client: Name of Client Representative:		Tel. No.:	
Name of Consulting Engineering Firm:		Tel. No.:	
Name of Consultant's Representative:		Tel./ Cell No.:	

Details of the above Contract
The following information is required for evaluation of the above contract and the Tenderer shall provide such information to the best of his knowledge:
1. Description and scope of work completed:

Confirmation of documentation submitted is to be recorded on Page 49.

CLIENT CONFIRMATION

I, the undersigned, as the abovementioned representative of the Client, hereby confirm that information contained in this form is both true and correct

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.15 ELIGIBILITY: EXPERIENCE OF TENDERER SUBMISSION #2

Refer to Clause C.2.1.3 (a) for Eligibility evaluation prompts.

Tendering Firm's experience of successfully completed contracts or current contracts that meet the criteria in Table 1 of C.2.1.3 (a):

Contract Ref no.: Description:			
Month and Year Commenced:		Award Value (VAT Excl.)	
Month and Year Completed:		Value at Completion or to date (VAT Excl.)	
Name of Client: Name of Client Representative:		Tel. No.:	
Name of Consulting Engineering Firm:		Tel. No.:	
Name of Consultant's Representative:		Tel./ Cell No.:	

Details of the above Contract
The following information is required for evaluation of the above contract and the Tenderer shall provide such information to the best of his knowledge:
1. Description and scope of work completed:

Confirmation of documentation submitted is to be recorded on Page 49.

CLIENT CONFIRMATION

I, the undersigned, as the abovementioned representative of the Client, hereby confirm that information contained in this form is both true and correct

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.15 ELIGIBILITY: EXPERIENCE OF TENDERER SUBMISSION #3

Refer to Clause C.2.1.3 (a) for Eligibility evaluation prompts.

Tendering Firm's experience of successfully completed contracts or current contracts that meet the criteria in Table 1 of C.2.1.3 (a):

Contract Ref no.: Description:			
Month and Year Commenced:		Award Value (VAT Excl.)	
Month and Year Completed:		Value at Completion or to date (VAT Excl.)	
Name of Client: Name of Client Representative:		Tel. No.:	
Name of Consulting Engineering Firm:		Tel. No.:	
Name of Consultant's Representative:		Tel./ Cell No.:	

Details of the above Contract
The following information is required for evaluation of the above contract and the Tenderer shall provide such information to the best of his knowledge:
1. Description and scope of work completed:

Confirmation of documentation submitted is to be recorded on Page 49.

CLIENT CONFIRMATION

I, the undersigned, as the abovementioned representative of the Client, hereby confirm that information contained in this form is both true and correct

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.16 ELIGIBILITY: PROPOSED STAFFING

Reference is to be made to the **Table 3 of Tender Data: C.2.1.3 (b)**.

Confirmation of submission of Information/ Documentation

The Tenderer is to indicate (by marking with an “X” in the shaded column) the documentation that has been included in this tender submission, in support of each experience submission.

		If submitted, mark with an “X”
CONTRACTS ENGINEER	Qualifications Form (completed and signed)	
	Experience Forms (8No) (completed and signed)	
	Certified copy of qualification	
	Certified copy of professional registration certificate	
	Sworn affidavit and ID document	
CONSTRUCTION MANAGER	Qualifications Form (completed and signed)	
	Experience Forms (4No) (completed and signed)	
	Certified copy of qualification	
	Sworn affidavit and ID document	
CONCRETE FOREMAN	Qualifications Form (completed and signed)	
	Experience Forms (3No) (completed and signed)	
	Sworn affidavit and ID document	
CIVIL FOREMAN	Qualifications Form (completed and signed)	
	Experience Forms (2No) (completed and signed)	
	Sworn affidavit and ID document	

QUALIFICATIONS OF TENDERER'S CONTRACT'S ENGINEER

Refer to Clause C2.1.3 (b) for Eligibility evaluation prompts.

The person nominated for the key personnel position above shall provide all the information required below and sign the declaration at the end of this form

Full Name & Surname:			
ID/ Passport No.		Age:	
Name of Tertiary Institution/s Attended:			
Tertiary Qualification/s (and Year/s Obtained):			

Note: Certified copies of all relevant qualifications must be attached to this form.

Declaration by nominee for key staff position above:

I, the undersigned, declare that all the information provided above and in forms that follow correctly describes my qualifications.

SIGNATURE DATE:
(of the person named on this form)

Note to Tenderer:

The Tenderer shall ensure that this form is signed by the person nominated for the above key staff position and that all the information provided is true. Any inconsistency in the information provided will lead to the conclusion that the person nominated is not suitably qualified for the position and will render the Tenderer not eligible. Should this key staff member not be available for deployment to this contract upon award, only approved candidates with similar or better credentials will be considered by the employer.

EXPERIENCE AS CONTRACT ENGINEER

Refer to Clause C.2.1.3 (b) for Eligibility evaluation prompts.

(Copies shall be made of this page to suit the number of contracts)

Contract Title:	
Name of Client:	
(Note: Client implies: eThekwin Municipality, Cape Town Municipality, Umgeni Water, etc.)	
Name of Referee for the above contract:	
Referee Tel. No. / Cell No.:	
Details of Structure and Contract Value (Adjustments for present day value to be at 6% per annum.)	

CLIENT CONFIRMATION

I, the undersigned, as the abovementioned representative of the Client, hereby confirm that information contained in this form is both true and correct

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.16 ELIGIBILITY: PROPOSED STAFFING

QUALIFICATIONS OF TENDERER'S CONSTRUCTION MANAGER

Refer to Clause C.2.1.3 (b) for Eligibility evaluation prompts.

The person nominated for the key personnel position above shall provide all the information required below and sign the declaration at the end of this form

Full Name & Surname:			
ID/ Passport No.		Age:	
Name of Tertiary Institution/s Attended:			
Tertiary Qualification/s (and Year/s Obtained):			

Note: Certified copies of all relevant qualifications must be attached to this form.

Declaration by nominee for key staff position above:

I, the undersigned, declare that all the information provided above and in forms that follow correctly describes my qualifications.

SIGNATURE DATE:
(of the person named on this form)

Note to Tenderer:

The Tenderer shall ensure that this form is signed by the person nominated for the above key staff position and that all the information provided is true. Any inconsistency in the information provided will lead to the conclusion that the person nominated is not suitably qualified for the position and will render the Tenderer not eligible. Should this key staff member not be available for deployment to this contract upon award, only approved candidates with similar or better credentials will be considered by the employer.

EXPERIENCE AS CONSTRUCTION MANAGER

Refer to Clause C.2.1.3 (b) for Eligibility evaluation prompts.
(Copies shall be made of this page to suit the number of contracts)

Contract Title:	
Name of Client:	
(Note: Client implies: eThekwin Municipality, Cape Town Municipality, Umgeni Water, etc.)	
Name of Referee for the above contract:	
Referee Tel. No. / Cell No.:	
Details of Structure and Contract Value (Adjustments for present day value to be at 6% per annum.)	

CLIENT CONFIRMATION

I, the undersigned, as the abovementioned representative of the Client, hereby confirm that information contained in this form is both true and correct

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.16 ELIGIBILITY: PROPOSED STAFFING

QUALIFICATIONS OF TENDERER'S CONCRETE FOREMAN

Refer to Clause C2.1.3 (b) for Eligibility evaluation prompts.

The person nominated for the key personnel position above shall provide all the information required below and sign the declaration at the end of this form

Full Name & Surname:			
ID/ Passport No.		Age:	

Note: Certified copies of all relevant qualifications must be attached to this form.

Declaration by nominee for key staff position above:

I, the undersigned, declare that all the information provided above and in forms that follow correctly describes my qualifications.

SIGNATURE DATE:
(of the person named on this form)

Note to Tenderer:

The Tenderer shall ensure that this form is signed by the person nominated for the above key staff position and that all the information provided is true. Any inconsistency in the information provided will lead to the conclusion that the person nominated is not suitably qualified for the position and will render the Tenderer not eligible. Should this key staff member not be available for deployment to this contract upon award, only approved candidates with similar or better credentials will be considered by the employer.

EXPERIENCE AS CONCRETE FOREMAN

Refer to Clause C.2.1.3 (b) for Eligibility evaluation prompts.

(Copies shall be made of this page to suit the number of contracts)

Contract Title:	

Name of Client:	
(Note: Client implies: eThekweni Municipality, Cape Town Municipality, Umgeni Water, etc.)	

Name of Referee for the above contract:	

Referee Tel. No. / Cell No.:	

Details of Structure and Contract Value (Adjustments for present day value to be at 6% per annum.)	

CLIENT CONFIRMATION

I, the undersigned, as the abovementioned representative of the Client, hereby confirm that information contained in this form is both true and correct

NAME (Block Capitals):

Date

SIGNATURE:

T2.2.16 ELIGIBILITY: PROPOSED STAFFING

QUALIFICATIONS OF TENDERER'S CIVIL FOREMAN

Refer to Clause C2.1.3 (b) for Eligibility evaluation prompts.

The person nominated for the key personnel position above shall provide all the information required below and sign the declaration at the end of this form

Full Name & Surname:			
ID/ Passport No.		Age:	

Note: Certified copies of all relevant qualifications must be attached to this form.

Declaration by nominee for key staff position above:

I, the undersigned, declare that all the information provided above and in forms that follow correctly describes my qualifications.

SIGNATURE DATE:
(of the person named on this form)

Note to Tenderer:

The Tenderer shall ensure that this form is signed by the person nominated for the above key staff position and that all the information provided is true. Any inconsistency in the information provided will lead to the conclusion that the person nominated is not suitably qualified for the position and will render the Tenderer not eligible. Should this key staff member not be available for deployment to this contract upon award, only approved candidates with similar or better credentials will be considered by the employer.

EXPERIENCE AS CIVIL FOREMAN

Refer to Clause C.2.1.3 (b) for Eligibility evaluation prompts.

(Copies shall be made of this page to suit the number of contracts)

Contract Title:	
Name of Client:	
(Note: Client implies: eThekwin Municipality, Cape Town Municipality, Umgeni Water, etc.)	
Name of Referee for the above contract:	
Referee Tel. No. / Cell No.:	
Details of Structure and Contract Value (Adjustments for present day value to be at 6% per annum.)	

CLIENT CONFIRMATION

I, the undersigned, as the abovementioned representative of the Client, hereby confirm that information contained in this form is both true and correct

NAME (Block Capitals):

Date

SIGNATURE:

PART C1: AGREEMENT AND CONTRACT DATA
C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.1: OFFER

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

Contract No: 32547-5W

Contract Title: Mobeni 2 Reservoir: The reinstatement of the collapsed reservoir, upgrades to the existing reservoir complex, embankments and associated works: Ward 64

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:**

R..... (In words
.....)

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

For the Tenderer:

*** Name of Tenderer (organisation)** :

*** Signature (of person authorized to sign the tender)** :

*** Name (of signatory in capitals)** :

Capacity (of Signatory) :

Address :

:

Telephone :

Witness:

Signature : **Date** :

Name (in capitals) : :

Notes:

*** Indicates what information is mandatory.**

Failure to complete the mandatory information and sign this form will invalidate the tender.

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.2: FORM OF ACCEPTANCE

This Form will be completed by the Employer

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

The terms of the contract are contained in:

- Part C1 : Agreement and Contract Data, (which includes this Agreement)
- Part C2 : Pricing Data, including the Bill of Quantities
- Part C3 : Scope of Work
- Part C4 : Site Information

and the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C4 above.

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

Name (*of signatory in capitals*) :

Capacity (*of Signatory*) :

Name of Employer (*organisation*) :

Address :

:

Witness:

Signature : **Date** :

Name(*in capitals*) : :

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.3: SCHEDULE OF DEVIATIONS

This form will be completed by THE EMPLOYER and ONLY THE SUCCESSFUL TENDERER

1.

Subject

:

Details

:

:

2.

Subject

:

Details

:

:

3.

Subject

:

Details

:

:

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

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

FOR THE TENDERER		FOR THE EMPLOYER
	Signature	
	Name (<i>in capitals</i>)	
	Capacity	
	Name and Address of	
	Organisation	
	Witness Signature	
	Witness Name	
	Date	

C1.2: CONTRACT DATA

C1.2.1 CONDITIONS OF CONTRACT

C1.2.1.1 GENERAL CONDITIONS OF CONTRACT

The Conditions of Contract are the General Conditions of Contract for Construction Works (2015 3rd Edition), (GCC 2015) published by the South African Institution of Civil Engineering. Copies of these conditions of contract may be obtained from the South African Institution of Civil Engineering (Tel: 011-805-5947, Fax: 011-805-5971, E-mail: civilinfo@saice.org.za).

The Contract Data (including variations and additions) shall amplify, modify, or supersede, the GCC 2015 to the extent specified below, and shall take precedence and shall govern.

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

C1.2.2 CONTRACT DATA

C1.2.2.1 DATA TO BE PROVIDED BY THE EMPLOYER

1.1.1.13 The **Defects Liability Period**, from the date of the Certificate of Completion, is **1 Year**

1.1.1.14 The **time for achieving Practical Completion**, from the Commencement Date is **655 Days**. The period as stated in 5.3.2, and the 37 days referred to in 5.3.3, are included in the above time for achieving Practical Completion. The special non-working days as stated in 5.8.1 are included in the time for achieving Practical Completion.

1.1.1.15 The Employer is the eThekweni Municipality as represented by:
Deputy Head: **Water & Sanitation**

1.2.1.2 The address of the Employer is: eThekweni Water and Sanitation
Physical: 3 Prior Road, Durban, 4001
Postal: P. O Box 680, Durban, 4000
Telephone: 031-311 8656
E-Mail: Leisel.bowes@durban.gov.za

1.1.1.16 The **name of the Employer's Agent** representative is Josh Padayachee

1.2.1.2 The address of the Employer' Agent is: Naidu Consulting (Pty) Ltd
Physical: No. 5 the Boulevard, Westway Office Park, Spine Road, Westville, 3635
Postal: P O Box 2796, Westway Office Park
Telephone: 031-265 6007
E-Mail: Josh.Padayachee@naiduconsulting.com

1.1.1.26 The **Pricing Strategy** is by **Re-measurement Contract**

3.2.3 The Employer's Agent shall obtain the **specific approval of the Employer** before executing any of his functions or duties according to the following Clauses of the General Conditions of Contract:

- 6.3: Council approval in order to authorise any expenditure in excess of the Tender Sum plus **10% contingencies**.

4.11.1 To carry out and complete the works, the Contractor shall employ a competent Contracts Engineer (Manager), Site Engineer/Agent/Construction Manager, Concrete Foreman and Civil Foreman as part of the key staff. It is a requirement for the aforementioned staff meet the requirements as set out below:

Contracts Engineer

- Qualification in Civil Engineering as a Technician (N. Dip)/Technologist(B-Tech)/Engineer (BSc/BEng)
- Registered with SACPCMP as PrCM or ECSA as a Pr Techni/Pr Tech Eng/Pr Eng
- Minimum ten (10) years' experience as a Contract's Engineer
- Successfully completed the construction of a minimum of four (4) reinforced concrete water retaining structures with a minimum capacity of ten (10) Mℓ or greater
- Successful completion of a minimum four (4) civil projects with either one or more of the following:
 - Reinforced Earth Embankments
 - Stormwater Infrastructure
 - Continuously Welded steel pipelines (water)
 - Repair/Improvement/reinstatement of reinforced concrete civil structures with a minimum project value of R 20 million.

Construction Manager

- Qualification in Civil Engineering as a Technician (N. Dip)/Technologist(B-Tech)/Engineer (BSc/BEng)
- Minimum seven (7) years' experience as a Construction Manager
- Successfully completed the construction of a minimum of three (3) reinforced concrete water retaining structures with a minimum capacity of ten (10) Mℓ or greater.
- Successful completion of a minimum one (1) civil project with either one or more of the following:
 - Reinforced Earth Embankments
 - Stormwater Infrastructure
 - Continuously Welded steel pipelines (water)
 - Repair/Improvement/reinstatement of reinforced concrete civil structures with a minimum project value of R 20 million.

Concrete Foreman

- minimum ten (10) years reinforced concrete experience
- successfully completed the construction, from commencement to completion, of a minimum of three (3) reinforced concrete water retaining structures with a minimum value of R 20 million and a minimum capacity of ten (10) Mℓ or greater.

Civil Foreman

- Minimum ten (10) years civil construction experience i.e. stormwater, earthwork reinforcement, bulk water pipeline installation
- Successfully completed the construction, from commencement to completion of a minimum of two (2) civil (i.e. stormwater/earthwork reinforcement and or bulk water pipeline installation) construction works projects with a minimum value of R 10 million

The CV's of the Contracts Engineer, Construction Manager, Concrete Foreman and Civil Foreman shall be submitted to the Employer's Agent's Representative for acceptance by the Department (reference is made to Cl.5.3.1 of the Contract Data).

Note:

- i) "similar nature" implies projects that were of a value of at least 70% of this tender's value, and had a comparable Scope of Work in terms of technical requirements and operations.
- ii) "experience" implies experience on projects of a similar nature.
- iii) "accredited degree / diploma" implies a minimum 3-year qualification within the built environment, from a registered University or Institute of Technology.

5.3.1 The **documentation required** before commencement with Works execution are:

- Health and Safety Plan (refer to Clause 4.3)
- Initial Programme (refer to Clause 5.6)
- Security (refer to Clause 6.2)
- Insurance (refer to Clause 8.6)
- CV(s) of Key Site Staff (refer to Clause 4.11.1)
- CPG Implementation Plan
- If required to be registered, in terms of the Occupational Injuries and Diseases Act (130 of 1993 as amended), the Contractor is to supply proof of being registered and in good standing with the compensation fund by submitting a valid Letter of Good Standing from the Compensation Commissioner. Should the Contractor's Letter of Good Standing be expired, but an application for renewal has been made, the Contractor is to submit the expired Letter of Good Standing AND proof of an application for renewal.

5.3.2 The **time to submit the documentation** required before commencement with Works is **14 Days**

5.3.3 Add the following paragraph:

"If a construction work permit, in terms of Clause 3(1) of the Construction Regulations (2014), is applicable, the instruction to commence carrying out of the works may only be issued once the construction work permit has been obtained by the Employer's Agent. If a construction work permit is applicable, the contractor shall allow for a minimum period of 37 days, after the submission (or re-submission) of the documentation referred to in Clause 5.3.1., for the issuing of the construction work permit."

5.4.2 The access and possession of Site shall not be exclusive to the Contractor but as set out in the Site Information. The Employer shall grant the Contractor access to the reservoir site to perform the required construction and commissioning activities, whilst ensuring the continuity of the Employer's operational activities. Access arrangements shall be shared and coordinated to facilitate the Contractor's work without compromising the operational integrity of the reservoir system.

5.6.2.2 The sequence, timing and resources for carrying out the Works which shall take into account the following hold points and restrictive working conditions:

- a) No access/storage/construction activities will be permitted on the neighboring private property (ERF 1/3010). Demolition of small buildings and reservoir 2 shall be done in such sequencing that access can be accommodated from only within the reservoir boundary.
- b) Existing services on site to be proved and protected where necessary before commencement of works. Special attention shall be paid to the existing pylon; the contractor is responsible for the protection of the existing pylon at all times and must ensure that it is fully operational for the duration of the contract.
- c) Demolition must be fully controlled such that saw-cutting or similar approved means are employed to completely separate the portion of the reservoir to be demolished from the portion to remain in place, prior to the actual demolition taking place, and with such plant and equipment utilized that will not have any adverse impact on the founding conditions and embankments throughout the course of works.
- d) No soil nailing or piling will be allowed until the survey of the pylon and adjacent embankment and soil nail pull out test, are complete, and results/designs reviewed and approved by the Geotechnical Engineer, a 2-week allowance for the Geotechnical Engineer's review is to be allowed as a minimum.

- e) The mechanically stabilized gabion wall, embankment and platforming, are to be completed before the main piling works can commence (i.e.: Piling of the working piles can only commence upon completion of the mechanically stabilized gabion wall and platform).
- f) The installation of the test pile, and the subsequent pile load test can be undertaken concurrently with the construction of the mechanically stabilized gabion wall. The position of the test pile is to be identified on site and approved by the Geotechnical Engineer.
- g) During the pile load testing, no activities that will result in vibratory effects on the test pile, including but not limited to compaction and excavation activities in close proximity to the pile load testing site, shall be permitted.
- h) Installation of the working piles may only commence following the successful completion of the pile load test, and approval of the results from the Geotechnical Engineer. A minimum time of 3 weeks post receipt of the results by the Geotechnical Engineer shall be allowed before commencement of the working piles.
- i) The pipework at Chamber C6 (Supply from Woodlands 3 & 4 to Mobeni Reservoir 1 Cell 1) shall be isolated and blank flanged to allow for the inlet at Chamber C3 (Supply from Woodlands 3 & 4 to Mobeni Reservoir 1 Cell 2) to be constructed and tied into the new DN450 steel pipeline.
- j) The Contractor shall only construct the new inlet Chamber C6 once inlet Chamber C3 has been constructed and commissioned.
- k) All pipework, valves, and chambers along the outlet pipeline of Mobeni Reservoir 2 shall be constructed, tested, commissioned prior to commissioning Reservoir 2.
- l) Reservoir 2 must be fully commissioned before Reservoir 1 can have a shut down for works on the reservoir.
- m) All telemetry and associated electrical works must be fully commissioned before Reservoir 1 can have a shut down for works on the reservoir.

If the Contractor chooses to undertake work that would alter the above envisaged restrictions/hold points, any delay and associated costs shall be for the Contractor's account and will not be considered a reason for extension of time in relation to Clause 5.12.

5.8.1 The **non-working days** are **Saturdays and Sundays**.

(5.1.1) The **special non-working** days are:

- All statutory holidays as declared by National or Regional Government.
- The year-end break:
 - Commencing on the first working day after 15 December.
 - Work resumes on the first working day after 5 January of the next year.

5.8.1 Delete the words "sunset and sunrise" and replace with "17:00 and 07:00".

5.12.2.2 **Abnormal Climatic Conditions (Rain Delays)** - The numbers of days per month, on which work is expected not to be possible as a result of rainfall, for which the Contractor shall make provision, is given in the table below. During the execution of the Works, the Employer's Agent's Representative will certify a day lost due to rainfall only if at least 75% of the work force and plant on site could not work during that specific working day.

Extension of time as a result of rainfall shall be calculated monthly being equal to the number days certified by the Employer's Agent's Representative as lost due to rainfall, less the number of days allowed for as in table below, which could result in a negative figure for certain months. The total extension of time for which the Contractor may apply, shall be the cumulative algebraic sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as NIL.

<u>Month</u>	<u>Days Lost</u>	<u>Average Rainfall</u>	<u>Month</u>	<u>Days Lost</u>	<u>Average Rainfall</u>
January	4*	134	July	1	39
February	3	113	August	2	62
March	3	120	September	2	73
April	2	73	October	3	98
May	2	59	November	3	108
June	1	28	December	1*	102
TOTAL	27	1009mm	* = The number of working days lost allows for the annual statutory Construction holiday in December and January of each year.		

5.13.1 The **penalty for delay** in failing to complete the Works is **R 15 000.00** (per Day).

5.13.3 (a) If the Contractor fails to provide 7 days' notice to the Employer's Agent prior to any postponement or cancellation of any shutdown for any reason within the Contractor's control, the Contractor shall be liable to the Employer for the sum of R10 000.00 per occurrence.

(b) If the Contractor fails to complete work within the shutdown periods stated in the project specifications, and if the delay is caused directly by the Contractor in recommissioning the pipeline/service, the Contractor shall be liable to the Employer for the sum of R10 000.00 per hour for each hour beyond the scheduled end of the shutdown

5.14.1 The **requirements for achieving Practical Completion** will be determined by the Employer's Agent (in consultation with the Contractor) and recorded in the minutes of the first Site Meeting / Handover Meeting. (Refer to 1.1.1.24 for a generic definition.) The requirements are to be regularly reviewed with respect to any variations to the Contract.

5.16.3 The **latent defect liability** period is **10 Years**.

6.2.1 **Security (Performance Guarantee):** Delete the word "selected" and replace it with "stated".

The liability of the Performance Guarantee shall be as per the following table:

Value of Contract (incl. VAT)	Performance Guarantee Required
Less than or equal to R 1m	Nil
Greater than R 1m and less than or equal to R 10m	5% of the Contract Sum
Greater than R 10m	10% of the Contract Sum

6.5.1.2.3 The **percentage allowance** to cover overhead charges for daywork are as follows:

- **80%** of the gross remuneration of workmen and foremen actually engaged in the daywork;
- **20%** on the net cost of materials actually used in the completed work.

No allowance will be made for work done, or for materials and equipment for which daywork rates have been quoted at tender stage.

6.8.2 **Contract Price Adjustment Factor:** The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule (GCC 2015 - page 86) with the following Indices / Descriptions / Coefficients:

- The proportion not subject to adjustment: **x = 0.10**.
- The base month will be the month prior to the month in which tenders close.

- The Index for, **Plant, Materials, and Fuel** shall be based on **2023 = 100**.
- The Index for **Labour** shall be based on **2024 = 100**.

	STATS SA Statistical Release	Table	Description	Coefficient
• "L" is the "Labour Index"	P0141	Table A	Geographic Indices; CPI per Province; Kwa-Zulu Natal	a = 0.28
• "P" is the • "Contractor's Equipment Index"	P0151.1	Table 4	Plant and Equipment	b = 0.28
• "M" is the "Materials Index"	P0151.1	Table 6	Civil Engineering Material (excluding bitumen)	c = 0.38
• "F" is the "Fuel Index"	P0142.1	Table 1	Coke, petroleum, chemical, rubber and plastic products; Coal and petroleum products; Diesel	d = 0.06

6.8.3 Price adjustments for **variation in the cost of the special material(s)** listed below, will be allowed.

6.10.1.5 The **percentage advance** on materials not yet built into the Permanent Works is **80%**.

The **percentage advance** on Plant not yet supplied to Site: **Not Required**

6.10.3 **Retention Money:** Delete the word "selected".
The percentage retention on the amounts due to the Contractor is 10%.
The limit of "retention money" is 5% of the Contract Sum.
Should the Contract Price exceed the Contract Sum then the limit of "retention money" is 5% of the Contract Price.
Interest will not be paid on retention withheld by the Employer.

8.6.1.1.2 The **value of Plant and materials** supplied by the Employer to be included in the insurance sum: **Not Required**

8.6.1.1.3 The **amount to cover professional fees** for repairing damage and loss to be included in the insurance sum: **R 300 000.00**

8.6.1.2 **SASRIA Coupon Policy** for Special Risks to be issued in joint names of Council and Contractor for the full value of the works (including VAT).

8.6.1.3 The limit of indemnity for **liability insurance**: **R 10 000 000.00**

8.6.1.4 **Ground Support Insurance:**

- Minimum amount for any one occurrence, unlimited as to the number of occurrences, against any claim for damages or loss caused by vibration and / or removal of lateral support:
R 15 000 000.00
- Maximum first excess: **R 50 000.00**

8.6.1.5 Furthermore, the insurance cover effected by the Contractor shall meet the following requirements:

Third Party Insurance (Public Liability)

- Minimum amount for any one occurrence, unlimited as to the number of occurrences, for the period of the contract, inclusive of the maintenance period: **R 10 000 000.00**
- Consequential loss to be covered by policy: **Yes**
- Liability section of policy to be extended to cover blasting: **Nil**
- Maximum excess per claim or series of claims arising out of any one occurrence: **R 25 000.00**

Principal's own surrounding Property Insurance

- Minimum amount for any one occurrence unlimited as to the number of occurrences against any claim for damage which may occur to the Council's own surrounding property: **R 5 000 000.00**
- Maximum first excess: **R 20 000.00**

Insurance of Works

- Minimum amount for additional removal of debris (no damage): **R 3 000 000.00**
- Minimum amount for temporary storage of materials off site, excluding Contractor's own premises: **R 10 000 000.00**
- Minimum amount for transit of materials to site: **R 5 000 000.00**

8.6.5 **Approval by Employer:** At the end of the sub-clause, add the following paragraph:

"Except where otherwise provided in the Special Conditions of Contract, the insurance cover effected by the Contractor in terms of this clause shall not carry a first loss amount greater than those set out below:

Contract Price	First Loss
Less than R 100,000	R 5,000
R 100,000 to R 500,000	R 10,000
R 500,000 to R 1,000,000	R 20,000
R 1,000,000 to R 2,000,000	R 30,000
R 2,000,000 to R 4,000,000	R 40,000
Greater than R 4,000,000	R 50,000

The insurance policy shall contain a specific provision whereby cancellation of the policy prior to the end of the period referred to in Cause 8.2.1 cannot take place without the prior written approval of the Employer."

10.1.4 If, in respect of any claim to which this Clause refers, the Contractor fails to comply with the 28 day notice period in Clause 10.1.1, as read with Clause 10.1.2 or the Contractor fails to comply with the requirements of Clause 10.1.1.3, or does not deliver his final claim within 28 days after the end of the events or circumstances, the Due Completion Date shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged of all liability with the claim.

10.7.1 Failing ad-hoc adjudication, the determination of disputes shall be by arbitration.

C1.2.2.2 DATA TO BE PROVIDED BY CONTRACTOR

1.1.1.9 The legal name of Contractor is:

1.2.1.2 The Physical address of the Contractor is:

The Postal address of the Contractor is:

The contact numbers of the Contractor are:

Telephone:

Fax:

The E-Mail address of the Contractor is:

6.5.1.2.3 The **percentage allowance** to cover overhead charges for daywork are as follows:

- % of the gross remuneration of workmen and foremen actually engaged %
in the daywork;
- % on the net cost of materials actually used in the completed work. %

C1.2.3 ADDITIONAL CONDITIONS OF CONTRACT

C1.2.3.1 COMMUNITY LIAISON OFFICER

The Ward Councillor(s) in whose ward(s) work is to be done will, collectively, identify a community liaison officer (CLO) for the project and make the person known to the Contractor within two days of being requested to do so. The Contractor will be required to enter a written contract with the CLO that specifies:

- The hours of work and the wage rate of the CLO (200% of the Civil Engineering Industry minimum wage).
- The duration of the appointment.
- The duties to be undertaken by the CLO which could include:
 - Assisting in all respects relating to the recruitment of local labour.
 - Acting as a source of information for the community and councillors on issues related to the contract.
 - Keeping the Contractor advised on community issues and issues pertaining to local security.
 - Assisting in setting up any meetings or negotiations with affected parties.
 - Keeping a written record of any labour or community issue that may arise.
 - Any other duties that may be required by the Contractor.

Responsibility for the identification of a pool of suitable labour shall rest with the CLO, although the Contractor shall have the right to choose from that pool. The Contractor shall have the right to determine the total number labourers required at any one time and this may vary during the contract.

The Contractor shall have the right to replace labour that is not performing adequately. Should such occasion arise, it must be done in conjunction with the CLO.

Payment: The CLO will be reimbursed from the PC Sum item in the Preliminary & General Section of the Bill of Quantities.

C1.2.3.2 EMPLOYMENT OF LOCAL LABOUR

It is a condition of contract that the contractor will be required to employ local labour as specified in eThekweni Council Policy "The use of CLOs and Local Labour". The contractor will be required to ensure that a minimum of 50% of the labour force is made up of local labour. For the purposes of this contract, "Local labour" will be deemed to be any **persons who reside within Ward 64**. The contractor will be required to provide proof of authenticity of local labour. Signed confirmation by the appointed CLO will suffice for this.

No additional costs will be entertained due to this Particular Specification. The contractor will remain responsible for providing proper supervision of all labour and will be responsible for the quality of work produced.

C1.2.3.3 CONTRACTOR PARTICIPATION GOAL (CPG)

It is a condition of contract that the contractor must allow for a minimum of **30%** of the contract value (excluding PC Sum items and Fixed Cost allowances) to be subcontracted to contractors who are **>51%** owned by Black People. Proof of payment to the subcontractors will be required to verify that the minimum has been achieved.

The penalty for not achieving the specified CPG will be 0.5% of the contract value (excluding PC Sum items and Fixed Cost allowances) for every 1% of CPG not achieved.

C1.2.3.4 FTE (Full Time Equivalent) EMPLOYMENT INFORMATION

It is a condition of contract that the Contractor supplies the Employer's Agent's Representative with information in respect of the employment of all foremen, artisans and Labour (skilled and unskilled) employed to work on this contract. The information required is:

- Initials (per ID doc)
- Last Name (per ID doc)
- ID Number
- Disability (y / n)
- Education Level

Level 1 Unknown	Level 2 No Schooling	Level 3 Grade 1-3	Level 4 Grade 4	Level 5 Grade 5-6
Level 6 Grade 7-8	Level 7 Grade 9	Level 8 Grade 10-11	Level 9 Grade 12	Level 10 Post Matric

- Category of Employment

Category A: Employed as Local Labour for this contract only Category B: Temporarily employed by the Contractor Category C: Permanently employed by the Contractor

In addition, the following information is required in respect of each person listed above, on a monthly basis:

- Number of days worked during the month;
- Daily wage rate;
- Number of training days during the month.

The information is to be forwarded in a format acceptable to the Employer's Agent's Representative, but preferably in the form of an emailed EXCEL file (an original file, to be used as a template, will be issued to the Contractor). Contractors without computer facilities will be required to submit a hard copy of the information in a format as agreed to between the Contractor and the Employer's Agent's Representative.

In addition to the tax invoice, to be submitted by the Contractor with his monthly statement, mentioned in Clause 6.10.4 of GCC 2015, the Employer reserves the right to withhold payment until the monthly FTE information has been forwarded to the Employer's Agent's Representative. No additional payment for complying with the above will be made and the Contractor is to make allowance for complying through the time related P & G items (sum) under Part AA: Preliminaries, of the Bill of Quantities.

C1.2.3.5 PERFORMANCE MONITORING OF SERVICE PROVIDERS

[For contract awards over R10m] The Contractor shall be subjected to "Performance Monitoring" assessments in terms of the applicable Section (S.53) of the Employer's Supply Chain Management Policy.

Key Performance Indicators (KPIs) are specified in the C3: Scope of Works, or will be discussed and agreed with the Contractor before commencement of the contract.

C1.2.3.6 EXCEPTED RISKS (Clause 8.3)

Pursuant to Clause 8.3 of the Conditions of Contract (GCC 2015), the Employer shall not be liable for the payment of standing time costs as a result of the occurrence of any of the "Excepted Risks" as defined under Clause 8.3.

However, the Employer shall reimburse the Contractor in respect of plant de-establishment and re-establishment costs as a result of "Excepted risks" when a written instruction to de-establish is issued to the Contractor.

C2.1: PRICING ASSUMPTIONS / INSTRUCTIONS

C2.1.1 GENERAL

The Bill of Quantities forms part of the Contract Documents and must be read and priced in conjunction with all the other documents comprising the Contract Documents (refer to C.1.2 of the Tender Data).

C2.1.2 PRICING INSTRUCTIONS AND DESCRIPTION OF ITEMS IN THE SCHEDULE

Measurement and payment shall be in accordance with the relevant provisions of Clause 8 of each of the Standard Engineering Specifications referred to in the Scope of Work. The Preliminary and General items shall be measured in accordance with the provisions of C2.1.8.

The descriptions of the items in the Bill of Quantities are for identification purposes only and comply generally with those in the Standard Engineering Specification.

Clause 8 of each Standard Engineering Specification, read together with the relevant clauses of the Scope of the works, set out what ancillary or associated work and activities are included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standard Engineering Specification, or the Scope of the works, conflict with the Bill of Quantities, the requirements of the Standard Engineering Specification or Scope of the work, as applicable, shall prevail.

C2.1.3 QUANTITIES REFLECTED IN THE SCHEDULE

The quantities given in the Bill of Quantities are estimates only, and subject to re-measuring during the execution of the work. The Contractor shall obtain the Employer's Agent's detailed instructions for all work before ordering any materials or executing work or making arrangements for it.

The Works as finally completed in accordance with the Contract shall be measured and paid for as specified in the Bill of Quantities and in accordance with the General and Special Conditions of Contract, the Specifications and Project Specifications and the Drawings. Unless otherwise stated, items are measured net in accordance with the Drawings, and no allowance

has been made for waste.

The validity of the contract will in no way be affected by differences between the quantities in the Bill of Quantities and the quantities finally certified for payment.

C2.1.5 MONTHLY PAYMENTS

Unless otherwise specified in the Specifications and Project Specifications, progress payments in Interim Certificates, referred to in Clause 6.10.1 of the General Conditions of Contract, in respect of "sum" items in the Bill of Quantities shall be by means of interim progress instalments assessed by the Employer's Agent and based on the measure in which the work actually carried out relates to the extent of the work to be done by the Contractor.

C2.1.4 PROVISIONAL SUMS / PRIME COST SUMS

Where Provisional Sums or Prime Cost sums (PC Sum) are provided for items in the Bill of Quantities, payment for the work done under such items will be made in accordance with Clause 6.6 of the General Conditions of Contract. The Employer reserves the right, during the execution of the works, to adjust the stated amounts upwards or downwards according to the work actually done under the item, or the item may be omitted altogether, without affecting the validity of the Contract.

The Tenderer shall not under any circumstances whatsoever delete or amend any of the sums inserted in the "Amount" column of the Bill of Quantities and in the Summary of the Bill of Quantities unless ordered or authorized in writing by the Employer before closure of tenders. Any unauthorized changes made by the Tenderer to provisional items in the schedule, or to the provisional percentages and sums in the Summary of the Bill of Quantities, will be treated as arithmetical errors.

C2.1.6 PRICING OF THE BILL OF QUANTITIES

The prices and rates to be inserted by the Tenderer in the Bill of Quantities shall be the full inclusive prices to be paid by the Employer for the work described under the several items, and shall include full compensation

for all costs and expenses that may be required in and for the completion and maintenance during the defects liability period of all the work described and as shown on the drawings as well as all overheads, profits, incidentals and the cost of all general risks, liabilities and obligations set forth or implied in the documents on which the Tender is based.

Each item shall be priced and extended to the "Total" column by the Tenderer, with the exception of the items for which only rates are required (Rate Only), or items which already have Prime Cost or Provisional Sums affixed thereto. If the Contractor omits to price any items in the Bill of Quantities, then these items will be considered to have a nil rate or price.

All items for which terminology such as "inclusive" or "not applicable" have been added by the Tenderer will be regarded as having a nil rate which shall be valid irrespective of any change in quantities during the execution of the Contract.

All rates and amounts quoted in the Bill of Quantities shall be in Rands and Cents and shall include all levies and taxes (other than VAT). VAT will be added in the Summary of the Bill of Quantities.

C2.1.7 "RATE ONLY" ITEMS

The Tenderer shall fill in rates for all items where the words "Rate Only" appear in the "Total" column. "Rate Only" items have been included where:

- (a) an alternative item or material is contemplated;
- (b) variations of specified components in the make-up of a pay item may be expected; and
- (c) no work under the item is foreseen at tender stage but the possibility that such work may be required is not excluded.

For "Rate Only" items no quantities are given in the "Quantity" column but the quoted rate shall apply in the event of work under this item being required. The Tenderer shall however note that in terms of the

Tender Data the Tenderer may be asked to reconsider any such rates which the Employer may regard as unbalanced.

C2.1.8 PRELIMINARY AND GENERAL

The Preliminary and General Section is provided to cover the Contractor's expenses incurred in complying with the requirements of the tender documents and consists of the following parts:

- Part AA: Preliminaries
- Part AB: General Specifications
- Part AH: Occupational Health and Safety

Fixed Charge Items: Each item should be priced separately and, subject to the Engineer certifying in terms of Clause 6.7 of the General Conditions of Contract that the work has been done, payment will be made as follows:

- (i) the total amount due when the certified value fixed charge items in this section is less than 5% of the net contract price;
- (ii) when the certified value of fixed charge items in this section is greater than 5% of the net contract price, payment will be limited to 5% of the net contract price. The remainder will be paid when the value of the work done under the contract, excluding the value of fixed charge items in this section, is greater than 50% of the net contract price, excluding the value of fixed charge items in this section.

Time Related Items: Any Time Related items not priced shall be deemed to be covered by the prices of other items in the section.

Payment of Time Related items in this section will be made throughout the contract period, the amount per month being the value of the item divided by the completion in months or, if specified in weeks, the equivalent number of months, in terms of Clause 5.5 of the General Conditions of Contract. The final monthly increment will only be paid upon the issue of a completion certificate.

C2.2: BILL OF QUANTITIES

The Bill of Quantities follows and comprises of 60 pages. The pages are numbered 78 to 137.

SCHEDULE 1 - PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
1	SABS 1200 A	PRELIMINARY AND GENERAL				
1.1	8.3	FIXED-CHARGE AND VALUE RELATED ITEMS				
1.1.1	PSA 8.3.1	Contractual Requirements	Sum	1.00		
	8.3.2.1	<u>Establish facilities on the site for Engineer (SABS 1200 AB):</u>				
1.1.2	8.3.2.1 (a) PSAB 3.2	Furnished offices (2 No.)	Sum	1.00		
1.1.3	8.3.2.1 (b)	Telephone for Engineer	Sum	1.00		
1.1.4	8.3.2.1 (c)	Project name boards (2 No.)	Sum	1.00		
1.1.5	PSA 8.3.2.1 (d)	Meeting room facilities	Sum	1.00		
	8.3.2.2	<u>Establish facilities on the site for Contractor:</u>				
1.1.6	8.3.2.2 (a)	a) Offices & storage sheds	Sum	1.00		
1.1.7	8.3.2.2 (e)	b) Ablution & latrine facilities	Sum	1.00		
1.1.8	8.3.2.2 (f)	c) Tools & equipment	Sum	1.00		
1.1.9	8.3.2.2 (g)	d) Water supplies, electric power and communications	Sum	1.00		
1.1.10	8.3.2.2 (h)	e) Dealing with water	Sum	1.00		
1.1.11	8.3.2.2 (i)	f) Access	Sum	1.00		
1.1.12	8.3.3	Other fixed-charge obligations	Sum	1.00		
1.1.13	8.3.4	Removal of site establishment	Sum	1.00		
	PSA 8.9	<u>Occupational Health and Safety</u>				
1.1.14		Health & safety plan	Sum	1.00		
		<u>Allow for the following additional items which the tenderer requires to be priced separately</u>				
1.1.15		a)	Sum	1.00		
1.1.16		b)	Sum	1.00		
1.1.17		c)	Sum	1.00		
1.2	8.4	TIME-RELATED ITEMS				
1.2.1	PSA 8.4.1	Contractual requirements	Days	655		
	8.4.2.1	<u>Facilities for Engineer for duration of construction (SABS 1200 AB):</u>				
1.2.2	8.4.2.1 (a)	Furnished offices (2 No.)	Days	655		
Total Carried Forward						

SCHEDULE 1 - PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
1.2.3	8.4.2.1 (b) PSAB 5.4	Telephone for Engineer	Days	655		
1.2.4	8.4.2.1 (c)	Project name board (2 No.)	Days	655		
1.2.5	PSA 8.4.2.1 (d)	Meeting room facilities	Days	655		
	8.4.2.2	<u>Facilities for Contractor for duration of construction:</u>				
1.2.6	8.4.2.2 (a)	a) Offices & storage sheds	Days	655		
1.2.7	8.4.2.2 (e)	b) Ablution & latrine facilities	Days	655		
1.2.8	8.4.2.2 (f)	c) Tools & equipment	Days	655		
1.2.9	8.4.2.2 (g)	d) Water supplies, electric power and communications	Days	655		
1.2.10	8.4.2.2 (h)	e) Dealing with water	Days	655		
1.2.11	8.4.2.2 (i)	f) Access	Days	655		
1.2.12	8.4.3 PS 14	Supervision for duration of construction	Days	655		
1.2.13	8.4.4	Company and head office overhead costs	Days	655		
1.2.14	8.4.5	Other time-related obligations	Days	655		
	PSA 8.9	<u>Occupational Health and Safety</u>				
1.2.15		General safety (time related)	Days	655		
1.2.16	PSA 8.10	Environmental Management Obligations	Days	655		
1.3	8.5	SUMS STATED PROVISIONALLY BY ENGINEER				
1.3.1		Provisional sum for concrete cube strength and durability tests ordered by the Engineer	Prov Sum	1.00	150,000.00	150,000.00
1.3.2		Overheads, charges and profit on item 1.3.1	%	150,000.0		
1.3.3		Provisional sum for non-destructive testing of steel pipelines	Prov Sum	1.00	100,000.00	100,000.00
1.3.4		Overheads, charges and profit on item 1.3.3	%	100,000.0		
1.3.5	PCL	Provisional sum for Contractors responsibility in terms of the Policy for the use/appointment of Community Liaison officer (CLO), Local labour and facilitation of suitable communication mechanisms between the community and the project team.	Prov Sum	1.00	500,000.00	500,000.00
Total Carried Forward						

SCHEDULE 1 - PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
1.3.6		Overheads, charges and profit on item 1.3.5	%	500,000.00		
1.3.7		Provisional sum for equipment for Engineer	Prov Sum	1.00	20,000.00	20,000.00
1.3.8		Overheads, charges and profit on item 1.3.7	%	20,000.00		
1.3.9		Provisional sum for additional geotechnical investigations	Prov Sum	1.00	150,000.0	150,000.00
1.3.10		Overheads, charges and profit on item 1.3.9	%	150,000.00		
1.3.11		Provisional sum for design and installation of cathodic protection, inclusive of all investigative works required	Prov Sum	1.00	1,500,000	1,500,000.00
1.3.12		Overheads, charges and profit on item 1.3.11	%	1,500,000.0		
1.3.13		Provisional sum for additional surveying as directed by the Engineer	Prov Sum	1.00	50,000.00	50,000.00
1.3.14		Overheads, charges and profit on item 1.3.13	%	50,000.00		
1.3.15		Provisional sum for a weather station	Prov Sum	1.00	10,000.00	10,000.00
1.3.16		Overheads, charges and profit on item 1.3.15	%	10,000.00		
1.3.17		Provisional sum for flow monitoring by means of insertion probe, including installation and removal of the probe, high speed data logger hire, and detailed report	Prov Sum	1.00	50,000.00	50,000.00
1.3.18		Overheads, charges and profit on item 1.3.17	%	50,000.00		
1.3.19		Provisional sum for Employers health and safety agent	Prov Sum	1.00	250,000.0	250,000.00
1.3.20		Overheads, charges and profit on item 1.3.19	%	250,000.00		
1.4	8.7	DAYWORKS				
		<u>Labour:</u>				
1.4.1		Foreman (Rate only)	hours	1		Rate Only
1.4.2		Semi-skilled (Rate only)	hours	1		Rate Only
1.4.3		Unskilled (Rate only)	hours	1		Rate Only
		<u>Construction Plant:</u>				
1.4.4		CAT 930 (75kW) or similar (Rate only)	hours	1		Rate Only
Total Carried Forward						

SCHEDULE 1 - PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
1.4.5		Other (Contractor to specify if required) <u>Bulldozer with ripper:</u>	hours	1		Rate Only
1.4.6		CAT D8 or similar (Rate only) <u>Motor Grader:</u>	hours	1		Rate Only
1.4.7		110 kW (Rate only)	hours	1		Rate Only
1.4.8		Other (Contractor to specify) <u>Tip Truck:</u>	hours	1		Rate Only
1.4.9		10m³ (Rate only)	hours	1		Rate Only
1.4.10		6m³ (Rate only)	hours	1		Rate Only
1.4.11		Other (Contractor to specify) <u>Backactor:</u>	hours	1		Rate Only
1.4.12		100kW, 23 ton (Rate only)	hours	1		Rate Only
1.4.13		30 ton (Rate only)	hours	1		Rate Only
1.4.14		TLB (Rate only)	hours	1		Rate Only
1.4.15		Other (Contractor to specify) <u>Compactors:</u>	hours	1		Rate Only
1.4.16		Self propelled vibrating roller, 9 ton (Rate only)	hours	1		Rate Only
1.4.17		Bomang 60 or similar (Rate only)	hours	1		Rate Only
1.4.18		Plate compactor (Rate only)	hours	1		Rate Only
1.4.19		Other (Contractor to specify)	hours	1		Rate Only
1.4.20		Pneumatic Roller (Rate only) <u>Water Tankers:</u>	hours	1		Rate Only
1.4.21		Water Tanker 12000 litres (Rate only)	hours	1		Rate Only
1.4.22		Water Tanker 9000 litres (Rate only) <u>Self propelled crane:</u>	hours	1		Rate Only
1.4.23		20 Tonne (Rate only)	hours	1		Rate Only
1.4.24		Generator and Breaker 5KVA (Rate only)	hours	1		Rate Only
1.4.25		Water/Sludge Pump 50mm (Rate only) <u>Welding Equipment:</u>	hours	1		Rate Only
1.4.26		Heavy duty, self powered welding machine 400A (Rate only)	hours	1		Rate Only
Total Carried Forward						

SCHEDULE 1 - PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
1.4.27		Welder (Coded) with assistant (Rate only)	hours	1		Rate Only
		<u>Various Other:</u>				
1.4.28		Compressor 400 cuft/min - with 2 breakers (Rate only)	hours	1		Rate Only
1.4.29		Electric breaker - single phase (Rate only)	Day	1		Rate Only
1.4.30		Angle Grinder - 230mm (Rate only)	Day	1		Rate Only
1.4.31		Pneumatic Hammer Drill - 1500 Watt (Rate only)	Day	1		Rate Only
1.4.32		Concrete mixer - 360l capacity (Rate only)	Day	1		Rate Only
1.4.33		7 Tonne flat bed with mounted crane and driver (Rate only)	hours	1		Rate Only
1.4.34		1 Tonne LDV with driver (Rate only)	km	1		Rate Only
1.4.35		Tractor 30kW or similar (Rate only)	hr	1		Rate Only
1.4.36		3 Disk Plow (Rate only)	hr	1		Rate Only
		<u>Materials supplied by the Contractor:</u>				
1.4.37		Sand (building) (Rate only)	m³	1		Rate Only
1.4.38		Sand (river) (Rate only)	m³	1		Rate Only
1.4.39		50kg pocket of cement (Rate only)	No	1		Rate Only
1.4.40		Dump Rock 150mm (Rate only)	m³	1		Rate Only
1.4.41		Crusher Run 28mm (Rate only)	m³	1		Rate Only
1.4.42		G5 material (Rate only)	m³	1		Rate Only
1.4.43		G2 material (Rate only)	m³	1		Rate Only
		<u>Other to be specified by Contractor</u>				
		a)				
		b)				
		c)				
1.5	8.8	TEMPORARY WORKS				
1.5.1	8.8.2	Accommodation of traffic for construction vehicles entering and leaving the construction site	Sum	1.00		
1.5.2	8.8.4 (a)	Supply or hire of equipment required to detect all underground services within the area of construction	Sum	1.00		
Total Carried Forward						

SCHEDULE 1 - PRELIMINARY AND GENERAL

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
1.5.3	8.8.4 (b)	The use of equipment referred to in item (a) above	Sum	1.00		
1.5.4	8.8.4 (c)	Excavation by hand in soft material to expose suspected but unknown existing services.	m³	50.00		
1.5.5	8.8.4 (d)	Temporary protection, as required in terms of the project specification, of known and detected underground services within the area of construction	Sum	1.00		
1.6		MISCELLANEOUS				
1.7	PSA 8.11	<u>As-builts and Documentation:</u>				
1.7.1		Sum for surveying additional existing reservoir no. 1 by a Registered Surveyor, Inclusive of cleaning and disinfecting inside the reservoir prior to survey.	Sum	1.00		
1.7.2		Provision of full set of dimensioned marked up Record Drawings in A0 Hardcopy and Electronic PDF format and electronic submission of construction progress drone imagery.	Sum	1.00		
1.7.3		Provide as-built drawings and wiring diagrams of the complete lightning protection and earthing installation	Sum	1.00		
1.7.4		Provide as-built drawings and wiring diagrams of all electronic flow meters and control valves	Sum	1.00		
1.7.5	PS14.20.8	Meter Registrations	No.	3.00		
Total Carried Forward To Summary						

SCHEDULE 1 - PRELIMINARY AND GENERAL

SUMMARY OF SECTIONS

SECTION	DESCRIPTION	AMOUNT (RAND)
1	PRELIMINARY AND GENERAL	
Total Carried Forward To Summary Of Schedules		

SCHEDULE 2: SANS

SECTION 1: SITE CLEARANCE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
1	SABS 1200 C	SITE CLEARANCE				
1.1		CLEAR SITE				
	8.2.1 PSC 8.2.1	<u>Clear and grub:</u>				
1.1.1		Reservoir site & pipeline routes	m ²	17,160.00		
	8.2.2	<u>Remove and grub large trees and tree stumps of girth</u>				
1.1.2		a) over 1 m and up to and including 2 m	No.	10.00		
	8.2.4 PSC 8.2.4	<u>Re-clear surfaces where directed by Engineer (Provisional)</u>				
1.1.3		Reservoir site & pipeline routes	m ²	1,720.00		
1.2		REMOVE TOPSOIL AND OTHER SURFACES				
	8.2.10 PSC 8.2.10	<u>Remove topsoil, stockpile, maintain and dispose of surplus to nominal depth of 150mm, for:</u>				
1.2.1		Reservoir Site, fill embankments, along pipeline routes and designated areas	m ³	2,575.00		
	PSC 8.2.7, PS 7.4	<u>Dismantle and remove existing pipelines. Refer to dwg 60591/001</u>				
		<i>Pipeline removal, include clearing and grubbing, topsoil stripping, excavation, and off-site disposal of surplus materials to an approved facility.</i>				
1.2.2		a) DN300 AC pipeline - Clairwood Hospital pipeline (Provisional Quantity)	m	15.00		
1.2.3		b) DN450 AC pipeline - supply line from Woodlands Reservoirs 3 & 4 (Provisional Quantity)	m	5.00		
1.2.4		c) DN450 AC pipeline - backup supply line from Woodlands Reservoirs 1 & 2 (Provisional Quantity)	m	5.00		
1.2.5		d) DN450 AC pipeline (Mobeni Reservoir 1 outlet)	m	67.00		
	PSC 8.2.8	<u>Demolish and remove existing structures/buildings</u>				
1.2.6		a) Existing ablution/changeroom. Refer to dwg 60591/001 for location of structure.	m ³	40.00		
1.2.7		b) Existing shed. Refer to dwg 60591/001 for location of existing structure.	m ³	10.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 1: SITE CLEARANCE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
1.2.8		c) Existing abandoned guard house. Refer to dwg 60591/001 for location of existing structure.	m ³	10.00		
1.2.9		d) Existing Chambers. Refer to dwg 60591/001 for location of chambers.	m ³	130.00		
1.2.10		e) Partially demolish damaged portion of reservoir still in place. Refer to dwg 60591/030	m ³	950.00		
1.2.11	PSC 8.2.18	Partially demolish existing chambers and make redundant	m ³	25.00		
	PSC 8.2.11	<u>Removal of collapsed portions of structures/buildings:</u>				
1.2.12		a) Collapsed portion of reservoir within adjacent embankment	m ³	790.00		
	PSC 8.2.19	<u>Temporary Embankment Protection</u>				
1.2.13		Lateral support during works on reservoir and embankment	Sum	1.00		
	PSC 8.2.20	<u>Temporary Support</u>				
1.2.14		For roof slab during and after partial demolition	Sum	1.00		
1.3		REMOVAL OF EXISTING ROADWAY				
1.3.1	PSC 8.2.12	Saw cutting of asphalt surfaces up to 60mm depth and remove existing road surface	m	52.00		
1.3.2	PSC 8.2.14	Remove existing road asphalt surface to spoil	m ²	25.00		
1.3.3	PSC 8.2.15	Remove existing gravel layerworks to spoil (Provisional Quantity)	m ³	11.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 2: EARTHWORKS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
2	SABS 1200 D PSD	EARTHWORKS				
2.1	8.3.2 PSD 3.1.4	BULK EXCAVATION				
		<u>Excavate in all materials and dispose of surplus/unsuitable material to an approved spoil site to be determined by the contractor, for:</u>				
2.1.1	8.3.2 (a) PSD 8.3.2 (a)	Excavate in all materials for grading of new site platform and perimeter embankments, stockpile, maintain, and use for embankment or backfill. Refer to dwg 60591/002, 60591/003 & 60591/004	m³	2,260.00		
	8.3.2 (b)	<u>Extra-over Item 2.1.1 & 2.1.2 for excavation in:</u>				
2.1.2		1) Intermediate excavation	m³	1,194.00		
2.1.3		2) Hard rock excavation	m³	360.00		
2.1.4		3) Boulder excavation, Class A (Provisional Quantity)	m³	10.00		
2.1.5		4) Boulder excavation, Class B (Provisional Quantity)	m³	10.00		
2.2	8.3.3	RESTRICTED EXCAVATION				
	8.3.3 (a) PSD 8.3.3 (a)	<u>Excavate to founding level of new portion of reservoir, new chambers and stormwater channels:</u>				
2.2.1		a) New valve chambers	m³	467.00		
2.2.2		b) Existing Valve Chambers	m³	340.00		
2.2.3		c) New stormwater drainage channels and manholes	m³	300.00		
	8.3.3 (b)	<u>Extra-over Item 2.2.to 2.2.3 for excavation in:</u>				
2.2.4		1) Intermediate excavation	m³	50.00		
2.2.5		2) Hard rock excavation	m³	10.00		
2.2.6		3) Boulder excavation, Class A (Provisional Quantity)	m³	5.00		
2.2.7		4) Boulder excavation, Class B (Provisional Quantity)	m³	5.00		
	PSD 8.3.3	<u>Restricted excavation by hand</u>				
2.2.8		Excavate by hand on reservoir structure to expose concrete	m³	110.00		
2.3	8.3.3 (a)	FOUNDATION PREPARATION				
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 2: EARTHWORKS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
2.3.1	8.3.4 (a) PSD 8.3.4	Rip and re-compact 300mm layer of in-situ material beneath new manholes and chambers to 100% MOD AASHTO	m ³	50.00		
2.4		FILL OR BACKFILL				
		<u>Importation of G8 fill material from commercial sources and compacted in 300mm layers to 100% mod AASHTO, for:</u>				
2.4.1		New site platform and perimeter embankments.	m ³	7,420.00		
	PSD 8.3.14	<u>Imported G5 material obtained from a commercial source compacted in 150mm layers to 95% Mod AASHTO, for:</u>				
2.4.2		Layerworks below chamber and manhole base slabs	m ³	30.00		
2.5		RESTRICTED BACKFILL BY HAND				
2.5.1		a) Backfill and compact by hand against new chamber and manholes after construction (Provisional Quantity)	m ³	200.00		
2.5.2	8.3.10 PSD 8.3.10	b) Backfill and compact by hand on reservoir structure after reinstatement	m ³	300.00		
2.6		FINISHING				
2.6.1		Topsoiling from stockpile	m ³	2,790.00		
2.6.2		Grassing/rehabilitation of the site as directed by the Engineer	m ²	16,640.00		
2.7	PSD 8.3.15	BARRICADING				
2.7.1		Barrier fence for preventing access and visibility	m	100.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 3: EARTHWORKS (PIPE TRENCHES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
3	SABS 1200 DB	EARTHWORKS PIPE TRENCHES				
3.1	8.3.2 PSDB 8.3.2	EXCAVATION FOR STEEL PIPELINES				
	8.3.2 (a) PSDB 8.3.2 (a)	<u>Excavate in all materials for pipe trenches, backfill, compact to specification and dispose of surplus/unsuitable material, for pipes (rate to include shoring for trenches):</u> <i>DN450 steel pipeline for total trench depth</i>				
3.1.1		Up to 2.0m	m ³	930.00		
3.1.2		2.0m to 4.0m	m ³	315.00		
3.1.3		4.0m to 6.0m	m ³	20.00		
	8.3.2 (b) PSD 8.3.2 (b)	<u>Extra-over Item 3.1.1 to 3.1.3 for the following: (All provisional)</u>				
3.1.4		1) Intermediate excavation	m ³	100.00		
3.1.5		2) Hard rock excavation	m ³	20.00		
3.1.6		3) Boulder Excavation class A (Provisional)	m ³	5.00		
3.1.7		3) Boulder Excavation class B (Provisional)	m ³	5.00		
3.1.8	PSDB 8.3.8	Hand excavation and backfill where ordered by Engineer (Provisional Quantity)	m ³	50.00		
3.1.9	8.3.2 (c)	Excavate and dispose of unsuitable material from trench bottom (Provisional Quantity)	m ³	50.00		
3.1.10	PSDB 8.3.9	Hand excavation to prove existing services (Provisional Quantity)	m ³	50.00		
3.2	8.3.2 PSDB 8.3.2	EXCAVATION FOR THE REMOVAL OF EXISTING PIPELINES				
	8.3.2 (a) PSDB 8.3.2 (a)	<u>Excavate in all materials for pipe trenches, backfill, compact to specification and dispose of surplus/unsuitable material, for pipes (rate to include shoring for trenches):</u> <i>DN450 pipelines for total trench depth</i>				
3.2.1		Up to 2.0m	m ³	110.00		
3.2.2		2.0m to 3.0m	m ³	30.00		
3.2.3		4.0m to 6.0m (Provisional)	m ³	5.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 3: EARTHWORKS (PIPE TRENCHES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
	8.3.2 (b) PSDB 8.3.2 (b)	<u>Extra-over Item 3.2.1 to 3.2.3 for the following: (All provisional)</u>				
3.2.4		1) Intermediate excavation	m ³	15.00		
3.2.5		2) Hard rock excavation	m ³	6.00		
3.2.6		3) Boulder Excavation class A (Provisional)	m ³	3.00		
3.2.7		4) Boulder Excavation class B (Provisional)	m ³	3.00		
3.2.8	PSDB 8.3.8	Hand excavation and backfill where ordered by Engineer (Provisional Quantity)	m ³	50.00		
3.2.9	8.3.2 (c)	Excavate and dispose of unsuitable material from trench bottom (Provisional Quantity)	m ³	50.00		
3.2.10	PSDB 8.3.9	Hand excavation to prove existing services (Provisional Quantity)	m ³	30.00		
3.3	8.3.2 PSDB 8.3.2	EXCAVATION FOR STORMWATER PIPELINES				
	8.3.2 (a) PSDB 8.3.2 (a)	<u>Excavate in all materials for stormwater/scour pipe trenches, backfill, compact and dispose of surplus/unsuitable material, for (rate to include provision for shoring):</u>				
	8.3.2 (a) PSDB 8.3.2 (a)	<i>110mm solid pipe for chamber drainage to stormwater manhole</i>				
3.3.1		a) Up to 2m	m ³	100.00		
3.3.2		b) 2m to 4m	m ³	5.00		
	8.3.2 (a) PSDB 8.3.2 (a)	<i>450 mm Concrete stormwater pipe for total trench depth</i>				
3.3.3		Up to 2.0m	m ³	1,205.00		
3.3.4		2.0m to 4.0m	m ³	880.00		
3.3.5		4.0m to 6.0m	m ³	410.00		
3.3.6		6.0m to 8.0m	m ³	80.00		
	8.3.2 (a) PSDB 8.3.2 (a)	<i>315 mm HDuPVC stormwater pipe for new stormwater system for total trench depth</i>				
3.3.7		Up to 2.0m	m ³	25.00		
3.3.8		2.0m to 4.0m (Provisional Quantity)	m ³	10.00		
3.3.9		4.0m to 6.0m (Provisional Quantity)	m ³	10.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 3: EARTHWORKS (PIPE TRENCHES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
	8.3.2 (b) PSDB 8.3.2 (b)	<u>Extra-over Item 3.3.1 to 3.3.9 above for the following: (All provisional)</u>				
3.3.10		1) Intermediate excavation	m ³	150.00		
3.3.11		2) Hard rock excavation	m ³	10.00		
3.3.12		3) Boulder excavation, Class A (Provisional)	m ³	5.00		
3.3.13		4) Boulder excavation, Class B (Provisional)	m ³	5.00		
3.3.14	PSDB 8.3.8	Hand excavation and backfill where ordered by Engineer (Provisional Quantity)	m ³	40.00		
3.3.15	8.3.2 (c)	Excavate and dispose of unsuitable material from trench bottom (Provisional Quantity)	m ³	50.00		
3.3.16	PSDB 8.3.9	Hand excavation to prove existing services (Provisional Quantity)	m ³	30.00		
3.4	8.3.3 PSDB 8.3.3	EXCAVATION ANCILLARIES				
		<u>Make up deficiency in backfill material (Provisional)</u>				
3.4.1	8.3.3.1 (a)	a) from other necessary excavations on site	m ³	100.00		
3.4.2	8.3.3.1 (c)	b) by importation from commercial sources	m ³	100.00		
3.5	8.3.5	EXISTING SERVICES				
	8.3.5 (a)	<u>Protect, maintain, repair services that intersect a trench:</u>				
3.5.1		Water AC/PVC pipelines	Prov No.	10.00		
3.5.2		Steel Pipelines	Prov No.	10.00		
3.5.3		Concrete stormwater pipes	Prov No.	10.00		
3.5.4		Electrical U/G cables	Prov No.	10.00		
3.5.5		Electrical O/H cables	Prov No.	10.00		
3.5.6		Telecommunication/ Optical Fibre Cables	Prov No.	10.00		
	8.3.5 (b)	<u>Protect, maintain, repair services that adjoin a trench:</u>				
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 3: EARTHWORKS (PIPE TRENCHES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
3.5.7		Water AC/PVC pipelines (Provisional Quantity)	m	20.00		
3.5.8		Steel Pipelines (Provisional Quantity)	m	20.00		
3.5.9		Concrete stormwater pipes (Provisional Quantity)	m	20.00		
3.5.10		Electrical U/G cables (Provisional Quantity)	m	20.00		
3.5.11		Telecommunication/ Optical Fibre Cables (Provisional Quantity)	m	20.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 4: PILING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
4	SABS 1200 F	PILING				
4.1	8.2.1	Establishment on site for piling	Sum	1.00		
4.2	8.2.2	Move equipment and set up at each pile position	No.	116.00		
4.3	8.2.3	Standing time (Provisional)	hr	24.00		
	8.2.4	<u>Auger holes of 600mm diameter through material situated in the following successive depth ranges</u>				
4.4		a) over 0,0m and up to 10,0m	m	1,160.00		
4.5		b) over 10,0m and up to 15,0m	m	580.00		
4.6		c) over 15,0m and up to 20,0m	m	580.00		
4.7		d) over 20,0m and up 25,0m	m	285.00		
	8.2.16	<u>Steel reinforcement in cast insitu piles</u>				
4.8		a) Mild steel (250 MPa)	t	5.00		
4.9		b) High tensile steel (450 MPa)	t	18.00		
4.10	8.2.17	Concrete cast in situ piles (30 MPa/19mm)	m³	815.00		
	8.2.22	<u>Load Test on Piles</u>				
4.11		a) 600mm diameter, 24m long, compression pile at 1500kN following the British Procedure	No.	1.00		
	PSF 8.2.27	<u>Pile Integrity Testing</u>				
4.12	PSF 8.2.27.1	Providing and installing (85mm diameter) mild steel tubes for "Cross Hole Sonic Logging" in all designated piles	m	2,400.00		
4.13	PSF 8.2.27.2	Carrying out of Impact Frequency Response (IFR) measurements or Sonic Tapping tests and interpretation of results	No.	116.00		
4.14	PSF 8.2.27.3	Cross-Hole Sonic Logging tests and interpreted results	m	2,400.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 5: CONCRETE (STRUCTURAL)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
5	SABS 1200 G PSG	CONCRETE (STRUCTURAL)				
5.1	8.2.2	SMOOTH FORMWORK				
		<u>Vertical to:</u>				
5.1.1		a) Base slab	m ²	65.00		
5.1.2		b) Roof slab	m ²	215.00		
5.1.3		c) Columns (C1) base dia 680mm	m ²	4.00		
5.1.4		d) Columns (C1) dia 380mm	m ²	85.00		
5.1.5		e) Columns (C2)	m ²	25.00		
5.1.6		f) Reservoir vertical wall	m ²	965.00		
5.1.7		g) Telemetry room apron slab	m ²	1.00		
5.1.8		h) Telemetry room roof slab	m ²	2.00		
5.1.9		i) Ancillary works foundations	m ²	30.00		
5.1.10		j) Attenuation tank roof	m ²	6.00		
5.1.11		k) Chambers	m ²	365.00		
5.1.12		l) Staircases	m ²	40.00		
		<u>Horizontal to:</u>				
5.1.13		a) Underside of reservoir roof slab	m ²	345.00		
5.1.14		b) Underside of telemetry roof slab	m ²	7.00		
5.1.15		c) underside attenuation tank roof	m ²	45.00		
		<u>Inclined to:</u>				
5.1.16		a) Column (C1) heads	m ²	15.00		
5.1.17		b) Columns (C2) bases	m ²	1.00		
5.1.18		c) Beams	m ²	45.00		
5.1.19		d) Reservoir wall	m ²	260.00		
5.2		REINFORCEMENT				
	8.3.1	<u>Steel bars</u>				
5.2.1		i) Mild steel bars	t	5.50		
5.2.2		ii) High-tensile steel bars	t	100.00		
	8.3.2	<u>High-tensile steel welded mesh</u>				
5.2.3		i) Ref 395	m ²	6.00		
	PSG 8.9	<u>High tensile galvanized steel dowel bars</u>				
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 5: CONCRETE (STRUCTURAL)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
5.2.4	8.4 8.4.3 PSG 8.4.3	i) 1m long Y16 bars	No.	1,550.00		
5.3		CONCRETE				
		<u>a) Grade Concrete (35 MPa/19mm Durability Concrete) in Reservoir:</u>				
5.3.1		i) Reservoir Base slab	m³	320.00		
5.3.2		ii) Reservoir Roof slab	m³	105.00		
5.3.3		iii) Reservoir Inclined Beams	m³	7.00		
5.3.4		iv) Reservoir Inclined Walls	m³	50.00		
5.3.5		v) Reservoir Vertical wall	m³	350.00		
5.3.6		vi) Reservoir Columns type C1	m³	16.50		
5.3.7		vii) Reservoir Columns type C2	m³	4.00		
		<u>b) Grade Concrete (30 MPa/19mm) to:</u>				
5.3.8		i) Telemetry room floor flabs	m³	1.00		
5.3.9		ii) Telemetry room roof slab	m³	1.50		
5.3.10		iii) Core wall	m³	4.00		
5.3.11		iv) Chambers	m³	135.00		
5.3.12		v) Attenuation tank	m³	30.00		
5.3.13		vi) Staircase	m³	5.00		
		<u>c) Grade Concrete (15 MPa/19mm) to:</u>				
5.3.14		i) Blinding	m³	130.00		
5.4		8.4.4	UNFORMED SURFACE FINISHES			
	<u>a) Wood-floated finish to:</u>					
5.4.1	i) Telemetry room roof slab		m²	10.00		
	ii) Telemetry room surface bed		m²	5.50		
5.4.3	iii) Telemetry room apron slab		m²	2.00		
	<u>b) Steel-floated finish to:</u>					
5.4.4	i) Columns (C1) base dia 680mm		m²	3.00		
5.4.5	ii) Reservoir vertical wall		m²	55.00		
5.4.6	iii) Base slab		m²	420.00		
5.4.7	iv) Roof slab		m²	345.00		
5.4.8	v) Upstand Beams	m²	25.00			
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 5: CONCRETE (STRUCTURAL)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
5.5	PSG 8.4.7	CURING AND PROTECTION				
5.5.1		Reservoir floor slab	m ²	660.00		
5.5.2		Reservoir Walls	m ²	1,235.00		
5.5.3		Reservoir Inclined Beams	m ²	40.00		
5.5.4		Top surface of the reservoir roof slab	m ²	460.00		
5.5.5		Soffit of the reservoir roof slab	m ²	420.00		
5.5.6		Reservoir columns	m ²	110.00		
5.5.7		Telemetry room surface bed	m ²	5.50		
5.5.8		Telemetry room apron slab	m ²	2.50		
5.5.9		Telemetry room roof slab	m ²	50.00		
5.5.10		Chambers	m ²	365.00		
5.6	PSG 8.5 PSG 5.5.7	JOINTS				
5.6.1		i) Roof Slab per drawing 60591/031-Sheet 4	m	55.00		
5.6.2		ii) Inclined Walls per drawing 60591/031-Sheet 4	m	20.00		
5.6.3		iii) Base Slab per drawing 60591/031-Sheet 4	m	70.00		
5.7	PSG 8.12	MISCELLANEOUS				
5.7.1		Paint roof slab of all new and existing chambers with 2 coats of yellow road marking paint including stencilling of chamber descriptions on roof slabs	m ²	50.00		
5.7.2		Paint all chamber walls where above ground with 2 coats of green road marking paint	m ²	150.00		
5.7.3		Supply and install lockable concrete covers	No.	16.00		
5.8	8.6	<u>Manufacture (or supply) and erect precast elements</u>				
	8.6 (b)	<i>Different types and sizes of units</i>				
5.8.1		a) 1200 x 1200mm ROCLA stormwater portal culvert or similar	No.	3.00		
5.8.2		b) 1600 x 1200mm ROCLA bases or similar	No.	6.00		
5.8.3		c) Precast valve covers. Refer to dwg 60591/008, 60591/008, 60591/009 & 60591/010	No.	4.00		
5.8.4		d) Precast valve spacer rings	No.	50.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 5: CONCRETE (STRUCTURAL)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
5.8.5	PSG 8.15	e) 1250mm internal diameter concrete manhole rings for air valve chamber. Refer to dwg 60591/013	No.	6.00		
5.8.6		f) Precast manhole covers for air valve chambers. Refer to dwg 60591/013	No.	2.00		
5.8.7		g) Precast lintels (1.4m long)	No.	4.00		
5.8.8		h) Blinding	m³	130.00		
5.8.9		i) 4200 x 2000 x 200 Precast Roof Slab (Valve Chamber - DN450 Incoming & Clairwood)	No.	1.00		
5.8.10		j) 2500 x 2800 x 200 Precast Roof Slab (Valve Chamber)	No.	1.00		
5.8.11		k) 2800 x 3000 x 200 Precast Roof Slab (Valve Chamber)	No.	1.00		
5.8.12		l) 2100 x 2900 x 200 Precast Roof Slab (Valve Chamber)	No.	1.00		
5.8.13		m) 1600 x 2500 x 200 Precast Roof Slab (Valve Chamber)	No.	1.00		
5.8.14		n) 4200 x 2000 x 200 Precast Roof Slab (Isolated Flange Chamber)	No.	1.00		
5.8.15		Construct concrete surround (25Mpa) for valve covers	m³	1.00		
5.8.16		Supply and install No.5 valve covers and cast into concrete surround	No.	10.00		
5.8.17		Supply and Install concrete valve markers , cast into concrete surround and paint.	No.	10.00		
5.9		GROUTING OR CASTING OF PIPES AND SPECIALS THROUGH/IN CHAMBER WALLS <u>Supply all labour, plant and materials for casting of fabricated pipe specials into brick chamber walls and wrapping with "Denso 1250/300" Tape wrapping system 600mm long to manufacturer's specifications (puddle flange not to be wrapped):</u>				
5.9.1		DN450 steel pipeline	No.	10.00		
		<u>Supply all labour, plant and materials for grouting of pipe specials through walls or slabs inclusive of pipe wall joint sealing</u>				
5.9.2		DN450 steel pipeline	No.	4.00		
5.9.3		DN300 steel pipeline	No.	2.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 5: CONCRETE (STRUCTURAL)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
5.9.4	PSX	DN750 steel pipeline	No.	4.00		
5.9.5		DN600 steel pipeline	No.	2.00		
5.10		BRICKWORK				
		<u>Brickwork for Chambers</u>				
5.10.1		a) Double skin (230 mm) walls	m²	300.00		
		<u>Brickwork for Telemetry Room</u>				
5.10.2		a) 2 no. single skin with concrete core (330 mm) walls	m²	70.00		
		<u>Brickwork for Attenuation Tank</u>				
5.10.3		a) Doubleskin (230 mm) walls	m²	65.00		
5.10.4		Removal of brickwork from chambers to replace pipework and valves in chambers	No.	20.00		
		<u>Waterproofing</u>				
5.10.5		250 Micron "USB Green" polyethylene waterproof sheeting with 150mm overlaps for underneath chamber floors	m²	75.00		
5.11		<u>Water Tightness Testing</u>				
5.11.1	PSG 8.13	Reservoir structure	Sum	1.00		
5.11.2	PSG 8.14	Application of cementitious crystalline slurry inside reservoir	m²	350.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 6: STRUCTURAL STEEL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
6	SABS 1200 HA PSHA	STRUCTURAL STEEL				
	8.3.2 PSHA 5.2.6	<u>Handrails</u>				
	8.3.2 (b)	<i>Handrail Assembly Complete (Galvanized mild steel Mentis type)</i>				
6.1	8.3.2 (b)(1)	Horizontal	m	75.00		
6.2	8.3.2 (b)(2)	Sloping (measured on slope)	m	15.00		
6.3	8.3.3	Ladders, complete and installed (GRP ladder. Refer to dwg 60591/020	No.	16.00		
6.1	PSHA 8.3.7	NEW FENCING AND ACCESS GATE				
6.1.1		Erect new razor wire diamond mesh fencing around the reservoir site (up to 2.7m high). Refer to dwg 60591/018	m	650.00		
6.1.2		Supply and install new access gate to reservoir site. Refer to detail on dwg 60591/018	Sum	1.00		
6.2	PSHA 8.3.8	MISCELLANEOUS STRUCTURAL STEEL ITEMS				
6.2.1		Supply and install DN200 air vents for new valve chambers. Refer to dwg 60591/023	No.	10.00		
6.2.2		Supply and install new pipe supports. Refer to dwg 60591/023	No.	4.00		
6.2.3		Supply and install new steel door for new control valve chamber. Refer to dwg 60591/023	No.	1.00		
6.2.4		Supply and install saddle pipe support. Refer to dwg 60591/023	No.	1.00		
6.2.5		Supply and install wall and floor mounted brackets for pipework. (Provisional). Refer to dwg 60591/023	No.	30.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
7	SABS 1200 L PSL	MEDIUM PRESSURE PIPELINES				
7.1	SANS1200L	PIPELINES				
	PSL 8.2.1	<u>Supply and install pipe, inclusive of uplifting and transportation from suppliers storage yards, checking for holidays in external coating and internal lining, in accordance with the project specification.</u>				
7.1.1		DN450 * 4.5mm thick * Grade X42 pipe	m	450.00		
	PSL 8.2.2 PSL 8.2.1.3 PSL 8.2.1.1	<u>Preparation and welding of straight joints in pipeline, including NDT testing of joints and reinstatement at the joint for external coating and internal lining damage in accordance with the project specification.</u>				
7.1.2		DN450 * 4.5mm thick * Grade X42 pipe	No.	80.00		
	PSL 8.2.2 PSL 8.2.1.3 PSL 8.2.1.2	<u>Preparation of pipe by means of cutting, welding of joint, including NDT testing of joints and reinstatement at the joint of external coating and internal lining damage in accordance with the project specification. (Provisional Quantity)</u>				
7.1.3		DN450 * 4.5mm thick * Grade X42 pipe (Provisional Quantity)	No.	80.00		
7.2		BENDS				
		<u>Supply and Installation of Bends complete, inclusive of testing, reinstatement of external coating and internal lining, transportation and handling:</u>				
	PSL 8.2.2 & PSL 3.4.4	DN450 * 4.5mm thick * Grade X42 pipe (Provisional Quantity)				
7.2.1		0 to 15 deg	No.	1.00		
7.2.2		>15 to 30 deg	No.	1.00		
7.2.3		>30 to 45 deg	No.	1.00		
7.2.4		>45 to 60 deg	No.	4.00		
7.2.5		>60 to 75 deg	No.	1.00		
7.2.6		>75 to 90 deg	No.	2.00		
7.3	PSL 3.9	REPAIR OF COATING AND LINING				
		<u>Repair, as result of damage inflicted by pipe supplier, external "Sintakote" coating complete inclusive of labour, materials, plant, supervision and QA/QC for defects:</u>				
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
7.3.1		up to 500mm ² in area	Prov No.	8.00		
7.3.2		from 501mm ² to 750mm ² in area	Prov No.	8.00		
7.3.3		from 751mm ² to 1000mm ² in area	Prov No.	3.00		
7.3.4		from 1001mm ² to 1400mm ² in area	Prov No.	3.00		
		<u>Repair, as a result of damage inflicted by pipe supplier, internal coated lining, complete inclusive of labour, plant, materials, supervision and QA/QC for defects for:</u>				
7.3.5		up to 200mm ² in area	Prov No.	8.00		
7.3.6		from 201mm ² to 400mm ² in area	Prov No.	8.00		
7.3.7		from 401mm ² to 600mm ² in area	Prov No.	8.00		
7.3.8		from 600mm ² to 800mm ² in area	Prov No.	3.00		
7.3.9		from 800mm ² to 1000mm ² in area	Prov No.	3.00		
7.4	PSL 8.2.5.1	SPECIAL ASSEMBLIES: SUPPLY & INSTALL				
	PSL 3.4.4	<u>Reservoir 1 Outlet Chamber (C1). Refer to dwg 60591/006</u>				
7.4.1		Item 1	No.	1.00		
7.4.2		Item 2	No.	1.00		
		Compulsory requirement for Tender Contractor to provide for item above				
		Valve make:				

		Valve supplier:				

		Data sheet for valve must be provided with Tender				
7.4.3		Item 3	No.	1.00		
7.4.4		Item 4	No.	1.00		
7.4.5		Item 5	No.	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
7.4.6	PSL 3.4.4	Item 6	No.	1.00		
7.4.7		Item 7	No.	1.00		
		<u>Reservoir 1 Outlet Chamber (C2). Refer to dwg 60591/006</u>				
7.4.8		Item 1	No.	1.00		
7.4.9		Item 2	No.	1.00		
		Compulsory requirement for Tender				
		Contractor to provide for item above				
		Valve make:				

		Valve supplier:				

		—				
		Data sheet for valve must be provided with Tender				
7.4.10	PSL 3.4.4	Item 3	No.	1.00		
7.4.11		Item 4	No.	1.00		
7.4.12		Item 5	No.	1.00		
7.4.13		Item 6	No.	1.00		
		<u>Reservoir 1 Scour Chambers (C4 & C5). Refer to dwg D724-52-5250</u>				
7.4.14		Item 1	No.	2.00		
		Compulsory requirement for Tender				
		Contractor to provide for item above				
		Valve make:				

		Valve supplier:				

		—				
		Data sheet for valve must be provided with Tender				
7.4.15	PSL 3.4.4	Item 2	No.	2.00		
		<u>Reservoir 1 Inlet Chamber (C3). Refer to dwg 60591/006</u>				
7.4.16		Item 1	No.	1.00		
7.4.17		Item 2	No.	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
7.4.18	PSL 3.4.4	Item 3	No.	1.00		
7.4.19		Item 4	No.	1.00		
7.4.20		Item 5	No.	1.00		
		Compulsory requirement for Tender Contractor to provide for item above				
		Valve make:				
		—				
		Valve supplier:				
		—				
		Data sheet for valve must be provided with Tender				
7.4.21		Item 6	No.	1.00		
7.4.22	PSL 3.4.4	Item 7	No.	1.00		
		<u>Reservoir 2 Outlet Chamber (C7). Refer to dwg 60591/007</u>				
7.4.23		Item 1	No.	1.00		
7.4.24		Item 2	No.	1.00		
7.4.25		Item 3	No.	2.00		
		Compulsory requirement for Tender Contractor to provide for item above				
		Valve make:				
		—				
		Valve supplier:				
		—				
		Data sheet for valve must be provided with Tender				
7.4.26	PSL 3.4.4	Item 4	No.	1.00		
7.4.27		Item 5	No.	1.00		
		<u>Reservoir 2 Scour Chamber (C8). Refer to dwg 60591/007</u>				
7.4.28		Item 1	No.	1.00		
		Compulsory requirement for Tender Contractor to provide for item above				
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
		Valve make: _____ –				
		Valve supplier: _____ –				
		Data sheet for valve must be provided with Tender				
7.4.29		Item 2	No.	1.00		
7.4.30		Item 3	No.	1.00		
7.4.31		Item 4	No.	1.00		
7.4.32		Item 5	No.	1.00		
	PSL 3.4.4	<u>Reservoir 2 - Chamber (C9). Refer to dwg 60591/007</u>				
7.4.33		Item 1	No.	1.00		
		Compulsory requirement for Tender				
		Contractor to provide for item above				
		Valve make: _____ –				
		Valve supplier: _____ –				
		Data sheet for valve must be provided with Tender				
7.4.34		Item 2	No.	2.00		
	PSL 3.4.4	<u>Reservoir 2 - Chamber (C10). Refer to dwg 60591/007</u>				
7.4.35		Item 1	No.	1.00		
		Compulsory requirement for Tender				
		Contractor to provide for item above				
		Valve make: _____ –				
		Valve supplier: _____ –				
		Data sheet for valve must be provided with Tender				
7.4.36		Item 2	No.	2.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
7.4.37	PSL 3.4.4	<u>DN350 Inline Meter Chamber. Refer to dwg 60591/008</u> Item 1	No.	2.00		
7.4.38		Item 2	No.	1.00		
7.4.39		Item 3	No.	1.00		
7.4.40		Item 4	No.	1.00		
7.4.41		Item 5	No.	2.00		
		Compulsory requirement for Tender Contractor to provide for item above Valve make: _____ — Valve supplier: _____ — Data sheet for valve must be provided with Tender				
7.4.42		Item 6	No.	1.00		
	PSL 3.4.4	<u>DN400 Inline Meter Chamber. Refer to dwg 60591/009</u>				
7.4.43		Item 1	No.	2.00		
7.4.44		Item 2	No.	1.00		
7.4.45		Item 3	No.	1.00		
7.4.46		Item 4	No.	1.00		
7.4.47		Item 5	No.	1.00		
		Compulsory requirement for Tender Contractor to provide for item above Valve make: _____ Valve supplier: _____ Data sheet for valve must be provided with Tender				
7.4.48		Item 6	No.	1.00		
	PSL 3.4.4	<u>DN450 Cross Connection Chamber (Mobeni/Woodlands 1 & 2). Refer to dwg 60591/011</u>				
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
7.4.49		Item 1	No.	3.00		
7.4.50		Item 2	No.	2.00		
		Compulsory requirement for Tender Contractor to provide for item above				
		Valve make:				

		—				
		Valve supplier:				

		Data sheet for valve must be provided with Tender				
7.4.51		Item 3	No.	2.00		
7.4.52		Item 4	No.	1.00		
7.4.53		Item 5	No.	1.00		
7.4.54		Item 6	No.	1.00		
7.4.55		Item 7	No.	1.00		
	PSL 3.4.4	<u>Typical Air Valve Assembly on DN450 Water Pipeline. Refer to dwg 60591/013</u>				
7.4.56		Item 1	No.	2.00		
7.4.57		Item 2	No.	4.00		
7.4.58		Item 3	No.	2.00		
	PSL 3.4.4	<u>Reservoir 2 - DN300 Inlet Pipework. Refer to dwg 60591/012</u>				
7.4.59		Item 1	No.	1.00		
7.4.60		Item 2	No.	1.00		
7.4.61		Item 3	No.	1.00		
		Compulsory requirement for Tender Contractor to provide for item above				
		Valve make:				

		Valve supplier:				

		Data sheet for valve must be provided with Tender				
7.4.62		Item 4	No.	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
7.4.63		Item 5 Compulsory requirement for Tender Contractor to provide for item above Valve make: _____ — Valve supplier: _____ Data sheet for valve must be provided with Tender	No.	1.00		
7.4.64		Item 6	No.	1.00		
7.4.65		Item 7	No.	1.00		
7.4.66		Item 8	No.	1.00		
7.4.67		Item 9	No.	1.00		
7.4.68		Item 10	No.	1.00		
7.4.69		Item 11	No.	2.00		
7.4.70		Item 12	No.	1.00		
7.4.71		Item 13	No.	3.00		
7.4.72		Item 14	No.	1.00		
7.4.73		Item 15	No.	1.00		
7.4.74		Item 16	No.	2.00		
7.4.75		Item 17	No.	1.00		
	PSL 3.4.4	<u>DN300 Inline Meter Chamber. Refer to dwg 60591/010</u>				
7.4.76		Item 1	No.	2.00		
7.4.77		Item 2	No.	1.00		
7.4.78		Item 3	No.	1.00		
7.4.79		Item 4	No.	1.00		
7.4.80		Item 5 Compulsory requirement for Tender Contractor to provide for item above Valve make: _____	No.	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
7.4.81	PSL 3.4.4	Valve supplier: Data sheet for valve must be provided with Tender	No.	1.00		
		Item 6				
		<u>Clairwood Hospital Line Valve Chamber (C6). Refer to dwg 60591/006.</u>				
7.4.82		Item 1				
7.4.83		Item 2				
7.4.84		Item 3				
		Compulsory requirement for Tender Contractor to provide for item above Valve make: Valve supplier:				
		 Data sheet for valve must be provided with Tender				
7.4.85		Item 4				
7.4.86		Item 5				
7.4.87	Item 6					
	<u>Offtake Chamber from Woodlands DN1200 pipeline (C12). refer to dwg 60591/007 for details</u>					
7.4.88		Item 1	No.	2.00		
7.4.89		Item 2	No.	4.00		
		Compulsory requirement for Tender Contractor to provide for item above Valve make: Valve supplier:				
		 Data sheet for valve must be provided with Tender				
7.5	PSL 7.3	HYDRAULIC TESTING				
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 7: MEDIUM PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
7.5.1	PSL 7.3 & PSL 8.2.2	<u>End cap, filling, testing and disinfection of pipelines within sections specified by the Engineer, for:</u> DN450 Steel pipe	m	415.00		
7.5.2	PSL 7.3 & PSL 8.2.2	<u>Testing and Disinfecting of pipework specials in chambers</u> up to DN450 steel	m	80.00		
7.6	8.2.8 PSL 8.2.8	REMOVAL OF EXISTING VALVES AND PIPEWORK FROM CHAMBERS <u>Dismantle of remove pipework and valves from the following existing valve chambers:</u>				
7.6.1		a) Chamber C1. Refer to dwg 60591/001	Sum	1.00		
7.6.2		b) Chamber C2. Refer to dwg 60591/001	Sum	1.00		
7.6.3		c) Chamber C3. Refer to dwg 60591/001	Sum	1.00		
7.6.4		d) Chamber C4. Refer to dwg 60591/001	Sum	1.00		
7.6.5		e) Chamber C5. Refer to dwg 60591/001	Sum	1.00		
7.6.6		f) Chamber C6. Refer to dwg 60591/001	Sum	1.00		
7.6.7		g) Chamber C7. Refer to dwg 60591/001	Sum	1.00		
7.6.8		h) Chamber C8. Refer to dwg 60591/001	Sum	1.00		
7.6.9		i) Chamber 9. Refer to dwg 60591/001	Sum	1.00		
7.6.10		j) Chamber C10. Refer to dwg 60591/001	Sum	1.00		
7.6.11		k) Chamber C11. Refer to dwg 60591/001	Sum	1.00		
7.6.12		l) Chamber C12. Refer to dwg 60591/007	Sum	1.00		
	PSL 8.2.23	ASSESSMENT OF EXISTING VALVES. Refer to dwg 60591/001				
7.6.13		a) MH23	No.	1.00		
7.6.14		b) MH24	No.	1.00		
7.7	PSL 8.2.24	REPLACEMENT OF VALVES				
7.7.1		a) MH23 & MH24	Prov Sum	1.00	100,000.00	100,000.00
7.8		MISCELLANEOUS				
	PSL 3.9.8.5	<u>Paint all above ground pipework as per specification with an approved UV stable overcoat</u>				
7.8.1		DN200 to DN450	m	80.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 8: BEDDING (PIPES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
8	SABS 1200 LB PSLB 8.1	BEDDING (PIPES)				
	8.2.1 PSLB 8.2.1	PROVISION OF BEDDING FROM TRENCH EXCAVATIONS:				
8.1		a) Selected granular material (Provisional)	m ³	50.00		
8.2		b) Selected fill material	m ³	50.00		
	8.2.2 PSLB 8.2.2	SUPPLY ONLY OF BEDDING BY IMPORTATION				
	8.2.2.1	<u>From other necessary excavations (provisional)</u>				
8.3		a) Selected granular material	m ³	50.00		
8.4		b) Selected fill material	m ³	50.00		
	8.2.2.3 PSLB 8.2.2.3	FROM COMMERCIAL SOURCES				
8.5		a) Selected granular material	m ³	660.00		
8.6		b) Selected fill material	m ³	400.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 9: STORMWATER DRAINAGE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
9	SABS 1200LE	STORMWATER DRAINAGE				
	PSLE 8.2.1.1	SUPPLY STORMWATER DRAINAGE PIPES FOR THE FOLLOWING:				
9.1		450 mm rubber ring joint type Spigot and Socket Class 100D concrete pipe.	m	400.00		
9.2		110mm rigid uPVC (heavy duty) slotted drainage pipes complete with couplings to under floor drains (Cordrain - Pushfit or similar approved) wrapped in Polythene Sheeting 250 micron 'Gunplas' or similar approved laid to fall in no-fine concrete measured elsewhere.	m	35.00		
9.3		315mm heavy duty solid uPVC pipes laid to fall complete with couplings, bends and tees.	m	120.00		
	8.2.1.2	INSTALL STORWATER DRAINAGE PIPES FOR THE FOLLOWING				
	PSLE 8.2.1.2					
9.4		450 mm rubber ring joint type Spigot and Socket Class 100D concrete pipe.	m	300.00		
9.5		110mm rigid uPVC (heavy duty) slotted drainage pipes complete with couplings to under floor drains (Cordrain - Pushfit or similar approved) wrapped in Polythene Sheeting 250 micron 'Gunplas' or similar approved laid to fall in no-fine concrete measured elsewhere.	m	35.00		
9.6		315mm heavy duty solid uPVC pipes laid to fall complete with couplings, bends and tees.	m	120.00		
	8.2.8	MANHOLES				
9.7		Supply and install stormwater manholes as per dwg 60591/016 complete with step irons, concrete benching & cover slabs up to 8m deep.	No.	20.00		
9.8		Supply and install stormwater field inlets as per dwg 60591/016 complete with step irons, concrete benching & cover slabs	No.	3.00		
	8.2.10	ACCESSORIES				
9.9		Cast iron manhole covers. Refer to dwg 60591/016	No.	20.00		
9.10		New grid inlets along access road. Refer to dwg 60591/016	No.	4.00		
	PSLE 8.2.15	STORMWATER DRAINAGE CHANNELS				
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 9: STORMWATER DRAINAGE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
9.11		Supply and install MacMat three-dimensional erosion control mats composed of UV stabilised synthetic fibres along new stormwater drainage channels. Refer to dwg 60591/016 for typical details	m²	424.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
10		ELECTRICAL, CONTROL AND INSTRUMENTATION INSTALLATION				
		<u>Design, manufacture, work test, supply, deliver to site, off-load, store if necessary and install the following electrical equipment, MCCs, DBs, LV electrical installation etc as specified and indicated on the drawings.</u>				
10.1		<i>NOTE: INSTRUMENTATION, TELEMETRY OR SYSTEM INTEGRATOR MUST BE A REGISTERED AND CERTIFIED SYSTEM INTEGRATOR FOR THE PLC, SCADA OR TELEMETRY SYSTEMS TO BE USED.</i>				
10.1.1	ELE 1.5.3; SANS10142	DB01 for telemetry room as specified	Sum	1.00		
10.1.2	SANS10142	Supply and install IP65 weatherproof CCG boxes for termination of instruments	No	12.00		
	ELE 1.6; SANS10142; SANS1507	<u>Supply, deliver to site, off-load and store if necessary for the following PVC ECC SWA cables (660/1000V grade) to SABS 1507:1990 as amended and specified.</u>				
10.1.3		a) 25mm ² x 4C PVC/ECC/SWA/PVC	m	140.00		
10.1.4		b) 10mm ² x 2C PVC/ECC/SWA/PVC	m	775.00		
10.1.5		c) Dekron instrument cable	m	180.00		
10.1.6		d) 1.5mm ² Twisted Pair 4 Pair individually screened overall screened SWA CAT 6 instrument armoured cable	m	575.00		
	ELE 1.6; SANS10142; SANS1507	<u>Install in trenches, ducts, sleeves, cable tray and in manholes the following cables supplied under item 10.2.7</u>				
10.1.7		a) 25mm ² x 4C PVC/ECC/SWA/PVC	m	140.00		
10.1.8		b) 10mm ² x 2C PVC/ECC/SWA/PVC	m	775.00		
10.1.9		c) Dekron instrument cable	m	180.00		
10.1.10		d) 1.5mm ² Twisted Pair 4 Pair individually screened overall screened SWA CAT 6 instrument armoured cable	m	575.00		
	ELE 1.6; SANS10142; SANS1507	<u>Make of ends, connect up, including glands, lugs, etc. Test and commission the following cables supplied under item 10.2.7 (outdoor glands shall be CCG weatherproof corrogland type)</u>				
10.1.11		a) 25mm ² x 4C PVC/ECC/SWA/PVC	No	4.00		
10.1.12		b) 10mm ² x 4C PVC/ECC/SWA/PVC	No	16.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.1.13	SANS10142; SANS1200	c) Dekron instrument cable	No	20.00		
10.1.14		d) 1.5mm ² Twisted Pair 4 Pair individually screened overall screened SWA CAT 6 instrument armoured cable	No	30.00		
10.1.15		Excavate and backfill cable trenches below ground level in all classes of pickable material and backfill (for rate only – future use)	m	875.00		
10.1.16		Supply and lay "Allen" yellow plastic cable	m	875.00		
10.1.17		Supply and install 20Mpa concrete over the cables and sleeves (150mm thick x 300mm wide) over 140m . (Rate only)	m ³	3.00		
10.1.18		Supply and install 3 phase meter box to eThekweni Electricity Dept. standards for reservoir site	No	1.00		
10.1.19		Supply and install LG or similar concrete cable markers to SABS specifications	No	12.00		
	SANS10142; ELE 1.8	<u>Supply and install galvanised or similar approved cable tray including all sets, bends, etc. fixed to structures walls, etc. including fixings as ff:</u>				
10.1.20	SANS10142	a) 200mm wide	m	20.00		
10.1.21		b) 100mm wide	m	20.00		
		<u>Supply and install the following uPVC cable sleeves and manhole including bends, etc.:-</u>				
10.1.22	SANS10142; ELE 1.8	a) 110-160mmø	m	50.00		
10.1.23		b) 50mmø	m	30.00		
10.1.24	SANS10142; ELE 1.8	Allow for all cable sleeves Telemetry Room on successful commissioning and completion of the works (lump sum)	Sum	1.00		
	SANS10142; ELE 1.8	<i>Note: All lighting, sockets, outlets, isolators, etc. to include for conduit, wiring, switches, covers, etc. for a complete working installation</i> <u>(Supply and install the following including PVC conduit, wiring etc complete)</u>				
10.1.25	SANS10142; ELE 1.8	a) Surface fluorescent light outlets with junction boxes including conduit and wiring etc complete	No	4.00		
10.1.26	SANS10142; ELE 1.8	b) Bulkhead and floodlight light outlets including conduit and wiring etc complete	No	4.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.1.27	SANS10142; ELE 1.8	c) Photo cell including conduiting and wiring etc complete	No	1.00		
10.1.28	SANS10142; ELE 1.8	d) Double 16A switched socket outlet surface weatherproof and UPS red outlet including conduit and wiring etc complete	No	4.00		
10.1.29	SANS10142; ELE 1.8	e) Surface 1 and 2 way light switch including conduit and wiring etc complete	No	4.00		
10.1.30	SANS10142; ELE 1.8	f) 1,5m light with carbonate diffuser type Corrosion Proof C2-2 x 26W LED light fitting with 26W LED lamps (1.5m long)	No	4.00		
10.1.31	SANS10142; ELE 1.8	g) Bulkhead lights type B20-2PL9SS screws light fitting with vandal proof glass, wire screen and screws	No	4.00		
10.1.32	SANS10142; ELE 1.8	h) 100W LED floodlight with LED lamp and aluminium body	No	4.00		
10.1.33	SANS10142; ELE 1.8	i) 187W LED Beka Ledlume streetlight with LED lamp and aluminium body with photocell as specified or similar approved	No	13.00		
10.1.34	SANS10142; ELE 1.8	j) 10m HDG hinged streetlight pole with CB, base plate and back to back mounting brackets as specified	No.	3.00		
10.1.35	SANS10142; ELE 1.8	k) 10m HDG hinged streetlight pole planted in ground with CB and streetlight mounting single brackets as specified	No.	1.00		
	ELE 1.14; ELE 1.15	<u>Allow for all statutory safety equipment and warning notice etc as follows:</u>				
10.1.36		a) 9kg DCP fire extinguisher	No	1.00		
10.1.37		b) Danger sign - "Electricity", "No Unauthorised Entry"	Sum	1.00		
10.1.38		c) "Machine starts automatically" warning notice (for rate only)	Sum	1.00		
10.1.39		d) Lump sum labelling for all instruments etc	Sum	1.00		
10.2		INSTRUMENTATION & TELEMETRY				
10.2.1	ELE 1.10.7; WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Take free issue the flow meter transmitter including cabling and install, connect up, test and commission the flow meter supplied under the civil contract (including configuring the meter to communicate and integrate with the telemetry and SCADA system). To include meter supplier to be in attendance on site	Sum	2.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.2.2	ELE 1.10.6; WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Earth the flow meter in accordance with the manufacturer's instructions	Sum	2.00		
10.2.3		Supply and install the submersible level probe including transducer as specified to EWS standards (refer to specification)	No	2.00		
10.2.4		Supply and install the level transmitters enclosures (reno-fab enclosure) to EWS standards. To include stainless steel mounting brackets for the transmitters	No	2.00		
10.2.5		Take free issue the solenoid switches and cabling for the reservoir flow control valves and install, test and commission (include to configure the solenoid switches to communicate and integrate with the telemetry and SCADA system). To include valve supplier to be in attendance on site	Sum	2.00		
10.2.6		Supply and install telemetry panel as specified	Sum	1.00		
10.2.7	ELE 1.10.5; WATER & SANITATION UNIT : TELEMETRY AND INSTRUMENT INSTALL SPECIFICATION REVISION 01 - 17/08/2023	Supply and install new telemetry equipment to include Schneider RTU , digital radios, SMA fly leads etc (For Mobeni Reservoir Site) as per specifications.	Sum	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.2.8	ELE 1.10.5; WATER & SANITATION UNIT : TELEMETRY AND INSTRUMENT INSTALL SPECIFICATION REVISION 01 - 17/08/2023	Supply and install the 45A/hr batteries for the telemetry panel supply	No	2.00		
10.2.9	WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Supply and install the battery/charger box with anti-theft limit switches fitted to the door and integrated to telemetry panel for signal transmission to SCADA	Sum	1.00		
10.2.10		Supply, install, and connect up the battery charger as specified for the telemetry panel supply (include all wiring)	Sum	1.00		
10.2.11		Supply and install the UPS for the telemetry back up supply	No	1.00		
10.2.12	ELE 1.10.5; WATER & SANITATION UNIT : TELEMETRY AND INSTRUMENT INSTALL SPECIFICATION REVISION 01 - 17/08/202	Supply and installation of new Webb radio antenna, with cables with associated mountings and accessories for telemetry system	Sum	1.00		
10.2.13		Supply and install of instrument cable for flow meters (0.75mm SWA twisted 16 pair shielded and overall shielded) in provided cable trays and routes/trenches by others	m	180.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.2.14	ELE 1.10.5 , WATER & SANITATION UNIT : TELEMETRY AND INSTRUMENT INSTALL SPECIFICATION REVISION 01 - 17/08/202EWS STANDARDS	Supply and install smoke detector and siren to Metro Standards in telemetry room including power supply and cabling and wiring to connect to telemetry panel (To integrate to telemetry panel I/O cards in telemetry room)	Sum	1.00		
10.2.15	ELE 1.10.5 , WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No. C & I - 005 Rev 3 - April 2025	Supply and install PIR intruder alarm sensors eThekwini Standards in telemetry room including cabling and wiring and connect to telemetry panel (To integrate to telemetry panel I/O cards in telemetry room)	Sum	1.00		
10.2.16	SANS10142	Supply and install bosal pipe at the reservoirs and telemetry room	m	160.00		
10.2.17	ELE 1.12 ; WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No. C & I - 005 Rev 3 - April 2025	Supply and install Wika or similar approved 0-40KPA range pressure transmitter installed on inlet pipework to reservoirs. To be supplied complete with matching controller installed in telemetry panel, to communicate and integrate to telemetry I/O cards and SCADA	No	2.00		
10.2.18		Supply and wire optical isolation between serial devices (Moxa TCC120I)	Sum	2.00		
10.2.19		Supply and wire serial surge protection and DC supply surge protection devices	set	2.00		
10.2.20	SANS10142	200x50x6mm thick copper earth bar pre-drilled with 3 holes for 10mm brass bolts fixed to wall of telemetry room with 50mm insulators (for instrument earthing)	No	4.00		
10.2.21		35mm ² PVC insulated earth wire terminations for instrument earthing connected to reservoir earth mat	m	40.00		
10.2.22		Supply and install coaxial cable with N type male/female connectors	Sum	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.2.23		300x300x75mm IP65 polycarbonate box surface mounted in equipment kiosk with clear lid and 1 x rows of DIN rail and 20 terminal DIN mount block	No	4.00		
10.2.24		Supply and install DIN rail mounted pre-fused surge arresters and fuses. Arresters to be combined lightning current and surge arrester for protection or power supply and information/ signal systems and cabling	No	2.00		
10.2.25		60 Amp DP isolator/fuses DIN mounted in weatherproof enclosure	No	4.00		
10.2.26	WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Provide documentation pack with all drawings, wiring diagrams, block diagrams, loop diagrams, PLC or Telemetry I/O lists, P & ID diagrams, hand-over documentation, etc. complete for the instrumentation, telemetry and SCADA systems	No	1.00		
10.2.27	WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Prepare and submit the hard and soft copies for approval of the FDS document/specifications and how the telemetry and SCADA software or programming and I/Os will be implemented (Provisional item)	Sum	1.00		
10.2.28	WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Configuration, integration, testing and commissioning of Telemetry, Instrumentation and SCADA systems (to include all flow meters, level transmitters and flow meters, level transmitters and flow control valve/solenoid switches)	Sum	1.00		
10.2.29	WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Allow for existing SCADA upgrade at EWS Control Room, software upgrade, re-programming, configuration and integration.	Sum	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.2.30	WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Facilitate training on SCADA upgrade at EWS Control Room, software upgrade, re-programming, configuration and integration	Sum	1.00		
10.2.31	WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No C & I - 005 Rev 3 - April 2025	Allow for initial tests, works test, FAT and final testing (SAT) and commissioning of all instrumentation, telemetry or SCADA equipment as specified	Sum	1.00		
10.3	ELE 1.9; SANS10313; SANS10199	LIGHTNING PROTECTION & EARTHING				
		<u>Supply, install, test and commission the following as specified:</u>				
10.3.1		a) Carry out the earth resistivity survey of all the sites at both reservoirs/telemetry room	Sum	1.00		
10.3.2		b) Supply and install the 70mm ² bare copper trench ring main	m	625.00		
10.3.3		c) Trenching and backfilling for earth mat	m	750.00		
10.3.4		d) Exothermic welds	No	90.00		
10.3.5		e) 16mm diameter x 1.8m long earth electrodes with 300x300 cast iron inspection wells	No	46.00		
10.3.6		f) Earth bushes brass type on concrete plinths or walls connected to reinforcing (include for breaking concrete to expose steel and making good)	No	30.00		
10.3.7		g) 70mm ² PVC connections from earth bushes to reservoir or roofing reinforcing or roof conductor and for other connections	m	300.00		
10.3.8		h) 25mm dia GAV conduit for earth wires (some cast into walls and roof slabs)	m	450.00		
10.3.9		i) 300x6mm thick earth bar for adjacent to MCC and connection to MCC	No	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.3.10	SANS10313; SANS10199	j) 10mm dia solid aluminium earth finials/conductor on MCC/Telemetry room roof and on reservoir roof connected to roof reinforcing steel	m	525.00		
10.3.11		k) 70mm ² terminations	No	80.00		
10.3.12		l) Test and commission the lightning protection and earthing installation for the entire site (for all structures) and issue of the earth test certificates, as-built layouts, hand-over data packs and compliance certificates.	Sum	1.00		
		<u>Additional items for the lightning protection and earthing installation the contractor considers are omitted and requires additional pricing as follows:</u>				
10.3.13		a)	Sum	1.00		
10.3.14		b)	Sum	1.00		
10.4		OTHER ITEMS AND ASSOCIATED WORK				
10.4.1	ELE 1.28 ; WATER & SANITATION UNIT : CONTROL & INSTRUMENTATION SPECIFICATION DOC No. C & I - 005 Rev 3 - April 2025	Allow provision of the O&M manuals including MCC / DBs as-built drawings/wiring diagrams, specifications and parts list of electrical equipment including "As Built" loop/block diagrams, post and final FDS and cable schedules etc complete	Sum	1.00		
10.4.2		Provide project management and attend progress and technical meetings etc	Sum	1.00		
10.4.3	ELE 1.17; SANS10142; STANDARD EWS ELECTRICAL SPECIFICATION _ 20200519	Test the entire electrical / instrumentation installation and issue the electrical COC in accordance with SANS10142	Sum	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.4.4	SANS10142; WATER & SANITATION UNIT : CONTROL & INSTRUMENTA TION SPECIFICATIO N DOC No. C & I - 005 Rev 3 - April 2025	Allow an amount to test and commission the reservoir system and all inlet and outlet flow to and from the two reservoirs including the flow control valves etc complete	Sum	1.00		
10.4.5	SANS10142	Disconnect/remove existing cabling systems, lights, power points, DB, instruments (level sensors, flow meter) and deliver to EWS stores in Springfield	Sum	1.00		
10.4.6		Allow a provisional sum of R 150 000,00 for the payment of the electricity connection costs and any unforeseen work and any additional work required on the existing SCADA system	Prov.Sum	1.00	R 150 000.00	
10.4.7		Allow for profit and attendance on above item 10.4.6	%		R 150 000.00	
10.4.8		Allow an amount of R 25 000,00 for the engineer to attend the FAT of all equipment at the suppliers or manufacturers facilities (to be paid directly to engineer)	Prov.Sum	1.00	R 25 000.00	
10.4.9		Allow for profit and attendance on above item 10.4.8	%		R 25 000.00	
10.4.10	ELE 1.8; SANS10142	Supply and install suitable sized CCG weatherproof termination boxes adjacent all pole lights (including for terminal etc)	No	40.00		
10.4.11		Allow an amount to make the application for a new power supply to eThekweni Electricity and all dealings with the supply authority to ensure the power is made available	Sum	1.00		
10.4.12	WATER & SANITATION UNIT : CONTROL & INSTRUMENTA TION SPECIFICATIO N DOC No. C & I - 005 Rev 3 - April 2025	Provide as-built drawings and wiring diagrams of the electrical and electronic installation for the control, telemetry and instrumentation systems	Sum	1.00		
Total Carried Forward						

SCHEDULE 2: SANS

SECTION 10: ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
Brought Forward						
10.4.13		<u>Additional items for the entire electrical and other services installation the contractor considers is omitted and requires additional pricing as follows:</u> a)	Sum	1.00		
10.4.14		b)	Sum	1.00		
Total Carried Forward To Summary						

SCHEDULE 2: SANS

SUMMARY OF SECTIONS

SECTION	DESCRIPTION	AMOUNT (RAND)
1	SITE CLEARANCE	
2	EARTHWORKS	
3	EARTHWORKS (PIPE TRENCHES)	
4	PILING	
5	CONCRETE (STRUCTURAL)	
6	STRUCTURAL STEEL	
7	MEDIUM PRESSURE PIPELINES	
8	BEDDING (PIPES)	
9	STORMWATER DRAINAGE	
10	ELECTRICAL, CONTROL & INSTRUMENTATION INSTALLATION	
Total Carried Forward To Summary Of Schedules		

SCHEDULE 3 - COTO

SECTION 1: CLEARING AND GRUBBING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
1	C1.6	CLEARING AND GRUBBING				
	C1.6.1	<u>Clearing</u>				
1.1	C1.6.1.1	Clearing with machines and some hand labour where necessary	ha	0.10		
	C1.6.2	<u>Grubbing</u>				
1.2	C1.6.2.1	Grubbing with machines and some hand labour where necessary	ha	0.10		
	C1.6.3	<u>Removal and grubbing of large trees and tree stumps:</u>				
1.3	C1.6.3.1	Girth equal to or exceeding 1,0 m up to and including 2,0 m	No	2.00		
1.4	C1.6.3.2	Girth exceeding 2,0 m up to and including 3,0 m	No	2.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 2: DRAINS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
2	C3.1	DRAINS				
	C3.1.1	<u>Excavation for open drains:</u>				
	C3.1.1.1	<i>Excavating all material situated within the following depth ranges below the surface level using conventional methods:</i>				
2.1		(a) 0 m up to 1,5 m	m ³	100.00		
	C3.1.4	<u>Excavation and disposal of material for subsoil drainage systems:</u>				
	C3.1.4.1	<i>Excavating in all material situated within the following depth ranges below the surface:</i>				
2.2		(a) 0 m up to 1,5 m	m ³	30.00		
	C3.1.5	<u>Impermeable backfilling to subsoil drainage systems</u>				
2.3	C3.1.5.1	Un-stabilised natural gravel obtained from approved sources on the site	m ³	20.00		
	C3.1.7	<u>Natural permeable material in subsoil drainage systems (approved crushed stone):</u>				
2.4	C3.1.7.2	Crushed stone obtained from commercial sources (20mm Nominal Size)	m ³	10.00		
	C3.1.8	<u>Natural permeable material in subsoil drainage systems (approved natural sand):</u>				
2.5	C3.1.8.2	Sand from commercial sources (Coarse Grade Nom. 4.75mm)	m ³	10.00		
	C3.1.9	<u>Pipes in subsoil drainage systems:</u>				
2.6	C3.1.9.1	U-PVC pipes and fittings , normal duty, complete with coupling (100 mm internal dia. slotted not perforated)	m	60.00		
2.7	C3.1.11	Geotextile (Synthetic-fibre filter fabric (Grade 2))	m ²	84.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 3: CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
3	C3.3	CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS				
	C3.3.2	<u>Concrete kerbing-channelling combination:</u>				
3.1	C3.3.2.1	Prefabricated kerbing-channelling (Fig. 6 Kerb and G9 or similar bedding)	m	120.00		
	C3.3.8	<u>Lining for open drains:</u>				
3.2	C3.3.8.1	Cast in situ concrete lining (Class 20/19 for open drains) as per drawing SD 0601/B	m ³	10.00		
3.3	C3.3.8.2	Class U2 surface finish to cast in situ concrete (Open Drains and Side Walk)	m ²	90.00		
	C3.3.9	<u>Formwork to cast in situ concrete lining for open drains (class F2 surface finish):</u>				
3.4	C3.3.9.1	To sides with formwork on the internal face only	m ²	300.00		
3.5	C3.3.9.3	To ends of slabs	m ²	70.00		
3.6	C3.3.10	Sealed joints in concrete and stone pitched linings of open drains ((Polysulphide sealant) at 12m centres - SD0601)	m	7.50		
	C3.3.12	<u>Reinforcement:</u>				
3.7	C3.3.12.3	Welded steel fabric	kg	200.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 4: COMMERCIAL MATERIALS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
4	C4.4	COMMERCIAL MATERIALS				
	C4.4.2	<u>Commercial materials identified by the Contractor from commercial, private or other non-commercial suppliers</u>				
	C4.4.2.1	<i>Pavement layer material:</i>				
4.1		(c) Type G5A material	m ³	30.00		
4.2		(d) Type G7 material	m ³	40.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 5: ROADBED

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
5	C5.1	ROADBED				
	C5.1.1	Roadbed construction and compaction				
5.1	C5.1.1.1	Compaction of in-situ material to 90% of MDD	m³	50.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 6: PAVEMENT LAYERS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
6	C5.3	PAVEMENT LAYERS				
	C5.3.2	<u>Construction of pavement layers</u>				
	C5.3.2.1	<i>Construction of layers using conventional construction methods:</i>				
6.1		(c) G7 Upper selected subgrade layer, 150mm thick compacted to 95% of MDD	m ³	40.00		
6.2		(r) G5A crushed rock/boulder baser layer (100mm thick) compacted to 100% of MDD	m ³	30.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 7: SEGMENTAL BLOCK PAVING LAYERS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
7	C6.2	SEGMENTAL BLOCK PAVING LAYERS				
	PC6.2.1	<u>Segmental block paving</u>				
7.1	PC6.2.1.1	Concrete block paving (Interlocking paving blocks (Type S-A) 60mm)	m ²	231.00		
7.2	C6.2.2	Cast in-situ concrete edge and intermediate beams	m ³	20.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 8: NON-STRUCTURAL GABIONS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
8	C11.2	NON-STRUCTURAL GABIONS				
	C11.2.1	<u>Foundation trench excavation:</u>				
	C11.2.1.1	<i>Excavating all material situated within the following depth ranges below the surface level:</i>				
8.1		(a) 0 m to 1,5 m	m ³	405.00		
8.2		(b) Exceeding 1,5 m and up to 3,0 m	m ³	585.00		
	C11.2.3	<u>Gabion boxes and mattresses:</u>				
8.3	C11.2.3.1	Galvanized gabion boxes (80mm x 100mm hexagonally woven mesh, 2.7mm OD fame wire and 2.2mm OD mesh wire) 1.0 m x 1.0 m x 1.0 m (Rate only)	m ³			Rate Only
8.4	C11.2.3.2	PVC coated gabion boxes (80mm x 100mm hexagonally woven mesh, 2.7mm OD fame wire and 2.2mm OD mesh wire) 1.0 m x 1.0 m x 1.0 m	m ³	160.00		
8.5	C11.2.3.3	Galvanized gabion mattresses (2.5m x 0.5m with mesh size 80mm x 100mm, 2.7mm OD fame wire and 2.2mm OD mesh wire and diaphragm spacing 1.0m) (Rate Only)	m ³			Rate Only
8.6	C11.2.3.4	PVC-coated gabion mattresses (2.5m x 0.5m with mesh size 80mm x 100mm, 2.7mm OD fame wire and 2.2mm OD mesh wire and diaphragm spacing 1.0m)	m ³	340.00		
8.7	C11.2.4	Geotextile (kaymat U24 or similar)	m ²	150.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 9: GROUND ANCHORS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
9	C12.2	SOIL NAILS, MESH AND SHOTCRETE (TEMPORARY LATERAL SUPPORT)				
9.1	C12.2.13	Establishment on the site for drilling of soil nails	Sum	1.00		
9.2	C12.2.14	Move to and set up at each soil nail position	No	144.00		
	PC12.2.15	<u>Install, grout and protect soil nails or rock bolts (6m) Threadbar 500. 25mm diameter. 200mm square head plate. 15mm thick. Nut and domed washer. Black - not galvanised (Temporary Support) Refer to drawing 60591/043</u>				
9.3		a) Length 6m drilled @ 100 to horizontal	m	144.00		
9.4		b) Length 9m drilled @ 100 to horizontal (Rate only)	No			Rate Only
9.6	PC12.2.20	Drainage medium: Fin Drain 100mm wide with netlon core	m	100.00		
9.7	PC12.2.21	Shotcrete 25 MPa: 75mm thick reinforced (Ref 245); Nail head and plate on outside face of shotcrete. All black - not galvanised (Temporary Support)	m ²	180.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 10: MECHANICALLY STABILISED FILL AND GABIONS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
10	C12.6	MECHANICALLY STABILISED FILL AND GABIONS				
10.1	C12.6.2	Excavation for wall base foundation	m ³	52.00		
	C12.6.9	<u>Polymer/ Geosynthetic reinforcing sheets</u>				
10.2		Geogrid 300kN/m (Maccaferri Paralink 300, or similar)	m ²	3,233.00		
10.3	C12.6.11	Backfill for foundation soil improvement (replace with compacted soil G8 min 100% MDD)	m ³	52.00		
	C12.6.13	<u>Drainage medium</u>				
10.4		Drainage medium (MacDrainW105M, or similar)	m ²	855.00		
	C12.6.16	<u>Gabions and mattresses</u>				
10.5	C12.6.16.4	Polymer coated gabion mattresses for Gabion Wall Facing (80mm x 100mm hexagonally woven mesh, 2.7mm OD fame wire and 2.2mm OD mesh wire) 1.0 m x 1.0 m x 1.0 m	m ³	190.00		
	C12.6.17	<u>Geotextile Filter Fabric</u>				
10.6		Kaytech Bidum A6 or similar	m ²	342.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SECTION 11: REPAIR AND REHABILITATION OF CONCRETE STRUCTURES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (RAND)
11	C14.0	REPAIR AND REHABILITATION OF CONCRETE STRUCTURES				
11.1	C14.4	SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS				
	C14.4.3	<u>Proprietary cementitious repair system in accordance with table A14.4.5-1</u>				
	C14.4.3.1	<i>Class R4 - (50 MPa finished strength structural non-shrink mortar or grout)</i>				
11.1.1		(a) in positions indicated by the Engineer	ℓ	12.00		
11.2	C14.5	ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION				
	PC14.5.7	<u>Crack filling</u>				
11.2.1	PC14.5.7.1	Repair system to cracked brickwork on chamber walls	m	20.00		
11.3	14.7	PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE				
11.3.1	PC14.7.2	Application of protective waterproofing torch-on membrane on brick chamber walls	m ²	280.00		
11.4	C14.9	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS				
11.4.1	PC14.9.1	Removal of plant growth and debris	m ²	20.00		
11.4.2	PC14.9.7	Removal of brick and replacing with concrete	m ²	5.00		
11.4.3	PC14.9.18	Ream out and replace mortar with 10 MPa finished strength on internal brick chamber walls to a depth of 15mm, at locations indicated by the Engineer.	m ²	140.00		
Total Carried Forward To Summary						

SCHEDULE 3 - COTO

SUMMARY OF SECTIONS

SECTION	DESCRIPTION	AMOUNT (RAND)
1	CLEARING AND GRUBBING	
2	DRAINS	
3	CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS	
4	COMMERCIAL MATERIALS	
5	ROADBED	
6	PAVEMENT LAYERS	
7	SEGMENTAL BLOCK PAVING LAYERS	
8	NON-STRUCTURAL GABIONS	
9	GROUND ANCHORS	
10	MECHANICALLY STABILISED FILL AND GABIONS	
11	REPAIR AND REHABILITATION OF CONCRETE STRUCTURES	
Total Carried Forward To Summary Of Schedules		

SUMMARY OF SCHEDULES

SCHEDULE	DESCRIPTION	AMOUNT (RAND)
1	SCHEDULE 1 - PRELIMINARY AND GENERAL	
2	SCHEDULE 2: SANS	
3	SCHEDULE 3 - COTO	
	SUBTOTAL	
	Add 15% VAT	
Total		

PART C3: SCOPE OF WORK

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C3.1: PROJECT DESCRIPTION AND SCOPE OF CONTRACT

C3.1.1 DESCRIPTION OF WORKS

In May of 2019 eThekweni Municipality's Water and Sanitation (EWS) Unit identified that a structural failure of the Mobeni Reservoir no. 2 occurred, resulting in extensive damage to the reservoir, supporting embankment, and the property adjacent to the site.

Due to the collapse of the Mobeni 2 Reservoir, the current supply to the supply zones is being met by Mobeni 1 and Mobeni Rear Reservoirs.

In order to meet the standard 48-hour storage requirements, as well as the future demands of the supply zones, the works under this contract consist of the partial demolition of the reinforced concrete Mobeni 2 Reservoir, and construction of a new, adjoining reinforced concrete portion to the reservoir, such that a finished capacity of 10.9 Mℓ is achieved.

In addition to the above the following items as stated below will be conducted under the works of this contracted:

- in order to bring all elements up to spec, pipework, valves, chambers and other ancillary works feeding both Reservoirs 1 & 2 will be upgraded within this contract;
- cathodic protection will be incorporated within this contract to improve the lifespan of new steel pipelines;
- to improve the overall stability and drainage of the site, ground levelling and embankment stabilisation will be incorporated within this contract;
- and to improve general safety and prevent theft within the site, new perimeter fencing and floodlights will be installed under this contract.

C3.1.1.1 Employers Objectives

This Contract has been prepared to assist EWS in achieving the objectives of its service delivery charter improving, upgrading and maintaining key infrastructure components and providing a service that is efficient, effective, affordable and sustainable, for the specific area.

C3.1.1.2 Main Components of the Works

This Contract comprises the construction of a new portion of the Mobeni 2 Reservoir, approximately 6.85m wide, is to be constructed, and will be joined to the remaining 67.7m long portion of the reservoir following the partial demolition.

The new portion will rest on piled foundations to limit differential settlement, and will consist of a 200mm thick roof slab, 500mm thick surface bed, 380mm diameter columns and a 650mm thick vertical RC wall.

In addition, further works on the site will be conducted to upgrade and improve the site as a whole. The totality of works will include but is not limited to the following:

- Establishment of Contractor's campsite;
- Protecting and protection of existing services;

- Temporary support and shoring;
- Demolition of existing structures and transport off site;
- Survey existing pylon and adjacent embankment;
- Install mechanically stabilised gabion wall and soil nailing;
- Earthworks and platforming;
- Top-soiling and grassing to approaches and footpath verges;
- Survey for main pile and test pile positions;
- Install and load test of test pile;
- Working pile installation;
- Construction of main structure;
- Water tightness testing;
- Earthworks and excavations;
- Install new steel pipelines
- Testing on existing lines that will remain active;
- Construction of new chambers and associated valves, meters, etc.;
- Decommission and bury old lines, valves and chambers;
- Install new lighting and power supply connection;
- Install new telemetry equipment, meters and sensors;
- Testing and commissioning of new equipment and signal strength;
- Install new cathodic protection system;
- Tie-ins for inlets/outlets on res 1 and 2;
- Commissioning of reservoir 2;
- Cleaning and survey of res 1;
- Compliance with Occupational Health and Safety Regulations and the Environmental Management Plan throughout the construction period; and
- De-establishment after all construction activities.

C3.1.1.3 Temporary Works

The Contractor shall carry out such temporary work, including the necessary access and construction roads, lateral support of embankments, trenches and excavations etc., as he may require enabling the permanent work to be constructed.

Temporary works are expected to include:

- necessary site access and deviations for traffic where the proposed works will disrupt traffic;
- shoring, dewatering and related temporary works required during excavation of trenches and excavations as required to enable the permanent works to be constructed. The design of the lateral support is to be undertaken by the Contractors Professional Engineer and included in the tendered rate. The design of the lateral support solution will be dependent on the technique used by the contractor to perform the excavation, as well as programmed to fit into the Contractors construction programme. The Contractor is to submit the detailed design for the approval and acceptance of the project geotechnical engineer;
- Any temporary support structures required to protect and maintain services;
- Any temporary pipe specials and fittings.

C3.1.2 DESCRIPTION OF SITE AND ACCESS

The site on which the proposed works are to be carried out is located on Alamein Avenue at the eThekweni Municipality Mobeni Depot in the South of Durban. Access to the site of works will be via Alamein Avenue, and no access will be allowed from the neighbouring property. The site is owned by eThekweni Municipality and contains Mobeni 1 and 2 Reservoir at GPS coordinates 29° 56' 02"S and 30° 57' 19"E. A locality plan of the reservoir site is shown in **C4.1**.

Two rectangular reservoirs, Mobeni Reservoir 1 (22.7Mℓ), approximately 56 x 87 x 5.18m deep, and Mobeni Reservoir 2 (currently collapsed), approximately 63 x 68 x 7m deep (old dimensions), are presently on site. Mobeni 2 was built during 1967/68 and Mobeni 1 during 1952/53. After remediation, Mobeni 2 will have a finished capacity of 10.9Mℓ.

The site for the is fully fenced and access is controlled by the EWS Central Area Operations.

C3.1.3 NATURE OF GROUND AND SUBSOIL CONDITIONS

Mobeni Reservoir No. 2 was breached in May 2019. The breach occurred at the western corner and water incorporating mud debris and dislodged sections of concrete etc. discharged downslope, cutting a valley or channel through the embankment slope and was deposited onto the adjacent property of Erf 1/3010 which is considerably lower in elevation, being immediately west of the reservoir. Since then, the site has become very overgrown with vegetation.

The general area within which the Mobeni Reservoirs No. 1 & 2 occurs is underlain by the predominantly sandy soils of the Berea Formation. These soils range in composition from silty sands through to slightly clayey silty sands. The reservoirs were constructed on a large, cut platform made into an elevated dune or hill crest area consisting of the Berea Formation dune soils.

The geotechnical report and results of tests on ground and subsoil conditions for the site is included in **Section C4, Site Information**. Trial holes may be excavated by Tenderers, (with the prior written consent of the Engineer's representative) to assist in the pricing of their excavation rates. Any trial hole shall be barricaded and shall be backfilled immediately after inspection of the soil conditions.

The tenderer shall be fully liable for any claims for losses, damage or injuries arising or as a consequence of carrying out trial hole excavations for the purpose of this tender. Furthermore, the Engineer's authority for the carrying out of any exploratory excavations is subject to the Tenderer indemnifying the Employer and the Engineer against any such claims.

C3.1.4 CIDB B.U.I.L.D. PROGRAMME (EMPLOYER'S OBJECTIVES)

Standard for Indirect Targeting for Enterprise Development

It will be a Condition of Contract that the Contractor shall, in the performance of the contract, achieve the **Contract Participation Goal (CPG)** relating to the engagement of targeted enterprises as established in the below referenced standard:

- CIDB Standard for Indirect Targeting for Enterprise Development through Construction Works Contracts, published in Gazette Notice No. 36190 of 25 February 2013.

- a) The objective of the project is to provide for a minimum contract participation goal (CPG) of 30% of the total project value and to develop targeted enterprises by the main or lead partner contractors.
- b) The successful contractor shall:
 1. Subcontract a minimum of 30% of the total project value to targeted enterprises;
 2. Develop the targeted enterprise/s in two development areas as specified in the Standard, and agreed by both the main contractor and the targeted enterprise/s;
 3. Perform needs analysis on the targeted enterprise to identify developmental goals;
 4. Provide internal mentorship support to improve the targeted enterprise/s performance;
 5. Develop a project specific enterprise development plan to improve the targeted enterprise/s performance in the identified developmental areas;
 6. Monitor and report the progress of the agreed development areas with the targeted enterprise/s; and
 7. Submit a project completion report to the Employer's representative for each targeted enterprise.
- c) The development of the Targeted Enterprise shall be guided by the **CIDB Competence Standard for Contractors** (Gazette No. 41237, 10 November 2017). Table 2. below outlines the minimum recognised qualifications to which development of targeted enterprises must be undertaken by the main contractor.

CIDB Grade	Minimum NQF Level	Recognised Qualifications
Business Management		
5 & 6	5	National Occupational Qualification in Business Management NQF 5
2 to 4	2	National Certificate: Construction Contracting NQF 2
Building and Construction Works Management		
5 & 6	5	National Certificate: Management of Building Construction Processes NQF 5
2 to 4	3	- NCV 4: Civil Engineering and Building Construction, or - National Certificate: Supervision of Construction Processes
Civil Engineering Construction Works		
5 & 6	5	- National Certificate: Management of Civil Engineering Processes NQF 5, or - National Diploma: Civil Engineering and Building Diploma
2 to 4	3	- NCV 4: Civil Engineering and Building Construction or - National Certificate: Supervision of Construction Processes, or - Further Education and Training Certificate: Supervision of Construction Processes

C3.2: PROJECT SPECIFICATION

PREAMBLE

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

C3.2.1 GENERAL

PS.1 PROGRAMME, METHOD OF WORK, AND ACCOMMODATION OF TRAFFIC

This Clause is to be read in conjunction with the provisions and obligations as contained in SANS 1921-1 and SANS 1921-2.

PS.1.1 Preliminary Programme

The Contractor shall include with his tender a preliminary programme on the prescribed form (see T2.2: Preliminary Programme) to be completed by all Tenderers. The programme shall be in the form of a simplified bar chart with sufficient details to show clearly how the works will be performed within the time for completion as stated in the Contract Data.

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

The Contractor shall be deemed to have allowed fully in his tendered rates and prices as well as in his programme for all possible delays due to normal adverse weather conditions (refer to Clause 5.12.2.2) and special non-working days (refer to Clause 5.1.1.1) as specified in the in the Contract Data.

PS.1.2 Programme in Terms of Clause 5.6 of the General Conditions of Contract

It is essential that the construction programme, which shall conform in all respects to Clause 5.6 of the General Conditions of Contract, be furnished within the time stated in the Contract Data (refer to Clause 5.3.1/2).

The preliminary programme to be submitted with the tender shall be used as basis for this programme.

The Tenderer's attention is drawn to the fact that a number of factors will affect the programming of and method of carrying out the works. The more important of these are:

- (1) Time required for proving of underground services.
- (2) Time required for the protection/temporary relocation of existing services.
- (3) Methodology for demolition, protection of remaining structure and embankment, and transport to registered landfill site.
- (4) Time required for attaining work permits.

- (5) Notification and engagement with PSC and local community during works.
- (6) Limited access due to deteriorated condition of access road.
- (7) No provision of electricity/water by the Employer.

For a more detailed breakdown of the items influencing programming, refer to clause 5.6.2.2 under the Contract Data.

Those known, existing services in the area of the works have been depicted on the contract drawings. It is evident, however, that the status of existing service records as far as can be ascertained might not reflect the actual situation in the field. As such, due allowance has been made in the Bill of Quantities for the proving of services, where directed by the Engineer.

PS.2 SERVICES

This Clause is to be read in conjunction with the provisions and obligations as contained in SANS 1921-1 and SANS 1921-2.

PS.2.1 Existing Services

The Tenderer's attention is drawn to the numerous existing services in the area. Although every effort has been made to depict these services accurately the positions shown must be regarded as approximate.

Special attention is drawn to the following existing services on site:

- (1) Electrical pylon and cables
- (2) Underground bulk water lines
- (3) Underground cabling and wires
- (4) Stormwater infrastructure
- (5) Cathodic protection

PS.2.2 Proving Underground Services

This clause must be read in conjunction with Clause DB.5.1.2, the requirements of which shall be extended to cover all earthworks operations whether for trenching or bulk earthworks, in the vicinity of underground services.

It is stressed that all services in a particular area must be proven before commencing work in that area.

Insofar as bulk earthworks are concerned, where services are indicated on the drawings or where from site observations can reasonably be expected that such services are likely to exist where excavations are to take place, the Contractor shall without instructions from the Employer's Agent carefully excavate by hand to expose and prove their positions.

The cost of the proving trenches is to be included in the work covered by Clause DA.8.3.

When a service is not located in its expected position the Contractor shall immediately report such circumstances to the Employer's Agent who will decide what further searching or other necessary action is to be carried out and shall instruct the Contractor accordingly. The cost of this additional searching shall be to the Council's cost and shall be paid for under DB.8.19 - Proving Existing

Services.

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.

When electrical cables are not in the positions shown on drawings of eThekweni Electricity and cannot be found after proving trenches have been put down, assistance may be obtained by calling an official of the Works Branch on Telephone No. 311-1111 during office hours, or by contacting Control on Telephone No. 305-7171 after hours.

It should be noted that 33,000 Volt and 132,000 Volt cables may only be exposed by the eThekweni Electricity's personnel. The cables are usually protected by concrete covering slabs, and therefore if the slabs are inadvertently exposed, excavation work must stop, and the eThekweni Electricity shall be contacted immediately on the above telephone numbers.

Proving of services shall be completed at least two weeks in advance of the actual programmed date for commencing work in the area. The position of these services located must be co-ordinated and levelled by the Contractor, and the information given in writing to the Employer's Agent's Representative.

The requirements of this clause do not relieve the Contractor of any obligations as detailed in the Conditions of Contract or under Clause 4.17 of SANS 1921-1.

PS.2.3 New Services and Relocation of Existing

This clause shall be read in conjunction with Clause PS.1.

New services are either to be installed by the Contractor as part of the contract or by others during the contract period. In the latter case excavation and subsequent backfilling of the trench from the top of the bedding layer shall generally be carried out by the Contractor.

Relocation of services shall generally be carried out by the relevant services organisation. Generally their work shall include the excavating and bedding the service which will include backfilling to a depth of approximately 300 mm above the service. The remainder of the backfilling shall be carried out by the Contractor.

Generally work shall only commence on the installation of new services once the bulk earthworks have been completed and roughly trimmed to level along a substantial portion of the services route. In addition no sidewalk, verge, median or island shall be surfaced or topsoiled until all work on the services has been completed.

Services affected by the contract are described as follows:

- PS.3: Watermains
- PS.4: Stormwater
- PS.5: Electrical Cables / Lightning
- PS.6: Cathodic Protection

Further to the above, Tenderers are referred to the services drawing and are to note that several minor cables / pipes may be encountered during excavation works which may require to be

relocated to some extent. It is anticipated that the two week period required under **PS.2.2** will allow sufficient time for these relocations.

It is the responsibility of the Contractor to negotiate the relocation of services with the relevant service providers.

The Contractor shall ensure that he/she commences with such negotiations well in advance in order to be able to plan and programme such work into the programme for the construction of the Works without causing a delay to the construction of the Works.

The Contractor will be responsible for the payment of initial deposits and relocation costs and will only be reimbursed for such costs from the relevant Provisional Sum item in the Bill of Quantities on a re measurable basis, once proof of relevant payments have been received by the Employer.

The Contractor is to further note that no excavation machinery may excavate within 300 mm vertically or horizontally of existing water pipelines unless otherwise agreed by the Employer's Representative, the balance of the excavation being carried out is to be done by hand or by other means approved by the Employer's Representative.

PS.2.4 Accommodation of Services

Further to Clauses PS.1 and PS.2 of this specification, Tenderers are to note that allowance must be made under this item and / or the appropriate rates, for all costs incurred as a result of complying with these clauses. It shall also cover liaison with the services organisations and accommodation of their work gangs / contractors on site.

PS.2.5 Location and protection

SANS 1921-1 Clause 4.17 has relevance and is added to herewith.

All enquiries on the latest situation with services are to be undertaken by the Contractor. The location of the services shown on the drawing by the Employer were effective at the time of design only and may have changed. Time required to confirm the latest situation with services has to be allowed for by the Contractor in his programme for construction.

Attention is drawn to the fact that whilst the position of the existing pipelines in servitudes, as well as other services in the vicinity of servitudes, and all other services are indicated on the drawing have been provided as accurately as possible, this information may not be completely accurate and it will be necessary for the Contractor to communicate with the service providers and to prove, trace and expose services which the Contractor has been made aware of as a result of his interaction with service providers. The Contractor shall coordinate meetings with all relevant service providers before construction commences and take all the necessary steps to ascertain the location of existing services before commencing work on any section of the Works. The rates tendered for the location of services and proving of same as well as the updating of existing records of services, shall be deemed to include for these meetings.

The Contractor shall establish at the meetings with service providers, the lead times required to update records and he shall include for this activity in his Construction Programme.

The Contractor shall take all the necessary steps to ascertain the location of existing services before commencing any section of the Works and shall exercise the greatest care when working in the vicinity of such services. Before commencing his operations in any particular area, the

Contractor shall request the latest available drawings from the relevant local Service Authorities, showing the location of their services already installed. The Contractor shall ensure that adequate time is allowed for making contact with the relevant Service Authorities in order for them to respond meaningfully. The Contractor shall compare the latest service locations obtained from the Service Authorities with the drawings provided for construction and where required, such construction drawings shall be updated. The Engineer shall be notified of any changes in service locations found on the construction drawings.

The Contractor shall take all necessary steps to protect any existing works or service whatsoever, against damage which may arise as a result of his operations on Site. The Contractor shall bear the cost of the repair of damage to any known service, the possible existence of which could reasonably have been ascertained by him beforehand.

Wayleave conditions/applications are attached to the annexure section named - WAYLEAVES. The Contractor shall procure the required equipment which will enable him to prove services. The Contractor shall locate existing pipes, optic fibres cables, electric cables and/or any other services by hand excavation without the use of picks, to minimise the risk of damaging existing services. The Contractor shall be held responsible for any damage caused to existing services that can reasonably be traced and located.

Whilst the location of power, telephone and optic fibre cables, as well as pipelines and other services are indicated on the plan and longitudinal section drawings, this may not be comprehensive. It is the Contractor's responsibility to obtain the latest known information on services, at all times.

It is a requirement of this contract that the Contractor exposes and proves every known service within the advance work front ahead of any work being performed, in order to determine whether its level or location clashes with the designed grading of the pipeline or with the coordinates of the proposed road alignment. All services are to be proved in conjunction with each service provider prior to excavation. Such proving shall be timed to coincide with the requirements of the programme and the limitations on the length of work fronts as specified.

The cost of this work is to be included in the tendered rates for trench excavation or any other excavation and all tendered rates shall be deemed to include for the exposing of known services and the proving of its location. No additional payment will be considered for the exposing and proving of services as payment for this shall be deemed to be included in existing payment items as specified in the Bill of Quantities for all types of excavation and the Lump Sum provided for this purpose under Preliminary and General. The item for excavation by hand to expose unknown and known services where instructed by the Engineer is for use by the Engineer only on an as and when required basis.

The Contractor shall be required to prove each and every service, indicating X, Y and Z coordinates. Claims for delays etc. arising from the non-compliance with this requirement will not be entertained.

In addition to the marking/pinpointing of known services, the Contractor is to screen the line of the proposed excavations by means of appropriate electronic tracing apparatus for other buried services, such as pipes or cables that may not be shown in services records. All services found in this manner shall be classified as known services and shall be proved as set out above.

Service connections to individual erven are to be located and handled in a manner acceptable to

the Engineer. Located and proved services are deemed to be known services.

Should any services which are not on the existing services layout drawings be located, the Contractor shall add the new information to the services layout drawings in order for the employer to update his information. All tendered rates for trench excavations and road works shall include for the location of services and the updating of services drawings for the Employer.

The top surface of all existing thrust blocks are to be proven and sufficiently protected before any excavation near these thrust blocks takes place. Such thrust blocks shall be defined as a "service".

PS.3 WATERMAINS

PS.3.1 General

Installation of new steel pipelines forms part of the scope of this project, and particular attention must be paid to tie-ins to the existing live mains, which have to be done by the Water Supply Branch even where installation of the new pipelines is included in this contract.

PS.3.2 Water Main Valve Access

Due to the dangerous situation occurring when water main valves are covered over, the Contractor shall maintain access to all water main valves at all times. During asphalt layer work, after each pass by the paving machine, the valves shall be exposed and access maintained in a safe condition.

Whatever method the Contractor chooses to use for this work, the cost of raising the valves from existing level to ultimate level shall be paid only once, irrespective of the number of times the valve is uncovered. Spacer rings required for the height adjustment of valve covers shall be supplied by the Water and Sanitation Unit. Tolerances on valve cover levels shall be as specified in clause PH.6.5. Before final setting in position of valve covers the Contractor shall liaise with the Employer's Agent regarding the direction in which covers shall be placed.

PS.3.3 Restriction on Compaction Equipment

The Contractor is to note that existing watermains traverse the site of the works and special care is to be taken in close proximity to these mains and connections. The existing mains and connections shall be proved on site by the Contractor prior to any construction work commencing in the vicinity of the watermains.

Under no circumstances will heavy road-making equipment, other heavy plant or vibratory compaction equipment be permitted to operate within 800 mm vertically or horizontally of the existing mains or connections. The permissible compaction plant within this restricted area shall be the equivalent of a "Bomag 90" under static compaction, or similar approved plant. When the roadworks are far enough advanced to provide a minimum of 800 mm cover to the existing mains, the above restriction will fall away.

The Contractor is to take cognisance of the above requirements when entering rates in the Bill of Quantities and in the programming of the works. No claim for additional payment based on the inability to use plant as a result of the requirements of this clause will be accepted. The Contractor will be held liable for any costs should the watermain or electrical cables be damaged during construction of the road.

PS.4 STORMWATER

As part of the upgrade of the site, new stormwater management infrastructure, such as new pipelines, manholes, field inlets, and an attenuation tank, forms part of the scope of works, and the stormwater runoff within the reservoir site must be accommodated accordingly.

PS.4.1 Blockage Stormwater

The Contractor shall be responsible for ensuring that cementitious sludge, sand and rubble from the works do not enter the stormwater reticulation system. The Contractor shall be liable for any costs incurred by the Council or others as a result of blockages in the reticulation system attributed to failure to comply with the above requirement.

PS.5 ELECTRICAL / LIGHTING

PS.5.1 General

Various types of electrical cables including high voltage, low voltage are affected by the contract. The laying, relocation and jointing of all cables will be carried out by eThekweni Electricity's work gangs, or agents appointed by them, whilst the excavation and backfilling forms part of this contract. Close liaison will therefore be necessary with eThekweni Electricity throughout the contract.

PS.6 CATHODIC PROTECTION

PS.6.1 General

As part of the upgrade of the site, a new cathodic protection system for the new steel pipelines forms part of the scope of work. The Contractor shall ensure that the existing Cathodic Protection system is protected during construction.

PS.7 MANAGEMENT OF THE ENVIRONMENT

The requirements of the National Environmental Management Act 107 of 1998 and subsequent amendments and addendums shall apply.

The contractor is responsible for employing, at no additional cost the Employer, a Designated Environmental Officer to oversee and audit compliance in terms of the relevant acts for the duration of the contract. Any such individual employed shall be registered with the relevant professional bodies for Professional Environmental Practitioners and have a minimum of 5 years post registration experience.

The Contractor shall pay special attention to the following:

PS.7.1 Natural Vegetation

The Contractor shall confine his operation to as small an area of the site as may be practical for the purpose of constructing the works.

Only those trees and shrubs directly affected by the works and such others as the Employer's Agent may direct in writing shall be cut down and stumped. The natural vegetation, grassing and

other plants shall not be disturbed other than in areas where it is essential for the execution of the work or where directed by the Engineer.

PS.7.2 Fires

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

PS.8 OCCUPATIONAL HEALTH AND SAFETY

PS.8.1 General Statement

When considering the safety on site the Contractor's attention is drawn to Annexure C3.6.3: Health and Safety Specifications and Baseline Risk Assessment, which outlines and issues/requirements specific to this project that need to be managed.

It is a requirement of this contract that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the OHS Act 1993 Construction Regulations 2014 issued on 7 February 2014 by the Department of Labour.

For the purpose of this contract the Contractor is required to confirm his status as mandatory and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of Section 37(2) of the Occupational Health and Safety Act.

PS.8.2 Health and Safety Specifications and Plans to be submitted at tender stage

PS.8.2.1 Employer's Health and Safety Specification

The Employer's Health and Safety Specification is included in Annexure C3.6.3: Health and Safety Specifications and Baseline Risk Assessment .

PS.8.2.2 Tenderer's Health and Safety Plan

At tender stage only a brief overview of the Tenderer's perception on the safety requirements for this contract will be adequate. This will be attached to T2.2: Contractor's Health and Safety Plan.

Only the successful Tenderer shall submit a separate Health and Safety Plan as required in terms of Regulation 7 of the Occupational Health and Safety Act 1993 Construction Regulations 2014, and referred to in T2.2: Contractor's Health and Safety Plan.

The detailed safety plan will take into consideration the site specific risks as mentioned under PS.14.21 and PSOH and must cover at least the following:

- (i) A proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 9 to 29;

- (ii) Pro-active identification of potential hazards and unsafe working conditions;
- (iii) Provision of a safe working environment and equipment;
- (iv) Statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (*Regulation 7*);
- (v) Monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
- (vi) Details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 8 and other applicable regulations; and
- (vii) Details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014.

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

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

A generic plan will not be acceptable.

PS.8.3 Cost of compliance with the OHSA Construction Regulations

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Act, the Construction Regulations and the Employer's Health and Safety Specification as applicable to this contract. Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided in the Construction Regulations and in the Employer's Health and Safety Specification.

Items that may qualify for remuneration will be specified in the Employer's Health and Safety Specification.

PS.9 SITE SECURITY

The Contractor shall, for the duration of the contract, provide sufficient security, watchmen, and temporary fencing, to adequately ensure the safety and protection of the works, the Contractor's staff, including local labour and subcontractors, and all site plant and construction equipment required for the works.

Site Security, in conjunction with the SAPS (where necessary), shall be responsible for removal of disruptive elements, that may interrupt the progress of the contract through acts such as, but not limited to, intimidation, threats of disruption, violent disruption, or criminal and illegal activity by the local community or independent organisations or entities that may result in slowing down or partial or total stoppage of the works.

The Contractor is to take note of the prevailing security rate in the rate area, together with the allowable PSIRA rates for security when pricing this item.

The process of negotiation will not be deemed as work stoppage.

Payment for this item shall be included for under item PSA 8.3.1. and PSA 8.4.1.

PS.10 PERFORMANCE MONITORING OF SERVICE PROVIDERS

The performance of service providers that have been selected to provide assistance in the provision of a municipal service, otherwise than in circumstances where Chapter 8 of the Municipal Systems Act applies, is required, by Section 116 of the Municipal Finance Management Act, to be monitored and reported on (see Cl.53 of the SCM Policy).

Appropriate key performance indicators (KPIs) for the contract must be set by the Municipality as a yardstick for measuring performance.

The following KPIs will be applicable to this contract:

- (a) Programme vs. Progress
- (b) Maintaining cashflow
- (c) Contractual compliance
- (d) Health & safety and Environmental compliance

PS.11 ENGINEERING

PS.11.1 EMPLOYERS DESIGN

The Employer is responsible for the design of the permanent works.

PS.11.2 CONTRACTORS DESIGN

The Contractor is responsible for the design of all temporary works, construction methods, and final mechanical, electrical, and instrumentation (MEI) designs. This responsibility includes the following:

- Design, detailing, and execution of tie-ins and interconnecting works.
- Design and implementation of shoring and lateral support systems required for trenching, as well as measures to protect the works and existing anchor block systems.
- Preparation of method statements and designs for the removal, relocation, and/or reconstruction of infrastructure and facilities on private properties, homeowners' properties, or properties owned by parastatals affected by construction activities.
- Development and approval of welding procedures, as well as certification of welders in accordance with these procedures.
- Detailed MEI designs, including but not limited to the final equipment, drawings, quality control documents, design information, layouts, schematics, and systems integration required for the permanent works.
- Any additional designs specified by the Employer's Agent for the Contract.
- The associated designs undertaken by the Contractor are to be signed and approved by a Professionally Registered Engineer.

The Contractor is expected to ensure all designs comply with applicable standards, regulations, and best practices, and to obtain all necessary approvals prior to implementation.

PS.11.3 DRAWINGS

The drawings issued to Tenderers as part of the tender documents must be regarded as provisional and preliminary for the Tender's benefit to generally assess the scope of work and to develop his pricing strategy. These drawings are marked as "Tender Drawings".

The construction of the Works shall be carried out against drawing revisions marked as “for construction purposes”. The Contractor has to ensure that he always refers to the latest construction drawing revision issued by the Engineer.

The Engineer shall, at commencement of the Contract, deliver to the Contractor, copies of the construction drawings in PDF format together with any associated instructions required for the commencement of the Works.

The Engineer may issue, from time to time, during the construction of the Works, revisions to previously issued drawings as may be required for adequate construction and completion of the Works. Such revisions will be in PDF format. The Contractor shall keep an updated drawing register for use on site.

The drawings are issued separately as Annexures to this document and issued as electronic documents (pdf), for tender purposes, are listed under **Part C3.5** on a CD for Hard Copy Tender Documents and/ or is accessible for Electronic Tender Documents obtained from the eTenders website via the web link under **Part C3.5**.

PS 11.3.1 Piping & Instrumentation Diagrams

The Contractor shall ensure that all Piping and Instrumentation Diagrams (P&ID) developed for the project conform to the specific requirements by the Employer. The Contractor shall ensure that the P&ID diagrams comply with the following:

- All symbols, notations, and representations must conform to the Employer’s standard conventions.
- The P&IDs must clearly indicate all piping systems, flow direction, control systems, instrumentation (separately indicating probe elements, transducers, transmitters, field indicators etc where applicable), control and alarm set points, hard and soft linkages and interlocks, valves, and other equipment, together with all tag numbers, as per the project requirements

The P&ID diagrams must be provided in the following formats:

- CAD Format: All P&ID diagrams must be delivered in AutoCAD or an equivalent 2D CAD format to ensure compatibility with the Employer’s systems.
- Plant 3D Format: The P&ID diagrams must also be submitted in Plant 3D format.
 - This format should provide a 3D representation of the piping, equipment, and instrumentation. It should allow the Employer to visualize the systems in three dimensions, facilitating integration with other 3D design models, clash detection, and further design validation. The Plant 3D files must include all relevant components, with accurate spatial relationships, dimensions, and connection points, ensuring that the system layout aligns with the physical design requirements and can be integrated with other engineering disciplines.
- The cost for the P&ID’s are deemed included in the tendered rates.

PS 11.4 EQUIPMENT

PS 11.4.1 General Requirements

The Contractor shall ensure that all equipment required, including process, mechanical, electrical, instrumentation, and control components, is subject to the Employer's acceptance and the Employer's Agent's approval prior to procurement and installation. The equipment planning, review, approval and delivery process must adhere to the following procedure, ensuring compliance with all project and particular specifications.

PS 11.4.2 Equipment List Development

The Contractor shall develop and submit a comprehensive Equipment List for all equipment to be utilized on the Contract. The Equipment List shall include, but not be limited to, the following details:

- Description of each item (e.g., valves, flow meters, electrical panels, etc.).
- Manufacturer and model/serial number.
- Technical specifications and compliance with applicable standards (e.g., EWS Standards, BS, SANS, ISO).
- Proposed installation location or system integration details, referenced to the project drawings.
- Quantity of each item.
- Lead times of each item for procurement.
- Unique tag numbers or identifiers, as specified in the Project and Particular Specifications. Tag numbering shall be in accordance with the Employers specific requirements and verified by the Contractor at the commencement of the Contract.
- The Contractor shall clearly identify any additional equipment not included in the design documentation or original specifications. Each item must be defined with an explanation of its function and purpose, along with reasons for its inclusion and details on how it integrates into the existing design.
- The Equipment List shall be correlated to the project's documentation, including:
 - Equipment drawings, schematics, and system diagrams.
 - Mechanical and electrical design documents.
 - Control and instrumentation specifications.
 - Tagging system references.
 - Functional Design Specifications and P&ID's.
- The Contractor shall submit the Equipment List to the Employer for acceptance and the Employer's Agent for approval within 30 days of the contract commencement.
- The Contractor shall thereafter provide an updated Equipment List every 30 days and presented at ongoing technical meeting.

PS 11.4.3 Submission of Detailed Equipment Documentation

Upon approval of the Equipment List, the Contractor shall submit detailed technical documentation for each listed item. The documentation shall include:

- Manufacturer's data sheets, technical specifications, and catalogues.
- Detailed drawings for installation, assembly, and electrical integration, with references to the relevant tag number.
- Performance criteria or other supporting test data.
- Installation and operation manuals, with reference to the tag number for each item.
- Maintenance and servicing manuals.
- Warranty documentation and after-sales support details.
- For equipment not previously included in the design documentation, the Contractor shall submit a comprehensive description of the equipment's function, the justification for its inclusion, and its impact on the overall system performance.

- The detailed documentation for the above shall be submitted to the Employer for acceptance and to the Employer's Agent for approval before procurement or installation can proceed.

PS 11.4.4 Technical Review and Approval

The Employer's Agent shall review the submitted documentation to ensure completeness, compliance with the contract specifications, and that the equipment aligns with the Equipment List and tagging system.

The Employer's Agent shall provide written approval or rejection of the provided documentation at a timeframe agreed with the Contractor. The minimum duration for responses shall be 20 days from the date of submission and the Contractor is to ensure this is reflected in the programme.

If the submission is rejected, the Contractor shall revise and resubmit the documentation, addressing any comments or additional requirements within 10 days of rejection.

Upon receipt of approval from the Employer's Agent, the equipment will be deemed approved, subject to any final conditions.

PS 11.4.5 Confirmation of Equipment and Supplier Coordination

If the Employer or Employer's Agent requires further clarity on the proposed equipment, the Contractor shall arrange a meeting with the supplier to discuss the equipment's technical specifications, integration into the system, and any necessary adjustments to meet the project's requirements, this timeframe is to be factored into the Contract Programme.

- The Contractor shall facilitate and attend this meeting with the supplier, Employer, and Employer's Agent to confirm the equipment's suitability and compliance with the contract specifications.
- The meeting shall focus on resolving any questions or concerns related to the equipment's features, its role within the overall system, Employer specific technical requirements and any potential modifications.
- Following the meeting, any required changes to the equipment shall be documented and reflected in the updated submission for approval by the Employer and Employer's Agent.
- This coordination shall occur before procurement or fabrication, with approval provided by Employer's Agent.

PS 11.4.6 Inspection and Testing

The Employer reserves the right to inspect the equipment at the manufacturer's facilities/factory to ensure compliance with the approved specifications. The total cost for this is deemed included in the tendered rates.

PS 11.4.7 Equipment Delivery and Certification

Upon delivery of equipment to site the Contractor shall ensure tags are installed on all equipment referencing the approved tag numbers and ensuring compliance with the Equipment List, project and particular specifications.

PS 11.4.8 Non-Conformance and Rectification

Any equipment procured or installed without prior acceptance and approval, shall be considered non-compliant. The Contractor shall be responsible for all costs associated with the rectification of non-compliant equipment, including removal, replacement, and any updates to the tagging system to ensure alignment with the approved documentation.

PS.12 PROCUREMENT

PS.12.1 SUBCONTRACTING

PS.12.1.1 Scope of mandatory Sub-Contracting

Mandatory sub-contracting is specified under the section dealing with Contractors Participation Goal in the Tender and Contract Data.

PS.12.1.2 Selected Sub-Contractors

The Employer, with the assistance of the Engineer, will prepare a detailed scope of work and or specification for the work or supply items to be executed by a Selected Sub Contractor.

The Employer and the Contractor will compile a list of firms or persons acceptable to both and who will then be invited by the Contractor to submit tenders for the required work to be carried out or goods to be supplied by Selected Sub Contractors. When the tenders are received they will be evaluated by the Employer and the Employer will indicate which tender he requires to be accepted by the Contractor. The Contractor will be advised accordingly. The Contractor shall then accept that Tender and appoint the relevant Selected Sub Contractor.

The Contractor shall incorporate in his sub contract provisions the following:

1. In respect of the work carried out or the goods supplied that are subject to the sub contract, the Selected Sub Contractor undertakes to the main Contractor mutatis mutandis the obligations and liabilities as are imposed upon the Contractor to the Employer in terms of the Contract, and holds the Contractor harmless from and indemnifies him against the same and in respect of all claims, demands, therewith, or arising out of or in connection with any failure to perform such obligations or to fulfil such liabilities.
2. The Selected Sub Contractor shall also hold the Contractor harmless from and indemnify him against the following:
 - a. Shortcomings in the sub contract work if and where the work was designed by the Selected Sub Contractor,
 - b. Defects in the goods if and where goods were manufactured and or supplied by the Selected Sub Contractor,
 - c. Any negligence by the Selected Sub Contractor or his/her agents, workmen and/or servants,
 - d. Any misuse by the Selected Sub Contractor of any constructional Plant, temporary works or materials provided by the Contractor for the purposes of the Contract,
 - e. Any claims as aforesaid.

PS.12.1.3 Attendance to sub-contractors

Attendance to sub-contractors is to comply with the Conditions of Contract.

PS.12.1.4 Cathodic Protection installations

The Cathodic Protection installations will be designed and constructed by a selected sub-contractor. The Employer will advise on his choice of selected sub-contractor.

The main contractor will be required to appoint the selected subcontractor and enter into an agreement with the selected sub-contractor.

The payment for the cathodic protection work will be effected from the provisional sum allowed for under the Time related Preliminary and General Section and the Contractor will be remunerated on an extra over for costs and profits basis as shown in the Bill of Quantities.

The CP sub-contractor will have to be health and safety compliant in terms of the relevant legislation applicable and it will be the main contractor's duty to manage this function. The rates provided by the Contractor and shown in the Bill of Quantities are deemed to be full and final payment for all the Contractors costs, including coordination of CP work into the required construction programme, allowing for lead times on CP work execution and management of the CP contractor in terms of his sub contract.

PS.12.2 PREFERENTIAL PROCUREMENT PROCEDURES

For the purpose of this Contract the Contractor shall comply with the preferential procurement and CPG statement provided in F3.11 of the Tender Data. Relevant Contract Data items are applicable.

PS.12.2.1 Requirements

The requirements are detailed in the Tender and Contract Data.

PS.12.2.2 Targeted Procurement

The requirements are detailed in the Tender and Contract Data.

PS.13 CONSTRUCTION

A range of standard specifications are referred to in this document, either as listed applicable standard specifications below or as standard specifications listed in Particular specifications and amended standard specifications.

Whilst every attempt is made to refer to all the standard specifications in the lists below, it could be that others standards are referred to in the Particular Specifications or amended standard specifications without being listed in the lists below. Such omission from the lists below, should it occur, should not be seen as misinformation and it is to be noted that ALL standards specifications referred to in this document are applicable, whether listed below or not.

It is the Contractor's duty to obtain copies of referenced standard specifications at his cost and all tendered rates shall be deemed to include for these costs.

PS.13.1 APPLICABLE SABS AND COTO STANDARDS

Refer to section C3.3

PS.13.2 APPLICABLE SANS AND COTO SPECIFICATIONS

Refer to section C3.3

PS.13.3 APPLICABLE INTERNATIONAL STANDARD SPECIFICATIONS

Refer to section C3.3

PS.13.4 PARTICULAR SPECIFICATIONS

Particular specifications are included under section C3.4

PS.13.5 CERTIFICATION OF 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 shall, when called upon by the Engineer, furnish the required Standard Specification compliance certificates.

PS.13.6 SITE ESTABLISHMENT

PS.13.6.1 Services provided by the Employer

Space for office accommodation within the fenced reservoir site might be allowed. Contractor to establish adequacy of space within confines of space within fenced area. An area may also be made available adjacent to the construction site for the Contractor to establish his construction camp.

The Employer shall be indemnified in all respects as a result of the occupation and use of the land and buildings, including any claims from third parties.

The allocated and occupied land and buildings is to be used only for site offices and for storage of materials and strictly for work pertaining to this contract.

The Contractor is fully responsible for any damage caused to the land and buildings, or improvements on it including services and for reinstating it to its former condition when vacated.

Should the Contractor want to occupy any portion of land not indicated by the Engineer, the required approval for same has to be obtained from the Engineer who will evaluate the request in terms of legislation and by laws applicable.

The Contractor shall ensure that the conditions of the EMP are met for all site offices and fabrication yards.

All tendered rates shall be deemed to include for all costs related to Site Offices and Fabrication Yards, regardless of their location.

The land and buildings used for the Contractor's camp shall be cleared and vacated by the Contractor within 14 days of the date of completion of the contract unless written permission from the Engineer is obtained to occupy the site for a longer period

PS.13.6.2 Facilities to be provided by the Contractor

The Contractor is responsible for:

- All Camps, Depots and Workshops as well as storage areas.
- The accommodation arrangements for Contractor's employees remain the responsibility of the Contractor in all respects. This includes arrangements for transport. See Conditions of Contract.
- Additional space requirements which cannot be accommodated on site as made available to the Contractor.

PS.13.6.3 Storage and laboratory facilities

The Contractor is responsible for the provision of storage facilities.

Storage facilities shall be suitable to ensure storage of materials and equipment and Plant on site, ensuring adequate protection.

Plant and equipment shall be stored on suitably prepared hard surfaces with adequate shade cover.

There are no specific laboratory requirements to the contract except for the fact that laboratories need to be SANAS registered.

PS.13.6.4 Other Facilities and Services

Source of water supply

The Contractor shall make his own arrangements for water supply connections for the camp sites and work fronts and shall be required to bear the cost of all water consumed at camp sites, inclusive of the connection fees. Should reticulated water not be available at any of the work locations, the Contractor shall be responsible for sourcing and storing of potable water for consumption and hygiene and water for construction purposes.

The Contractor shall make his own arrangements for water supply connections for construction purposes. The tendered rates under the individual items in the Bill of Quantities which require water for construction purposes, shall be deemed to include all the costs of water supply.

The water quality requirements for reinforced concrete needs to be met.

Water quality requirements for pipeline and structure disinfection shall be met.

The cost of water required to charge newly constructed pipeline sections for hydrostatic testing for the first time shall be borne by the Employer. (See amended specifications - Clause PSL 7). Water for any subsequent charging required, regardless of reason, shall be for the Contractor's account.

The cost of water required to fill structures for testing shall be borne by the Employer. (See amended specifications - Clause PSG). Water for any subsequent charging required, regardless of reason, shall be for the Contractor's account.

The cost for all water required for the execution of the construction of the Works shall be borne by the Contractor, excluding the costs highlighted above.

The Contractor shall make his own arrangements for water supply connections for the camp sites and work fronts and shall be required to bear the cost of all water consumed at campsites, inclusive of the connection fees. Should reticulated water not be available at any of the work locations, the Contractor shall be responsible for sourcing and storing of potable water for consumption and hygiene and water for construction purposes.

Source of power supply

The Contractor shall make his own arrangements for power supply connections for all camp sites and work fronts for construction purposes and he shall bear the cost of all power consumed, including the connection fees. Should it be required, the Contractor shall allow for the costs for the power supply for construction purposes, in the preliminary and general section of the BOQ.

The supply of a new power supply for telemetry equipment, if required, is a matter of specification and catered for in the contract documents.

Source of sewerage connection

Water-borne sewerage reticulation is not available in the area.

The Contractor shall provide at his own cost the necessary ablution facilities at his camp site and the site of the works for the use of his employees. Chemical toilets only will be allowed where temporary facilities have to be provided. Such conveniences, which shall comply with Municipal regulations, shall be maintained in a clean and hygienic condition and shall be properly secluded from public view and their use shall be strictly enforced. On removal of such conveniences the sites thereof shall be left in a clean, sanitary and tidy condition.

PS.13.6.5 Office space/facilities and equipment for Employer and Engineer

Engineer's Office

An office is required for the use of the Employer's Agent on site. (See SABS 1200 AB and as amended in the project specifications).

It will be a requirement of this contract that all work pertaining to the provision of the office of the Employer's Agent shall be completed in full prior to the Contractor being permitted to commence work on site.

Parking Facilities

The Contractor shall provide 3 dedicated parking areas for the Employer and the Engineer for exclusive use. Parking area to be covered with suitable covering to provide 100% shade.

Ablution Facilities

A male and female ablution facility with wash hand basis shall be made available for exclusive use for the Engineer and Employer.

PS.13.6.6 Advertising rights and notice boards

Advertising rights remain with the Employer.

A notice board for the construction activities, should be erected at the construction site. The requirements of PSAB of SABS1200 apply.

PS 13.7 MATERIALS SUPPLIED BY THE EMPLOYER/CONTRACTOR

PS 13.7.1 Pipe Supplied By The Contractor

Pipe shall be supplied in terms of the Particular Specification for steel pipe as attached in the annexures and Project Specification.

The following schedule of technical requirements are applicable for steel pipes:

- The steel pipe under this contract shall be grade X42, 4.5mm thick spigot and socket pipe plain ended on the non-bell side for fillet welding at the bell when jointing.
- The size of the pipe, the grade of steel for the pipe and wall thickness is defined in the relevant items in the Bill of Quantities and is also depicted on the drawings for the Construction of the Works.

- Pipe shall be ordered and delivered to site in lengths of no less than 12.192m.
- The internal lining system shall be Pipe Lining System 2: Cement Mortar Lined as per the steel pipe specification unless otherwise stated.
- The external coating system shall be Pipe Coating System 4: 3 layer polyethylene pipe coating system as per the steel pipe specification unless otherwise stated.

The following schedule of technical requirements are applicable for PVC-M pipes:

- The PVC-M pipe under this contract shall be spigot and socket pipe with integral socket and locked-in rubber ring seal
- Pipe shall be ordered and delivered to site in lengths of no less than 6.0m
- The size of the pipe and pressure ratings is defined in the relevant items in the Bill of Quantities and is also depicted on the drawings for the Construction of the Works.
- All PVC-M pipes are to comply with SANS 966-2

The following schedule of technical requirements are applicable for HDPE pipes:

- The HDPE pipe under this contract shall be plain ended for heat fusion/ thermofusion butt welding.
- Pipe shall be ordered and delivered to site in lengths of no less than 6.0m
- The size of the pipe and pressure ratings is defined in the relevant items in the Bill of Quantities and is also depicted on the drawings for the Construction of the Works.
- All HDPE pipes are to be PE100 and comply with SANS ISO 4427.

PS 13.7.2 Pipe Yards and Pipe Collection

The Contractor shall keep adequate records of his pipe upliftment activities and his pipelaying activities to ensure that he can do a pipe reconciliation of pipe material utilized. This pipe reconciliation shall be kept up to date on a weekly basis and shall form part of the permanent construction records to be incorporated into the construction dossier.

PS 13.7.3 Valves

The Contractor shall supply valves for incorporation into the Works which comply with the particular specifications for valves as attached in the annexures.

Valve technical data sheets are included in the returnable documents section. These technical data sheets have to be completed.

PS.13.8 CONSTRUCTION EQUIPMENT

Construction equipment utilised for reinstatement of pipe trenches shall be suitably sized for the work at hand. Rates for backfill and compaction as entered into the BOQ, shall be deemed for full compensation of the work, regardless of whether the pipe trench backfill is listed under PSLB or the PSM series of clauses. The rates provided for backfilling and compaction of pipe trenches, whether in road reserves, in roads and road crossings or in open veld shall be deemed to have evaluated the type of plant required for the applicable work to achieve the outcomes required as stated in the specification.

PS 13.9 EXISTING SERVICES

PS 13.9.1 Location and Protection

SANS 1921-1 Clause 4.17 has relevance and is added to herewith.

All enquiries on the latest situation with services are to be undertaken by the Contractor. The location of the services shown on the drawing by the Employer were effective at the time of design only and may have changed. Time required to confirm the latest situation with services has to be allowed for by the Contractor in his programme for construction.

Attention is drawn to the fact that whilst the position of the existing pipework/pipelines, process piping, cabling and associated infrastructure have been indicated on the drawings have been provided as accurately as possible, this information may not be completely accurate and it will be necessary for the Contractor to communicate with the associated service providers and/or Employer and to prove, trace and expose services which the Contractor has been made aware of as a result of his interaction with service providers. The Contractor shall coordinate meetings with all relevant service providers before construction commences and take all the necessary steps to ascertain the location of existing services before commencing work on any section of the Works. The rates tendered for the location of services and proving of same as well as the updating of existing records of services, shall be deemed to include for these meetings.

The Contractor shall establish at the meetings with service providers, the lead times required to update records and he shall include for this activity in his Construction Programme.

The Contractor shall take all the necessary steps to ascertain the location of existing services before commencing any section of the Works and shall exercise the greatest care when working in the vicinity of such services. Before commencing his operations in any particular area, the Contractor shall request the latest available drawings from the relevant local Service Authorities, showing the location of their services already installed. The Contractor shall ensure that adequate time is allowed for making contact with the relevant Service Authorities in order for them to respond meaningfully. The Contractor shall compare the latest service locations obtained from the Service Authorities with the drawings provided for construction and where required, such construction drawings shall be updated. The Engineer shall be notified of any changes in service locations found on the construction drawings.

The Contractor shall take all necessary steps to protect any existing works or service whatsoever, against damage which may arise as a result of his operations on Site. The Contractor shall bear the cost of the repair of damage to any known service, the possible existence of which could reasonably have been ascertained by him beforehand.

PS 13.9.2 Wayleaves

The Contractor shall procure the required equipment which will enable him to prove services.

The Contractor shall locate existing pipes, optic fibres cables, electric cables and/or any other services by hand excavation without the use of picks, to minimise the risk of damaging existing services. The Contractor shall be held responsible for any damage caused to existing services that can reasonably be traced and located.

Whilst the location of power, telephone and optic fibre cables, as well as pipelines and other services are indicated on the plan and longitudinal section drawings, this may not be comprehensive. It is the Contractor's responsibility to obtain the latest known information on services, at all times.

It is a requirement of this contract that the Contractor exposes and proves every known service within the advance work front ahead of any work being performed, in order to determine whether its level or location clashes with the designed grading of the pipeline or with the

coordinates of the proposed road alignment. All services are to be proved in conjunction with each service provider prior to excavation. Such proving shall be timed to coincide with the requirements of the programme and the limitations on the length of work fronts as specified.

The cost of this work is to be included in the tendered rates for trench excavation or any other excavation and all tendered rates shall be deemed to include for the exposing of known services and the proving of its location. No additional payment will be considered for the exposing and proving of services as payment for this shall be deemed to be included in existing payment items as specified in the Bill of Quantities for all types of excavation. The item for excavation by hand to expose unknown and known services where instructed by the Engineer is for use by the Engineer only on an as and when required basis.

The Contractor shall be required to prove each and every service, indicating X, Y and Z coordinates. Claims for delays etc. arising from the non-compliance with this requirement will not be entertained.

In addition to the marking/pinpointing of known services, the Contractor is to screen the line of the proposed excavations by means of appropriate electronic tracing apparatus for other buried services, such as pipes or cables that may not be shown in services records. All services found in this manner shall be classified as known services and shall be proved as set out above.

Service connections to individual erven are to be located and handled in a manner acceptable to the Engineer. Located and proved services are deemed to be known services.

Should any services which are not on the existing services layout drawings be located, the Contractor shall add the new information to the services layout drawings in order for the employer to update his information. All tendered rates for trench excavations and road works shall include for the location of services and the updating of services drawings for the Employer.

The top surface of all existing thrust blocks are to be proven and sufficiently protected before any excavation near these thrust blocks takes place. Such thrust blocks shall be defined as a "service".

Work is to take place alongside existing high pressure water pipelines, Transnet pipelines conveying fuel, electricity cables, fibre optic cables and the like, and this is of regional strategic importance and must therefore remain in service at all times during the construction of this project. The consequences of rupturing these pipelines or cables are severe and apart from the financial implications, possible loss of life to those working nearby and/or extensive damage to property is a real threat. The Contractor's attention is therefore drawn to the necessity to exercise due caution during construction, particularly during excavations for the pipeline and chambers.

Where work is to be undertaken beneath power lines, the Engineer shall be informed at least 21 working days in advance of such construction being carried out, so that the necessary arrangements can be verified with the authorities. The Contractor shall ensure that he is, at all times, familiar with the conditions of his wayleave approvals and shall adhere to the restrictions for working in servitude areas at all times.

Where work is to be undertaken in the vicinity of Transnet pipelines, the Contractor shall ensure that a Transnet Representative is informed at least 14 working days in advance of such work being carried out. All the instructions issued by the Transnet Representative, related to work in the vicinity of the Transnet pipelines shall be adhered to by the Contractor at all times.

PS 13.9.3 Relocation of Existing Services

It is the responsibility of the Contractor to negotiate the relocation of services with the relevant service providers.

The Contractor shall ensure that he/she commences with such negotiations well in advance in order to be able to plan and programme such work into the programme for the construction of the Works without causing a delay to the construction of the Works.

The Contractor will be responsible for the payment of initial deposits and relocation costs and will only be reimbursed for such costs from the relevant Provisional Sum item in the Bill of Materials on a re-measurable basis, once proof of relevant payments have been received by the Employer.

The Contractor is to further note that no excavation machinery may excavate within 300 mm vertically or horizontally of existing water pipelines unless otherwise agreed by the Employer's Representative, the balance of the excavation being carried out is to be done by hand or by other means approved by the Employer's Representative.

PS 13.9.4 Water Main Valve Access

Due to regular activity under construction work with water main valves being covered over, the Contractor shall ensure maintenance of access to all water main valves at all times. During asphalt layer work for example, after each pass by the paving machine, the valves shall be exposed and access maintained in a safe condition.

Whatever method the Contractor chooses to use for this work, the cost of raising the valve covers from existing level to ultimate level shall be paid only once, irrespective of the number of times a valve is uncovered. Spacer rings required for the height adjustment of valve covers shall be supplied by the Contractor. Before final setting in position of valve covers the Contractor shall liaise with the Employer's Agent regarding the direction in which covers shall be placed.

PS 13.10 PERMITS AND WAYLEAVES

The Employer will obtain the required and necessary approvals and the Contractor will be required to comply with the relevant authorities' and land owners requirements at all times.

The Contractor will be required to take cognisance of and comply with the general wayleave and 'permission to occupy' requirements of the authorities and land owners during the construction of the Works.

The Contractor will be required to confirm that he has notified property owners and authorities of his intentions to exercise his right in terms of the relevant wayleave or "permissions to occupy" in good time before commencement of the required work on the said properties.

PS.13.11 PRACTICAL COMPLETION AND COMPLETION

It is a requirement under the General Conditions of Contract that the requirements for practical completion be specified.

Practical Completion will only be considered upon final testing of the reservoir and upon all pipework having been connected and tested and commissioned and upon the pump installations have been commissioned and declared operational and the whole system constructed under this contract having been declared fit for purpose.

PS.14 MANAGEMENT OF THE WORKS

PS.14.1 APPLICABLE SANS 1921 STANDARDS

The SANS 1921 Volumes 1, 2 and 6 - Construction and Management requirements for works standards and associated specification data are applicable.

Volume 1 – General Engineering and construction works

Volume 2 – Accommodation of traffic on public roads occupied by the Contractor (note that it is a requirement of this Contract to apply the applicable clauses in this specification to the informal road reserves and accesses as described.

Volume 6 – HIV/AIDS awareness

The following specification data is applicable to this Contract:

Standard	Clause	Specification Data
SANS 1921-1		Essential/Additional/Amended Data
	4.1.1 (o)	Record Drawings to be provided within 30 days of completion of each activity which allows updates of a particular drawing. All records drawings to be submitted as a requirement for Completion certification.
	4.1.8	The software to be used for the programme submission to the Engineer is MS PROJECT-latest version available at the time of contract award
	4.2.1	The strategy in table 1 is "A".
	4.3	Refer to section named – PS – Construction Programme- and add
	4.3.3	The Contractor shall provide 24 hours notification.
	4.4	Refer to section named – PS – Quality Assurance - and add requirements as stated.
	4.10	Earthworks and resultant spoil management shall comply with the requirements of the EMP.
	4.11.1	Minimum testing sequences are specified in the Project Specifications. The Contractor shall execute more tests than those minimums specified where he deems such testing necessary for exercising adequate quality assurance and control in terms of his quality assurance plan.
	4.11.3	The Contractor is referred to additional requirements for records keeping and the presentation of the records. Refer to the requirement of a construction dossier for the Contract, section named -CONSTRUCTION DOSSIER in the annexures.

4.12.4	Refer to the Project Specification regarding the specific requirements for storage of materials, Plant and equipment.
4.13.3	Compaction equipment shall be suitable for the areas to be compacted and no addition payment will be made for working in limited space conditions other than that rates provided for compaction are deemed to include for working under the relevant space conditions.
4.13.4.1	The requirements of the specification for concrete as stated under the amended specifications for concrete, PSG, are applicable.
4.14.3	The specification data for accommodation and facilities are stated in the Project Specification.
4.14.5	The Contractor shall provide ablution facilities for the exclusive use of the Engineer and the Employer's Representative.
4.17	Refer to section PS – Existing Services in the Project Specification and add
4.18	The additional Health and Safety requirements of the Employer are as specified in the health and safety specifications attached and referred to under the Particular Specifications named – PA Particular Specification – Employers Health and Safety Specification
4.18.2	Add the amended standard specification as specified in the Project Specification for excavations
4.18.3	The required legislative requirements for excavations are to be met at all times
4.19	The requirements of the Environmental Management Plan are to be met at all times.
SANS 1921-2	Essential/Additional/Amended Data
3.8	The definition of “road reserve” includes the informal road reserve as defined under section named - PS – Informal Roads and Servitudes.
4.5	All costs for the maintenance of the said temporary deviations and existing roads used as temporary deviations shall be deemed to have been included in the rates as reflected in the Bill of Quantities. All existing roads used as haul roads for construction purpose shall be maintained to an applicable standard and costs for this maintenance shall be deemed to have been included in the rates shown in the Bill of Quantities.

4.6.1	Half width road construction, where applicable shall be limited to 500m maximum length
4.10	Temporary Traffic Control mechanisms are detailed under the section named – PA – Temporary Traffic Control Measures.

SANS 1921-6

Essential/Additional/Amended Data

1 (e)	To be added is "Appointment of and HIV/AIDS Awareness Champion.
4.2.1 (a)	A qualified service provider is a provider that appears on the list of recommended service providers, which is available from all regional offices of the Department of Public Works. The HIV/AIDS awareness programme shall be repeated at 6 monthly intervals for the duration of the Contract, including an initial programme at the commencement of the Contract.
4.3.2	The HIV/Aids awareness champion and the Employer's representative in this regard shall certify the report and schedule described in cl 4.3.1 whenever a claim for payment is issued to the Employer.

PS.14.2 STANDARD AND AMENDED SPECIFICATIONS

Standard Specifications are listed under section C3.3.

PS.14.3 PARTICULAR SPECIFICATIONS

Particular Specifications are listed under sections C3.4.

PS.14.4 CONSTRUCTION PROGRAMME

PS.14.4.1 Time for completion

The time for completion of the Contract is as specified in the Contract Data.

PS 14.4.2 Preliminary Programme

The Contractor shall include in his/her tender, a preliminary programme for the construction of the works. This preliminary programme shall clearly indicate how the Contractor plans to perform the Works to completion within the time for completion as stipulated.

The Tenderer shall be deemed to have allowed in his tendered rates and in his preliminary programme for possible delays due to inclement weather as specified in the contract data.

PS 14.4.3 Programme for the Construction of the Works

The construction programme shall comply with the requirements of the Contract in all respects.

The following shall be included in the construction programme, in addition to the Contract requirements; as well as in its subsequent updates and adjustments as required by the Contract:

- 1) The programme shall be prepared utilising MS Project and revisions of the programme shall be issued to the Engineer in both hard copy format and electronic format. A PDF of the programme is to be provided for each submission.
 - a) The Contractor may utilise an alternative software package for managing the construction of the Works but the programme submitted to the Engineer for approval has to be in MS PROJECT format, the latest version available at the time of commencement of the Contract. The programme submitted to the Engineer for approval shall be seen as the construction programme and shall be used for all time referencing and time deliberations during construction.
 - b) Should the Contractor find that translation of his programme from a particular format into the MS PROJECT format loses essential programme elements and formatting, the Contractor shall be required to repair such discrepancies in the electronic programme version submitted to the Engineer.
- 1) Each revision of the programme shall clearly indicate the programme name, revision number, date of issue and special variances.
- 2) The programme shall show ALL work items required to execute the work where such work items shall be properly grouped by main activity, and be able to be rolled up or down, depending on which detail needs to be viewed.
- 3) The programme shall comply with the following:
 - a) The programme work items shall be properly linked to show logic and a single critical path.
 - b) The programme shall show resources and such resources need to be levelled to reflect reality at all times.
 - i) Critical milestones shall be shown.
 - c) Critical milestones are to be agreed with the Engineer.
 - d) Accurate data shall be presented in so far as key dates and milestones are concerned, including projected completion and phased completion where required.
 - e) Production rates and durations are to be reasonable and practical.
 - f) Relationships between activities need to be logical.
 - g) The programme shall not reflect ownership of float.
 - h) Sub contractor's activities are to be shown and the duration for these are to be reasonable and practical.
 - i) The programme shall reflect the intricacies of the involvement of Emerging Contractors as per the CPG requirements under this Contract as detailed in the Contract and Tender Data.
 - i) No single activity shall have a duration of longer than 28 days
- 4) The correct and applicable programme calendar shall be used at all times.
- 5) Method Statements shall be prepared and be supported by the construction programme.
 - a) The Method Statements shall support the programme and vice versa.
- 6) The programme shall clearly indicate the obligations of the Engineer and the Employer.

- a) The Contractor's attention is drawn to the 24 hour notification period specified under SANS 1921.
- 7) The Contractor shall include in his programme for the meetings with service providers as required under this contract. Attention is drawn to the requirement to have electrical poles relocated where such relocation is part of the coordination responsibilities on the Contractor.
- 8) Performance test witnessing for equipment supplied where not manufactured in the eThekweni region requires a notification period of 14 calendar days in order for the Employer to make arrangements for his presence should he/she wish to attend.
- 9) The Contractor shall schedule work such that rehabilitation can be done during a seasonally appropriate time.
- 10) Cathodic Protection installations will be done by a selected sub-contractor, approved by the Employer, as a specialist in the field of Cathodic Protection.
 - a) The Cathodic Protection installation takes place in conjunction with the installation of the Works and has to be coordinated with the planned scheduling of the Work's construction by the main Contractor.
 - b) The main Contractor, appointed for the construction of the Works under this contract shall ensure that he sets up coordination meetings and discussions with the selected Cathodic Protection sub-contractor and ensure that all Cathodic Protection work is included in his programme for the construction of the Works, in such a manner that adequate timeframes are allowed for the said Cathodic Protection work.
 - c) The costs for coordination activities between the main Contractor and the Cathodic Protection, the programming of the Cathodic Protection work and the incorporation of this into the main programme shall be deemed to be covered by existing rates as reflected in the Bill of Quantities.
- 11) The Contractor shall allow in his programme for all the requirements pertaining to services, service proving and relocation, as stated in this specification.
- 12) The Contractor shall allow in his programme for the mechanical, electrical and instrumentation work as detailed in the particular specifications. The work shall be programmed in such a manner that this work does not become critical path work items at any stage of the execution of the Contract.
- 13) The Contractor shall pay particular attention to the requirements of submitting the electrical connection application to ESKOM or any other electricity provider timeously, ensuring that the delay in installation does not affect the completion and commissioning of the mechanical, electrical and instrumentation work.
- 14) The coordination of the tie in into the EWS Water supply and reticulation lines need to be coordinated with the requirements of EWS operations. This work shall be well planned and programmed up front, to ensure that such work does not delay the construction of the Works in general. The planning around shutdowns shall allow for a maximum shut down duration of 12 hours.
- 15) The Contractor shall schedule the construction of the Works in such a manner that all pipework constructed under this Contract is completed and tested and commissioned before commissioning commences.
- 16) Attention is drawn to the requirements set out in PSG 7.3.9 for water-tightness testing, and a period of not less than twenty-one (21) days shall be allowed for water-tightness testing in accordance with the specification. The backfilling around the structures shall only be done after successful completion of the water-tightness test.

- 17) Attention is drawn to clause 5.6.2.2 under the Contract Data which provides a detailed breakdown of the items affecting programming.

The Contractor shall deploy to site, a qualified planner who will be responsible for the programme. This programmer shall have as sole responsibility, the updating and maintenance of the programme for the construction of the Works.

PS 14.4.4 Working Hours

Normal working hours are considered to be between 07h00 in the morning and 17h00 in the afternoon, Monday to Friday with full cognisance to be taken of the information in the Contract Data and the description of working days.

All road signs, temporary road works, barricading and/or temporary structures required to make the site safe after normal working hours shall be in place after every work session or by 17h00 of every working day, whichever occurs first. No road signs, temporary road works, barricading and/or temporary structures required to make the site safe after normal working hours shall be removed before 07h00.

Working after normal working hours will not be allowed, unless it is approved by the Employer's Representative as work required to be executed under extra ordinary circumstances.

PS 14.4.5 Working Outside Normal Working Hours

Normal working hours are considered to be between 07h00 in the morning and 17h00 in the afternoon, Monday to Friday with full cognisance to be taken of the information in the Tender Data and the description of working days. All road signs, temporary road works, barricading and/or temporary structures required to make the site safe after normal working hours shall be in place after every work session or by 17h00 of every working day, whichever occurs first. No road signs, temporary road works, barricading and/or temporary structures required to make the site safe after normal working hours shall be removed before 07h00.

Working after normal working hours will not be allowed, unless it is approved by the Engineer as "work required to be executed under extra ordinary circumstances. The requirements of the EMP in so far as working times need to be adhered to.

The Contractor will however be required to execute work outside normal working hours due to operation criteria of EWS. Some shutdowns will be night shutdowns and the bill of quantities allows for these shutdowns. The rate shall include all additional costs required to perform the works such as security, power, lighting, workmen overtime etc.

No work will be allowed outside of normal working hours as a result of the need of the Contractor to execute work in order to improve upon his programme, as a result of the programme slipping behind schedule.

PS 14.4.6 Progress Reporting and Control

The construction programme shall be updated at least once every 14 days and shall be tracked at all times. A tracked programme report shall be submitted to the Engineer 2 working days before each and every monthly site meeting

The requirements of the General Condition of Contract for programme updating remains applicable and events requiring such updating and as specified in the Conditions of Contract might require programme update frequencies shorter than 14 days. The Conditions of Contract are to be adhered to.

Delays to the critical path of the construction programme could be claimable in terms of the Contract, should the delay be as a result of an Employers Risk. Such claims for delay, which affects the programme, shall be in terms of the Contract. The Contractor may however experience Contractor's Risk events which could cause delays to the critical path of the programme. The Contractor shall, within 10 days of experiencing such a Contractor's Risk event, delaying the critical path of his current programme, report to the Engineer in writing what, in his opinion, caused the delay and which measures the Contractor intends putting in place, to mitigate risks of further delay.

PS 14.4.7 Weather Conditions and Rain Delays - Programme Requirements

The Contractor shall keep accurate and detailed records of weather conditions which shall be included in his daily diary submitted to the Engineer. Claims for extension of time due to abnormal weather which the Contractor considers to be worse than the expected normal conditions, will only be considered if fully motivated with supporting documentation. Agreement between the Engineer and the Contractor on days affected adversely by rain shall be reached on the day of such adverse effect or the first day immediately thereafter. Claims for rain delays shall not be agreed retrospectively, after the event, when the site conditions cannot be assessed applicably.

The Contractor shall note that his programme shall include for weather conditions that can be expected, based upon historical records. The number of days allowed for adverse weather conditions shall be clearly shown for each month on the construction programme (refer to Contract Data).

River/stream and wetland crossings, or any work in a stream are to be scheduled for execution during periods of least risk for flooding.

The algebraic sum for rain delays shall be applicable for the original contract duration excluding applicable EOT periods. The algebraic calculation shall commence upon receipt of instruction to commence with the works.

For the extended period of contract duration, that is for the period for which EOT had been granted in terms of applicable claims, every month shall be assessed on its merits, but Contractors have to make provision for normally expected rainfall as stipulated in the rainfall table, in their EOT claims. This means that in the extended period, claims for rainfall delay will only be entertained for excessive or abnormal rainfall, that is rainfall in excess of that stipulated in the rainfall table.

PS 14.4.8 Shut Downs for Tie Ins

Shut downs for tie-ins of pipework to existing live systems will be complex and require meticulous planning to avoid disruptions. The maximum duration for any shutdown shall not exceed the time stipulated by the Employer, which is 12 hours for this Contract. Additionally, there must be a minimum recovery period of 2 weeks between shutdowns to ensure adequate system recovery and prevent disruption to the Employer's water supply system. The Contractor shall provide 21 days notice prior to any shuts.

All planned shutdowns must be approved by the Office of the City Manager and coordinated with Tongaat Hulett. The Contractor must also coordinate with the EWS Bulk and Operations Team to ensure that on-site storage is maintained during the shutdown period.

The Contractor is responsible for providing all necessary documentation required by the Employer to communicate the shutdown details effectively. This includes, but is not limited to:

- Shutdown schedules and timing;
- Risk assessments and method statements.
- Mock shut with all necessary fittings and ancillaries.

- Notification to relevant stakeholders such as the Office of the City Manager, Tongaat Hulett, and the EWS Bulk and Operations Team.
- System recovery plans and procedures for maintaining on-site storage during the shutdown.

The Contractor must schedule the tie-in work well in advance, ensuring it is integrated into the construction programme to avoid delays in the overall project timeline and to prevent negative impacts on the Employer's water distribution system. Proper planning for the shutdowns is essential to minimise disruption to the Employer's operations.

Approval of Method Statements:

Lead times for the approval of method statements (including shop drawings and ancillary documentation) must be adhered to, ensuring sufficient time for review and approval before shutdown activities commence. It is thus important these are submitted well before the 21 days' notice period specified above as the normal approval period shall be considered within the contractor's control and not be considered for a contract delay event.

Duration of Shutdown:

The duration of shutdown must be strictly followed, with upfront planning and preparation. The Contractor shall conduct dry runs prior to actual shutdown work to ensure full readiness and identify any potential issues before the shutdown begins.

An item in the Bill of Quantities has been provided for the Contractor to price the various required shutdowns. The Contractor will be compensated for each shutdown based on the tendered rates unless otherwise agreed upon with the Employer's Representative. The shutdown rate must cover, but not be limited to, the following:

- All planning and coordination efforts, including workshopping of the method statement and recording change requests from the Employer's personnel or their agents.
- Dry runs.
- Risk assessments, method statements, and shop drawings.
- Other related works necessary to execute the shutdown safely and efficiently.

PS.14.5 WORK FRONTS

By definition work fronts pertain to pipe laying activities, that is linear developments.

PS.14.5.1 Work front definition

A work front is that location where work of a specific nature is taking place for example clearing and grubbing and preparation of working corridor for pipe laying activities, pipe laying activities work front with excavation, pipe laying and backfilling taking place and the work front where rehabilitation activities are taking place.

The internal pipe length rehabilitation work front:

Construction progress shall be such that no internal joint rehabilitation shall take place further back than 3 pipe lengths being laid. This is an imperative limitation in order to ensure adequate conditions for lining repair, curing and inspection.

PS.14.5.2 Length of work fronts

Work in road reserves form pipe laying activities shall be limited to 150m in length in total.

PS.14.5.3 Number of work fronts

The number of work fronts for pipe laying activities will be limited to one at any given time (1 number).

PS.14.5.4 Work front width

The width of the working corridor for pipe laying activities shall be limited to half the road reserve width.

Working space for the entire pipeline route shall be deemed as restricted or limit due to the presence of buildings, structures and certain underground and overhead services which exist on the site. The method of construction in these restricted areas will depend largely on the Contractor's resources. Tenderers are to take cognisance of this fact and allow for the difficulty of working in a restricted space in the rates. No additional payment will be made for this requirement.

PS.14.5.5 Length of trenches not backfilled and rehabilitated

As a result of the limitation of the various work front lengths, the maximum length of trench not backfilled shall be 50m.

PS.14.5.6 Length of pipe to be pressure tested

The pipe laid may be tested over complete length.

PS.14.6 QUALITY ASSURANCE

Quality assurance and the deployment of a system to ensure quality is the responsibility of the Contractor.

The Contractor's quality assurance plan shall culminate into a quality control plan with method statements which needs to be submitted to the Engineer for approval before commencement of the Works.

Approval of the quality control plan by the Engineer does not absolve the Contractor from his responsibilities under the plan.

PS.14.6.1 Method Statements

The Contractor shall furnish the Employer's Representative with a method statement for all construction activities and in particular, but not limited to, reservoir shut downs, reservoir night shut downs, traffic management techniques as result of construction, method of application of tape wrap systems, method of repair of external coatings, method of repair of pipe internal lining, method of effecting compaction of fill around pipe, dealing with water, blasting, etc..

Method statements shall be submitted to the Employer's Representative with the programme for construction. Method statements shall be in sufficient detail for the Employer's Representative to determine their practicality and suitability and as a minimum shall include details of construction methods, work methods, plant and equipment particulars including details of critical standby equipment.

Method statements shall refer to Quality Control plans in order to assess suitability of same for the execution of the works in terms of the set Quality Control standards.

Method statements shall be crossed referenced to the relevant Quality Control documentation and upon evaluation of the programme for construction, the method statements and quality

Control documentation shall support the programme in order for the Employer's Representative to realistically evaluate the programme.

The Contractor is to provide EWS operations and the Employer's Representative a method statement and risk assessment per reservoir shutdown where required. This is to be provided to EWS Operations with a minimum 14 day notice period.

PS.14.7 DEALING WITH WATER

Notwithstanding the requirements of SANS1921, the Contractor shall take adequate precautions for the protection of the works from storm water runoff during periods of prolonged heavy rainfall. The Contractor shall be responsible for dealing with all water during construction from whatever source, and the cost of all dewatering, shall be deemed to be included in the tendered rates. The Contractor shall provide temporary storm water drainage and due cognisance must be taken of the highly erodible nature of the in situ and excavated material.

The Contractor shall be responsible for all repair works necessary to reinstate any damage caused by storm water runoff.

The Contractor shall be responsible for drawing up a Storm Water Management Plan for the handling of storm water for the duration of construction where the reservoir and pipelines are being constructed and within the adjacent Mobeni Depo site. The Stormwater Management Plan shall be submitted for the approval of the Engineer prior to the commencement of works. The tendered rates provided in the BOQ shall be deemed to include for all Storm Water Management issues related to the Contract.

PS.14.8 DISPOSAL OF SPOIL AND SURPLUS MATERIAL

Disposal of spoil and surplus material needs to conform with the requirements of the Environmental Specification and Employer's requirements.

The spoiling of excess bulk excavated material under this contract is the responsibility of the Contractor and he is responsible for identifying compliant spoil sites for the purpose of spoiling material. No overhaul is applicable to the Contract and all tendered rates are deemed to include for spoiling as required under the Contract.

PS.14.9 TESTING, COMPLETION, COMMISSIONING AND CORRECTION OF DEFECTS

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

The Contractor may establish his own laboratory on site or he may employ the services of an independent registered commercial laboratory. The costs for tests shall be deemed to be included in the relevant rates and no additional payment will be made for testing.

The Contractor shall submit the results of tests carried out on materials and workmanship, to the Engineer, in terms of the agreed quality control plan.

The tests required by the specifications which are to be carried out by the Employer's Representative will be conducted as expeditiously as possible, and the Employer shall not be liable for damages caused by any delays resulting from such tests. Such required testing shall be incorporated into the Contractor's programme for the construction of the Works.

In addition, the Contractor shall supply to the Employer's Representative, free of charge,

quantities of all materials which are truly representative of the materials to be used in the works for testing. Each sample shall be labelled, stating the sources of supply and the purpose for which it will be used. The Employer's Representative may, from time to time, instruct the Contractor to supply a further sample or samples to ensure that the quality of materials supplied conforms with the requirements of the Contract.

PS 14.9.1 Length of Pipelines To Be Pressure Tested

The testing regime for the pipelines constructed under this contract is detailed under the amended specifications, section PSL. Pipelines shall be completed and tested and commissioned before filling of structures for testing commences.

PS 14.9.2 Watertight Structure Testing

The testing regime for watertight structures constructed/refurbished under this contract is detailed under the amended specifications, section PSG.

PS 14.9.3 Commissioning

The Contract requires that contractual requirements for Practical Completion and Completion as milestones to be achieved in the construction process, be defined. The following minimum requirements are to be met for these certifications.

PS 14.9.4 Practical Completion and Completion Requirements

The General Conditions of Contract requires that contractual requirements for Practical Completion and Completion as milestones to be achieved in the construction process, be defined. The following minimum requirements are to be met for these certifications:

Practical Completion

- 1) All operations and maintenance manuals for the installed infrastructure need to be completed and handed to the Employer for operational and maintenance purposes.
 - a) The commissioning procedures as stated in the particular specifications have to be completed.
- 2) The Reservoir system as a whole has to be tested and certified as safe and acceptable, and be able to accept water through inlet systems and supply potable water to the respective supply zones under automatic control conditions.
 - a) By default, inlet control systems have to be able to run in auto mode after hot commissioning.
- 3) Mechanically stabilised gabion wall system completed and approved by Geotechnical engineer.
- 4) Pile load testing completed and approved by Geotechnical engineer.
- 5) Working pile system completed and approved by Geotechnical engineer.
- 6) All structural elements of the reinstated reservoir have been completed and approved by the Structural Engineer.
- 7) All associated pipelines, scour, inlet, outlet, air valve, and cross-connection systems have to be tested and certified correct and acceptable, with chambers being secured in terms of the design and construction requirements, fully functional.
- 8) All new chambers have been completed and approved by the Structural Engineer.
- 9) All cathodic protection systems have to be installed, tested, and functioning as required.
- 10) All mechanical systems have to be installed, tested, and functioning as required.

- 11) All electrical & instrumentation systems have to be installed and tested and functioning as required.
- 12) Access roads shall be completed in all respects.
- 13) Stormwater systems shall be completed and functioning in all respects.
- 14) All as built drawings shall have been submitted.
- 15) All training to the Employers Personnel shall be completed to the satisfaction of the Employer.
- 16) All safety signage shall be in place and the entire works shall be safe for operation by the trained staff.

In terms of the Contract Data, the above will be tabled at the Contract kick off meeting and will be minuted.

Completion

All the work specified under this Contract should be completed in terms of the requirements of the Contract before Completion will be certified.

PS.14.10 REQUIREMENTS TO ACCOMMODATE TRAFFIC

Traffic accommodation is required for access of heavy vehicles. The Contractor shall ensure that the requirements of an applicable traffic management plan are met.

PS.14.11 SURVEY CONTROL AND SETTING OUT OF THE WORKS

Survey control and setting out of the Works is covered under SANS 1921.

The Contractor shall be responsible for all survey work required to set out the works.

All survey data shall be signed off by a registered professional surveyor and tendered rates in the Bill of Quantities shall be deemed to include for all the costs associated with surveying for the construction of the Works. Registration required is with a recognised national body that controls the registration of professional surveyors in the Republic of South Africa.

PS.14.11.1 Survey beacons and control points

Survey control points will be shown to the Contractor at the time of handover of the site. Once survey control points have been pointed out, these will be signed over to the Contractor and such survey control points become the responsibility of the Contractor to maintain and protect and re-establish should it be damaged.

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

PS.14.11.2 Initial survey

An initial survey of the terrain where construction activities are to take place, shall be executed in a 10m by 10m grid. This data will inter alia be utilised to calculate quantities from, as are applicable. The survey data so obtained shall form part of the records to be compiled into the Construction Dossier.

PS.14.11.3 Final survey

A final survey of the terrain where construction activities did take place, shall at least cover a 10.0m by 10.0m grid, picking up all the constructed assets. The survey data so obtained shall form part of the records to be compiled into the Construction Dossier which will be deemed to be the permanent record for construction activities.

PS.14.11.4 Surveying general

The Contractor shall submit the following "As-built" data to the Engineer to enable him to complete the required Record Drawings before a Certificate of Completion will be issued:

- A tacky survey of the completed works carried out in accordance with TMH11: Standard Survey Methods, issued by the Committee of Land Transport Officials.
- Each point shall be suitably coded and identifiable by the Engineer, and shall be supplied on a computer disk in an ASCII file with the following format: –Code [SPACE] X Co-ordinate [SPACE] Y Co-ordinate [SPACE] Level [SPACE] Description.
- The above information is to be given to an accuracy of three decimal places and is to be surveyed by a suitably qualified person referenced to the nearest construction benchmarks used for the project.
- In addition to the above, all as-built information must be provided on a drawing in DXF and hard (paper) copy formats showing all relevant construction information. All other surveyed information must also be shown on the drawings.
 - Information requirements need to be confirmed with the Engineer.

Suitable checks on the accuracy of the information provided may be carried out by the Engineer and should any of the information provided be found to be inaccurate or untrue, the Employer reserves the right to withhold payment or to employ the services of an engineering surveyor to re-survey all the works listed above, at the Contractor's expense.

It is imperative that the surveyor utilises the nearest survey control point and notifies the Engineer accordingly. The survey shall be undertaken in WGS84 LO31 projection.

Survey of pipelines, bends, specials and fittings to accuracy of less than half the pipe diameter up to DN250 and one quarter pipe diameter up to DN500 and one eighth of pipe diameters larger than DN500.

The Contractor will be required to prove the accuracy of the GPS device he intends on using prior to any as built data being captured. The Employer's Representative may request further accuracy tests during the Contract should he deem it necessary.

Suitable checks on the accuracy of the information provided may be carried out by the Employer's Representative and should any of the information provided be found to be inaccurate or untrue, the Employer's Representative reserves the right on behalf of the Employer to withhold payment or to employ the services of an engineering surveyor to re-survey all the works listed above, at the Contractor's expense. For this purpose, the Employer shall request a minimum of three quotations from three independent engineering surveyors of his choice for the checking work and the lowest quotation will be accepted and the Contractor shall appoint the qualifying surveyor and the cost thereof will be deducted from monies due to the Contractor.

PS.14.11.5 Photographic record

The Contractor's tendered rates shall include the cost to prepare and submit an electronic

photographic record of the progress with the construction of the works using drone imagery. The photo record shall be done in intervals of at least 28 calendar days over the full duration for the construction of the Works.

The format for submission of the photographic record shall be agreed with the Engineer at the commencement of the Contract.

PS.14.11.6 As built records and records drawings

Any information in the possession of the Contractor which is necessary for the completion of the “as built” drawings must be submitted and approved by the Employer’s Representative before he will issue a Completion Certificate.

The Contractor is responsible for as-built point data capturing and redlining the pipework drawings for each installation and the Contractor shall:

- 1) mark-up, in RED, all the conflicting information on drawings as far as non-conformance with specifications is concerned, probable different site conditions encountered compared to what has been anticipated, differences in services locations encountered compared to what is indicated on the drawings and/or approved changes in design as instructed by the Engineer.
- 2) Any construction and or installation detail differing from that on the provided drawings shall be marked up.
- 3) The marking up of the Engineer’s drawings shall be on one of the A0 drawings issued in hard copy and shall reference any relevant site queries and sketches. Upon completion of the works, the updated information must be forwarded to the Engineer for incorporation into the Construction Dossier for which a full set of final Record Drawings will be prepared.
- 4) The drawings which the Contractor updates and which are marked up in RED shall be clearly marked in RED, in the top left hand corner, to reflect the words “RECORD DRAWING”. Should any specific drawing not require any amendments, it will be marked in RED in the top left hand corner to reflect the words “RECORD DRAWING – NO AMENDMENTS”. The Contractor shall therefore submit to the Engineer, a full set of record drawings in A0 format, marked up in RED.
- 5) All marked up in red drawings shall be submitted as a prerequisite for Completion certification.

The Contractor may only backfill on instruction by the Employer’s Representative and shall not backfill before the As-Built point data is captured.

The Contractor shall submit each “As Built” data point to the Employer’s Representative which shall be suitably coded and identifiable and be supplied on a computer disk in an ascii file or .csv file in tabulated format with the following column headings:-

- Code
- X Co-ordinate
- Y Co-ordinate
- Level (msl)
- Description

The above information is to be given to an accuracy of three decimal places and is to be surveyed by a suitably qualified person. It is imperative that the surveyor utilises the nearest survey control point and notifies us thereof. The survey shall be undertaken in WGS84 LO31 projection.

PS 14.11.7 As Built Point Accuracy

Survey of pipelines, bends, specials and fittings to accuracy of less than 100mm by a Professional Register Surveyor.

The Contractor will be required to prove the accuracy of the GPS device he intends on using prior to any as built data being captured. The Employer's Representative may request further accuracy tests during the Contract should he deem it necessary.

Suitable checks on the accuracy of the information provided may be carried out by the Employer's Representative and should any of the information provided be found to be inaccurate or untrue, the Employer's Representative reserves the right on behalf of the Employer to withhold payment or to employ the services of an engineering surveyor to re-survey all the works listed above, at the Contractor's expense.

The Employer shall request a minimum of three quotations from three independent engineering surveyors of his choice, and the lowest quotation will be appointed and the cost thereof will be deducted from monies owing to the Contractor.

PS 14.11.8 As-Built Data to be Captured

Item	Description	Co-Ordinates and Levels for the following
Pipelines/ Process Pipework	Positions and levels of buried and above ground pipes, valves, specials and fittings installed.	- Centre of crown of pipes, bends, tee's, reducing tee's and reducers; - All flanges; - All welds; - Stem of buried isolation valves; - Centre of Water Meters and PRVs; - Pipelines to be surveyed every 6m and/or every change in direction - Crown of all pipe jacks/ horizontal directional drilling sleeves
Cabling		Cable routes and associated details
Chambers	Position of all Chambers	- All corners - Location of pipe entry and exit from chamber from centre of crown of pipe - Floor Level
Structures	Detailed Structural Survey	- All structural elements such that a complete set of detailed structural layouts and sections can be produced. This will include but is not limited to; both reservoirs on site; all ancillary structures; telemetry room; etc. - Detailed drawing must include full sets of plan layouts, and sections, with accurate member sizes, for all structural elements, inclusive of foundations and piling.
Equipment	Position of equipment	All positions of equipment on site

The Contractor shall show that all infrastructure is located within the servitude boundaries.

For other infrastructure, the Contractor shall ensure that all infrastructure constructed under the Contract is shown on the as built survey.

PS 14.12 MANAGEMENT OF THE ENVIRONMENT

The requirements of the Environmental Management Specifications and where applicable, Environmental Management Programme and the Rehabilitation Specification, shall apply.

The Contractor shall for the construction of the Works, confine his operation to an area as small as possible. No disturbance of vegetation shall commence without approval of the Engineer. The planning for such disturbance shall be captured in the quality control plan for the construction of the Works.

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

PS 14.13 SECURITY

The Contractor is responsible for all security measures required on site and at work fronts of the linear development component of the construction of the Works.

All costs required for security measures taken on site shall be deemed to be covered in the billed rates of the Bill of Quantities.

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

An item has been included in the Schedule of Quantities for the provision of security.

PS 14.14 SITE PERSONNEL

It shall be noted that the Contractor will be required to strictly observe his obligations regarding adequate full time superintendence of the works, with particular reference to accuracy of setting out, excavations, correct steel fixing, properly constructed formwork, positioning of foundation bolts and /or bolt pockets, placing of concrete, etc. in order to achieve the high standard of workmanship required of him.

It shall be a requirement of this contract that **a Site Agent, Civil Foremen, and Structural Foremen**, are assigned to this contract on a full-time basis and are permanently on site. The Contractor is to also ensure that a suitably qualified Contracts Manager is appointed for the duration of this Contract.

The Contractor is responsible for timeously communicating requirements he may have in terms of technical meetings, commissioning activities, Employer requests and associated works during the duration of the Contract, to ensure availability of the relevant parties.

The Site Agent may not leave the works whilst work is in progress without the Engineer's written approval.

PS 14.15 MANAGEMENT MEETINGS

The Contractor and Sub-Contractors shall attend regular site meetings as and when these are required by the Employer. The objectives of such meetings will be to review progress and ensure compliance with the programme, discuss, and where possible solve any problems that may arise and generally liaise with all parties concerned with the works.

The cost of attending such meetings shall be included in the tendered price and instructions given by the Employer's Representative at such meetings and confirmed in the notes of the

meeting shall be considered as a written instruction by the Engineer, as referred to in the Contract.

Site Meetings will generally be held once a month but special meetings may be convened as and when required.

PS 14.16 DAILY RECORDS

The Contractor shall keep a daily site diary in which at least but not limited to the following data will be reflected:

- 1) Work executed
- 2) Plant and machinery deployed on site
- 3) Rainfall recorded
- 4) Agreement to rain delays
- 5) Disruptions and frustrations recorded for the day

The daily diary shall be submitted to the Engineer on a daily basis. The previous day diary shall be with the Engineer by 10h00 on the following working day.

Daily diaries shall be in the format as agreed with the Engineer.

Daily diaries need to be signed by the Contractor's Representative and the Engineer.

PS 14.17 FORMAT OF COMMUNICATIONS

Formal communication under this Contract shall comprise the issue and receipt of the following:

- 1) Official correspondence issued under transmittal slip, which includes claim and dispute documentation as required by the contractual processes
- 2) Issue of Site Instructions by the Engineer
- 3) Variation Orders issued by the Engineer
- 4) Requests for information submitted by the Contractor to the Engineer, in writing in a pre-determined format
- 5) Notes on meeting proceedings, signed off by attending organisations' representatives

NOTE: random e mail correspondence generated and distributed does not constitute official correspondence and communication under this Contract.

PS 14.18 PAYMENT CERTIFICATES

Measurement for payment purposes will take place between the 20th and 25th of each month. The Contractor needs to submit his monthly payment claim to the Engineer by the 26th of each month. The Engineer and the Employer's Representative will review the Certificate for accuracy and completeness.

Should any of these noted dates fall on a non working day or a special non working day, the following working day shall be applicable.

PS 14.19 EMPLOYMENT OF LOCAL LABOUR AND JOB CREATION

Employment of local labour is detailed in the Contract and Tender Data.

PS 14.19.1 Local Labour Statistics

The Contractor shall provide, on a monthly basis, together with his payment claim, the statistics of all labour employed under the Contract where such statistics shall as a minimum,

show for each employee, the name, ID number, address, age, gender, disability level if applicable. A certified copy of the employee's ID book cover page is required as well.

The FTE statistics for the Contract needs to be submitted on a monthly basis.

This is required to comply with relevant EPWP requirements

PS 14.20 HEALTH AND SAFETY

PS 14.20.1 Employers Health and Safety Plan

The Health and Safety Specifications are included in Annexure C3.6.3.

PS 14.20.2 Contractors Health and Safety Plan

The Contractor's Health and Safety plan shall comply with the requirements of the legislation applicable.

The Contractor, shall, immediately after appointment for the construction of the Works, make contact with the Employer's appointed Health and Safety agent and familiarise himself with the requirements of the Health and Safety plan for the construction of the Works.

The appointed Health and Safety Representative for the Employer will be introduced at the hand over meeting for the Contract.

PS 14.20.3 Cost of Compliance With The Relevant Statutory Requirements

An item has been inserted in the preliminary and general section of the Bill of Quantities for costs pertaining to compliance with the statutory requirements pertaining to Health and Safety. Rates provided under this contract are deemed to cover all costs applicable to Health and Safety compliance.

PS 14.20.4 Barricading and Lighting

Barricading and lighting is covered under the amended specification section PSD and SANS 1921.

PS 14.20.5 Traffic Control

See SANS 1921 and the traffic control management plan as included under the particular specifications.

PS 14.20.6 Aids Awareness

Refer to SANS 1921 – Vol 6.

PS 14.20.7 Operational Health and Safety

A provisional sum has been provided in the Schedule of Quantities to cover the cost of Operational Health and Safety (OH&S) monitoring as directed by the Employers Representative. The Contractor shall remunerate an external Employer identified Operational Health and Safety Agent appointed by the Engineer for the following:

- 1) Monthly OH&S audits, report preparation & submission;
- 2) Conducting OH&S Inspections and attend progress meeting;
- 3) Conducting a close - out inspection, issuing of snag list, verify snags closed - out for works completion and the submission & preparation of a close - out report;
- 4) Disbursements;

Any additional works required by the Employers Representative.

Working under or in close proximity of overhead powerlines

All relevant Health and Safety procedures and precautionary measures pertaining to working in the Eskom servitude or under or in close proximity of overhead powerlines shall be implemented.

The services of a cathodic protection specialist shall be obtained in order to develop the relevant procedures to be incorporated into the health and safety plan.

No additional payment for these requirements will be made and the rates provided for the laying of the pipelines shall be deemed to include for all the relevant eventualities in this regard.

Removal of Asbestos Cement Infrastructure

The Contractor shall be responsible for the safe removal and working procedure of the Asbestos Cement infrastructure from the reservoir site. The Contractor shall ensure that his personnel are equipped with the necessary PPE gear when working with Asbestos Cement and that the material is disposed of at a disposal approved site.

PS 14.20.8 Procedure for Meter Installation and Registration

The Contractor will be responsible for the following procedure for installation of ultrasonic meters:

1. Inform Bulk Metering Technician for EWS of intention to install a reservoir meter. The following information must be provided in writing to bulk metering Technician:
 - Meter number
 - Meter size
 - Meter type
 - Property Key where the meter is installed
 - Physical address where the meter is installed
2. The Bulk Meter Technician will ensure that the above data is captured and will provide a "Connection Number"
3. Bulk Metering Technician or a representative is to be present at the commissioning of the meter, where an opening meter reading will be taken and returned for capturing to the billing system.
4. Practical completion for the installation will only be granted when the Bulk Metering Technician (or representative) signs over acceptance of the meter and a "Connection Number" is provided for the meter and stencilled onto the chamber or kiosk.
5. For record drawing purposes, a GPS shape file is to be provided of all the installed meters with the above information included.

PS 14.20.9 Submission of Insurances and Sureties

In order that delays in acceptance by the Employer of insurances and sureties required in terms of this document be avoided, the Contractor is advised that the necessary documentation is to be submitted as follows:

Sureties and any bank guarantees to the Tenders Section, 6th Floor, Municipal Buildings, 166 K.E. Masinga Road (Formerly Old Fort Road) Durban.

Proof of the Contractor's good standing in terms of the Workmans Compensation Act to the Insurance Section of the City Treasurers Department, 6th Floor, Municipal Buildings, 166 K.E. Masinga Road (Formerly Old Fort Road) Durban.

The complete insurance policy is to be submitted to the Employer's Representative for approval by an independent insurance consultant appointed by the Employer. Once approved, this document will be forwarded to the Insurance Section of the City Treasurers Department by the Employer's Representative.

PS 14.21 ACCESSIBILITY TO SITE

It is the Contractors responsibility to ensure access to site for all applicable plant and machinery. The Contractor shall be responsible for liaison with the Employer to confirm access to site.

Under no circumstances shall the Contractor directly contact adjacent land owners. Access to the site is strictly limited to within the reservoir/depo complex unless agreed upon in writing by the Employer.

The Contractor shall also ensure that the existing access roads are maintained and where necessary (post Employer approval) regrade, resurface or widen the existing access road to the site. The Contractor shall ensure that all applicable environmental requirements/regulations are adhered to, as well as applicable wayleaves.

PS 14.22 PUBLIC RELATIONS OFFICER (ISD CONSULTANT)

The Contractor shall liaise with the Institutional and Social Development (ISD) Consultant that has been appointed by the Employer. The Contractor shall be required to offer reasonable assistance to the ISD in resolving all community-related matters on the project. The details of the ISD will be provided at the project handover meeting.

C3.3: STANDARD SPECIFICATIONS

C3.3.1 The Specifications on which this contract is based are the South African National Standards (SANS) 1200 – Building Specifications and Committee of Transport Officials (COTO) - Standard Specifications for Road and Bridge Works for South African Road Authorities – Draft Standard (hereafter referred to as the Standard Engineering Specifications). These documents are obtainable separately, and Tenderers shall obtain their own copies of the applicable Sections.

C3.3.1.1 APPLICABLE SANS STANDARDS

SABS 1200	A	1986	General
SABS 1200	AB	1986	Engineer's office
SABS 1200	C	1980	Site clearance
SABS 1200	D	1988	Earthworks
SABS 1200	DB	1989	Earthworks (pipe trenches)
SABS 1200	DM	1981	Earthworks (roads, subgrade)
SABS 1200	F	1983	Piling
SABS 1200	G	1982	Concrete (structural)
SABS 1200	L	1983	Medium pressure pipeline
SABS 1200	LC	1981	Cable ducts
SABS 1200	LB	1983	Bedding (pipes)

The following SANS specifications are also applicable to in this document, unless amended in any particular specification or shown as an amended standards specification. The Contractor is advised to obtain these standard specifications from Standards South Africa (a division of SABS) in Pretoria.

SANS 28	Metal ties for cavity walls
SANS 62- 1:2003	Steel Pipes Part 1 – Pipes suitable for threading and of nominal size not exceeding 150mm
SANS 62-2:2009	Steel Pipes Part 2 – Screwed pieces and pipe fittings of nominal size not exceeding 150mm
SANS 120:2009	Stemming for use in blasting
SANS 121:2011/ISO 1461:2009	Hot dip galvanised coatings on fabricated iron steel articles – Specification and Test Methods
SANS 135:2008/ISO 1456:2003	Metallic coatings – Electrodeposited coatings of nickel plus chromium and of copper plus nickel plus chromium
SANS 136:2008/ISO 1458:2002	Metallic Coatings – Electrode deposited coatings of nickel
SANS 0227:2007	Burnt Clay Masonry Units
SANS 657-:2011	Steel tubes for o-pressure purposes Part 1: Sections for scaffolding, general engineering and structural applications
SANS 675:2009	Zinc coated fencing wire
SANS 677:2010	Concrete non – pressure pipes

SANS 719: 2008	Electric welded low carbon steel pipes for aqueous fluids (large bore) (200mm nominal bore to 2230mm)
SANS 878:2012	Ready mixed concrete
SANS 929:2008	Plywood and composite board
SANS 966-1:2010	Components of pressure pipe systems Part 1: Unplasticized poly(vinyl chloride) (PVC-U) pressure pipe systems
SANS 1083:2006	Aggregates from natural resources – Aggregates for concrete
SANS 1085	Concrete testing
SANS 1117:2007	Plastic wrappings for the protection of steel pipelines
SANS 1123:2007	Pipe Flanges
SANS 1215	Concrete masonry units
SANS 1217:2001	The production of painted and powder coated steel pipes
SANS 1491 Part I	Ground granulated blastfurnace slag (GGBS)
SANS 1491 Part II	Pulverised Fly Ash (PFA)
SANS 1491 Part III	Condensed Silica Fume (CSF)
SANS 1580:2005	Hexagonal steel wire mesh gabions and revet mattresses
SANS 1914:2002	Targeted Construction Procurement. Part 1 – Participation of targeted enterprises
SANS 1921 – 1:2004	Construction and Management Requirements for Works Contracts Part 1: General Engineering and Construction Works and where accommodation of traffic is involved
SANS 1921-2:2004	Construction and Management Requirements for Works Contracts Part 2: Accommodation of Traffic on Public Roads Occupied by the Contractor
SANS 1921-3:2004	Construction and Management Requirements for Works Contracts Part 3: Structural Steelwork
SANS 1921-5:2005	Construction and Management Requirements for Works Contracts Part 3: Earthworks activities which are to be performed by hand
SANS 1921-6:2004	Construction and Management Requirements for Works Contracts Part 6: HIV/AIDS Awareness
SANS 6085	Testing of Concrete
SANS 4074:2003/ISO	Natural latex rubber condoms – Requirements and test methods
4074:2002	Polyethylene (PE) pipes for water supply - Specifications
SANS 4427:1996	
SANS 5772:2004	Preparation of steel substrates before the application of paints and related products – surface roughness characteristics of blast cleaned steel surfaces – Profile of blast cleaned surfaces determined by a micrometer profile gauge
SANS 10129:2006	Plastic tape wrapping of steel pipelines
SANS 10396: 2003	Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures
SANS 50196 Part1&2:1994	Portland cement
SANS 50196 Part 4:1993	Portland cement
SANS 50196 Part 5:1994	Portland cement
SANS 50196 Part 6&7:1989	Portland cement
SANS 50196 Part21:1989	Portland cement
SANS 50413 Parts1&2:1994	Portland cement
SANS 50196 Part3:1994	Portland cement
SANS 50197-1 OR EN 197-1	

SANS 51317-2: Part 2	Road restraint systems Part 2: Performance classes, impact test acceptance criteria and test methods for safety barriers.
SANS 10396: 2003:	Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures
SANS 1914-1 to 6 (2002)	Targeted Construction Procurement

The variations to and additions to the standard specifications are included under section defining the Amended Specifications and are prefixed “PS”, followed by the applicable clause reference. Such amendments take precedence over the SANS Standardised Specification.

Particular Specifications are included under section named PARTICULAR SPECIFICATIONS. Where a particular specification is in conflict with either the variations and additions to the standardised specifications or the SANS Standardised Specifications, the Particular Specification shall take precedence.

C3.3.1.2 APPLICABLE COTO STANDARDS

Chapter	Description	Date of Issue	
1	General	October	2020
2	Services	October	2020
3	Drainage	October	2020
4	Earthworks And Pavement Layers: Materials	October	2020
5	Earthworks And Pavement Layers: Construction	October	2020
6	Concrete Layers	October	2020
7	Maintenance and Repair of Concrete Layers	October	2020
8	Pretreatment and Repair of Existing Layers	October	2020
9	Asphalt Layers	October	2020
10	Surface Treatments	October	2020
11	Ancillary Road Works	October	2020
12	Geotechnical Applications	October	2020
13	Structures	October	2020
14	Repair and Rehabilitation of Structures	October	2020
20	Quality Assurance	October	2020

The variations to and additions to the standard specifications are included under the section defining the Amended Specifications and are prefixed “PC”, followed by the applicable clause reference. Such amendments take precedence over the COTO Standardised Specification.

Particular Specifications are included under the section named PARTICULAR SPECIFICATIONS.

Where a particular specification is in conflict with either the variations and additions to the standardised specifications or the COTO Standardised Specifications, the Particular Specification shall take precedence.

C3.3.2 AMENDMENTS TO THE STANDARD SPECIFICATIONS

C3.3.2.1 Amendments to SANS Specifications

Introduction

In certain clauses the standard, standardized and particular specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains additional specifications required for this particular contract.

The number of each clause and each payment item in this part of the project specifications consists of the prefix PS followed by a number corresponding to the number of the relevant clause or payment item in the standard specifications. The number of a new clause or payment item, which does not form part of a clause or a payment item in the standard specifications and which is included here, is also prefixed by PS, but followed by a new number which follows on the last clause or item number used in the relevant section of the standard specifications.

PS A	General
PS AA	General (Small Works)
PS AB	Engineer's Office
PS AD	General (Small Dams)
PS AH	General (Structural)
PS C	Site Clearance
PS D	Earthworks
PS DA	Earthworks (Small Works)
PS DB	Earthworks (Pipe Trenches)
PS DE	Small Earth Dams
PS DK	Gabions and Pitching
PS DM	Earthworks (Roads, Subgrade)
PS DN	Earthworks (Railway Sidings)
PS F	Piling
PS G	Concrete (Structural)
PS GA	Concrete (Small Works)
PS GB	Concrete (Ordinary Buildings)
PS GE	Precast Concrete (Structural)
PS GF	Prestressed Concrete
PS H	Structural Steelwork
PS HA	Structural Steelwork (Sundry Items)
PS HB	Cladding and Sheeting
PS HC	Corrosion Protection of structural steelwork
PS HE	Structural Aluminium Work
PS L	Medium-Pressure Pipelines
PS LB	Bedding (Pipes)
PS LE	Stormwater Drainage

C3.3: STANDARD SPECIFICATIONS **GENERAL (SABS 1200 A – 1986)**

PSA 5 CONSTRUCTION

PSA 5.1 SURVEY

Add the following:

The Contractor must note that a limited amount of survey control has been provided. The Contractor will be required to verify the accuracy of such and shall be held responsible for any errors in the setting out of the works which may arise from the usage of this survey

PSA 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

Replace with the following:

The Contractor is reminded of his obligations in terms of Clause 4 of the Conditions of Contract and Special Conditions of Contract is to prove the actual position of all services on site before any work commences in the vicinity of the services. The Contractor is further required to measure accurately the chainage and level at which these services occur and to report this information to the Engineer for comparison with the contract drawings prior to work commencing in the vicinity of the services.

The drawings illustrate the positions of services as accurately as has been possible to ascertain from existing records. However, it is possible that there are services existing which are not reflected on the Contract drawings which might have an effect on the works. Therefore, the Contractor must take cognisance of the above possibility and provide sufficient flexibility within his programme of works to accommodate any alterations that might be necessary.

Should it be necessary to adjust the line, level and / or position of any service not catered for in the contract to enable the construction to proceed, the Contractor shall on no account effect such adjustments, without the prior consent of the Engineer.

Buried electrical and telephone cables shall be exposed using hand tools initially before allowing the uncontrolled use of picks and other implements, or before using machines to excavate. Supporting or diverting cables must be done by, or in consultation with, officials of the Electricity Service Unit, Eskom or Telkom respectively.

When cables are not in the positions shown on the drawings and cannot be found after proving trenches have been put down, assistance may be obtained by calling an official from the appropriate authority during office hours.

Existing services including water mains, sewer pipes, stormwater pipes and drains, electricity and telephone lines, cables, poles and conduits shall be protected, supported, maintained in service and restored to the condition in which found by the Contractor at his expense, or where necessary by the appropriate authority at the Contractor's expense.

Provided that where it is necessary to relocate such existing services, such relocation shall be arranged by and carried out at the Employer's expense.

PSA 5.5 DEALING WITH WATER ON WORKS

Add the following:

The Contractor shall accept all risks for any water affecting the works during the construction period, whatever the source or cause may be, and shall properly deal with and dispose of all water to ensure that the works are kept sufficiently dry at all times for their proper execution.

For this purpose the Contractor shall provide, operate and maintain in sufficient quantity such pumping equipment, well points, pipes and other equipment as may be necessary and he shall also provide any sumps, furrows, cross-embankments, coffer-dams and other temporary works as may be necessary to minimise damage, inconvenience, or interference.

PSA 5.7 SAFETY

Add the following:

All work and particularly work carried out in the proximity of buildings, bridges, tanks or other structures shall be carried out in conformance with the regulations framed under the Occupational Health and Safety Act, 1993 and the Minerals Act, Act 50 of 1991, including shoring where necessary, to ensure the safety of structures that are at risk.

The Contractor shall make available for the duration of the contract safety helmets, gumboots and any other necessary safety equipment for sole use by the Employer's Representative and his representative

The Contractor is to be aware that the sites are bordered by busy roads and streets which are subject to increase traffic volumes during peak hours. Interference with usual traffic flow is to be kept to a minimum for the duration of the contract.

If any such interference is unavoidable, for example, during the supply or installation of any materials, then the Contractor shall provide all necessary traffic control materials, equipment and personnel in compliance with the prevailing Council Legislation and Bylaws.

PSA 5.8 GROUND AND ACCESS TO WORKS

Add the following:

The contractor is responsible for conducting a complete assessment of the site for the means of temporarily access that is deemed necessary and agreed with by the Employer's representative, inclusive of any specialist consultation fees, and temporary improvement works required for creating such temporary access. The assessment conducted must be presented in report format to the Employer's representative for approval.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.2.2 TIME RELATED ITEMS

Delete the following:

"An approved extension of time will qualify the Contractor to receive payment for each relevant time-related item at a unit rate determined from the sum tendered for such item and from the designated operation, the period stated for the completion of the item or the tendered contract

period, as applicable.”

And replace with:

An extension of time granted will not necessarily or automatically entitle the Contractor to additional payments of time related items. Additional payments for specific time related items after the granting of an extension of time must be motivated and substantiated by the Contractor and shall be subject to approval by the Employer’s Representative.

PSA 8.3 & PSA 8.4 FIXED AND TIME RELATED ITEMS

Add the following:

The tendered sum, PSA 8.3.1 (fixed charge) shall include full compensation for the erection of temporary security fencing on the entire perimeter of the site.

The tendered rate, for item PSA 8.4.1(time-related) shall include full compensation for the provision of security for the site for the duration of the contract.

Measurement for all Fixed Cost Items will be by way of sum, and payment will be in accordance with payment terms stipulated in SABS 1200 A for fixed cost.

The unit of measurement for all Time-Related items shall be per calendar day.

PSA 8.3.2.1 & PSA 8.4.2.1 Facilities For Engineer

Add the following new payment item:

(a) Meeting room facilities

The tendered rates shall include full compensation for the provision of meeting room facilities for the Engineer for the duration of the contract, in line with the requirements of SABS 1200 AB. The meeting room shall be a minimum of 24m² and shall be equipped with an air conditioning, chairs and a conference table large enough to seat 15 persons and shall have a surface area of at least 6m².

Add the following new payment item:

PSA 8.9 OCCUPATIONAL HEALTH AND SAFETY

Health and safety plan

The tendered sum (fixed-charge) shall include full compensation for assessing the risks associated with the Works, reviewing and taking cognisance of the Employer’s health and safety specifications and/or requirements, preparing the Contractor’s health and safety plan and for the submission of a copy of the plan to the Engineer.

The tendered rate (time-related) shall include full compensation for the management of occupational health and safety risks/requirements for the full duration of the project in line with the project specification PS 14.20.

Add the following new clause:

PSA 8.10 ENVIRONMENTAL MANAGEMENT OBLIGATIONS

The tendered rate shall include full compensation for all requirements to comply with the environmental management project specification PS 7 and particular specification PEM.

Add the following new clause:

PSA 8.11 AS-BUILTS AND DOCUMENTATION

The tendered rate shall include full compensation for documentation and producing as-built drawings in line with the requirements set out in the project specification PS 14.11

PSAB EMPLOYER'S REPRESENTATIVES OFFICE (SABS 1200AB – 1986)

PSAB 3 MATERIALS

PSAB 3.2 OFFICE BUILDINGS AND MEETING ROOMS

Add the following:

The Engineer's offices shall be a minimum of 30m² and fitted with:

- a) a correctly sized air conditioning unit
- b) an approved stand and holders for 20 vertically hung AO drawings
- c) an approved colour printer and scanner to print A3 documents
- d) a lockable cabinet
- e) 2 desks and 4 chairs
- f) Bar fridge, with a minimum dimension of 480 x 450 x 850
- g) Four carports which shall have a suitable roof and be enclosed on three sides. Carports made of shade cloth offering 80% or more UV resistance will be acceptable. The car ports shall be for the sole use of the Employers Representative.

PSAB 5 CONSTRUCTION

PSAB 5.4 TELEPHONES

The terms of sub-clause 8.2 of SABS 1200AA shall apply.

Add the Sub following:

The Tenderer is to include for a wireless internet service required for the employer's representative for the duration of the contract with a minimum data cap of 50 GB per month.

PSC SITE CLEARANCE (SABS 1200C – 1998)

PSC 3 MATERIALS

PSC 3.1 DISPOSAL OF MATERIALS

Add the following:

The freehaul distance for this contract is unlimited. Contractors are to note that no overhaul will be paid.

Material obtained from clearing excavations, and demolition must be disposed of offsite by the Contractor at his expense.

The Contractor will be held responsible for observing the by-laws and regulations of the relevant local authority and for any injury to persons and damage to property caused by any fire starting on site, in his camp or a fire started for any reason by his employees, regardless of whether such injury or damage is the direct or indirect result of such fire. The Contractor shall indemnify the Employer against all claims or damages arising from this source. Burning of combustible material shall not be allowed.

Where hazardous materials are involved, the contractor is responsible for observing the by-laws and regulations of the relevant local authority and for any injury to persons and damage to property caused by exposure to any hazardous materials. The contractor will hold full liability for identifying appropriate disposal sites for the relevant hazardous materials and the transport and disposal of the materials at these sites.

The site is situated adjacent to existing properties, and dust control is to be maintained at all times.

PSC 5 CONSTRUCTION

PSC 5.8 DEMOLITION OF STRUCTURES

Add the following:

Where partial demolition of the structure is required, the contractor shall ensure that the portion of the structure to be demolished is completely separated, by means of saw cutting or other approved means, from the portion that is to remain in place.

The contractor is to plan such demolition works with the use of appropriate temporary protection, plant and equipment accessible to the site, and ensure that, for partial demolition, the founding soils on the portions of the reservoir to remain in place, or supporting embankments are not adversely impacted in any manner.

Add the following new clause:

PSC 5.9 LATERAL SUPPORT

The Contractor shall provide complete details of proposed shoring systems or temporary earth retaining systems, including any design details, approved and signed off by an ECSA Registered Professional Engineer or Professional Technologist, for any location where the relevant system is required.

The Contractor shall ensure all relevant work is carried out under the supervision of the CCP, who was appointed in writing for that purpose. The CCP shall, as far as is reasonably practicable and applicable, assess the stability of the ground before demolition work begins and as the works proceed strictly in accordance with the applicable OHS regulations. All risks related to such support systems shall remain exclusively with the Contractor.

Add the following new clause:

PSC 5.10 TEMPORARY SUPPORT

The Contractor shall provide complete details of temporary support systems for structural elements affected by partial demolition works, including any design details, approved and signed off by an ECSA Registered Professional Engineer or Professional Technologist, for any location where the relevant system is required.

The Contractor shall ensure all relevant work is carried out under the supervision of the relevant

specialist who was appointed in writing for that purpose. The specialist shall, as far as is reasonably practicable and applicable, assess the stability of any such installation and approve it before any demolition work begins and as the works proceed, strictly in accordance with the applicable OHS regulations. All risks related to such support systems shall remain exclusively with the Contractor.

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.2.1 CLEAR AND GRUB

Replace the first line with the following:

"The area designated by the Employer's Representative to be cleared and grubbed will be measured in square metres to the nearest square metre or,"

The unit of measurement shall be square metre (m²).

PSC 8.2.4 RECLEAR SURFACES

The unit of measurement shall be square metre (m²).

PSC 8.2.5 TAKE DOWN EXISTING FENCES

Add the following:

The tendered rate shall include for storage and disposal of the fence and access gate as directed by the Employer's Representative on site

The unit of measurement shall be metre (m).

PSC 8.2.7 DISMANTLE AND REMOVE EXISTING SERVICES

Add the following:

The tendered rate shall include stockpiling and removal of dismantled services for returning to the Employer depots, where required. The Contractor shall ensure that the removal of Asbestos Cement pipelines complies with PS 17.18.8.

PSC 8.2.8 DEMOLISH AND REMOVE EXISTING STRUCTURES/BUILDINGS

Add the following:

The tendered rates shall include all plant, labour, materials and equipment, to transport all demolished material to a registered landfill site, regardless of distance from the construction site.

Where partial demolition is specified for the reservoir, the tendered rate shall further include all plant, labour, materials and equipment, to partially demolish the damaged portion of reservoir no. 2 in accordance with drawing no. 60591/030_Rev 0 and PSC 5.8, and transport of all demolished material to a registered landfill site, regardless of distance from the construction site.

The unit of measurement shall be cubic metre (m³).

PSC 8.2.10 REMOVE TOPSOIL TO STOCKPILE

Add the following:

The tendered rate shall include full compensation for removing topsoil to a depth of 150mm and for loading and transporting the material to and from a stockpile in the vicinity of the site of works.

The unit of measurement shall be cubic metre (m³).

Add the following new clause:

PSC 8.2.11 REMOVAL OF COLLAPSED PORTIONS OF STRUCTURES/BUILDINGS

The tendered rate shall include all plant, labour, materials and equipment, for breaking down and removing collapsed material that formed part of reservoir no. 2 within the sloped embankment in accordance with the procedure and specifications outlined in PSC 5.8, and transport of all demolished material to a registered landfill site, regardless of distance from the construction site.

The unit of measurement shall be metre (m³).

Add the following new clause:

PSC 8.2.12 SAW CUTTING OF EXISTING ASPHALT SURFACES

The unit of measure shall be the linear metre of the asphalt cut according to the plans or as instructed by the Employer's Representative. The rate shall include for the supply of an approved asphalt saw cutting machine and all other necessary equipment for saw cutting of asphalt, according to the specification which calls for a double cut on each side of the excavation if required.

The unit of measurement shall be metre (m).

Add the following new clause:

PSC 8.2.13 SAW CUTTING OF EXISTING CONCRETE

The unit of measure shall be the linear metre of the concrete cut according to the plans or as instructed by the Employer's Representative. The rate shall include for the supply of an approved asphalt saw cutting machine and all other necessary equipment for saw cutting of concrete, according to the specification which calls for a single cut.

The unit of measurement shall be metre (m).

Add the following new clause:

PSC 8.2.14 REMOVE EXISTING ROAD ASPHALT SURFACING TO SPOIL

The rate shall cover the cost of removing, loading, transporting and disposal to spoil of all asphalt surfacing as instructed by the Employer's Representative. The rate shall take into account that this work may have to be carried out in more than one operation depending on the Construction programme and traffic accommodation.

The unit of measurement shall be square metre (m²).

Add the following new clause:

PSC 8.2.15 REMOVE EXISTING GRAVEL LAYERWORKS TO SPOIL

The rate shall include the selective removal of existing gravel layerworks to the required depth as instructed by the Employer's Representative, loading and transporting to spoil as per Clause PSC 3.1: Disposal of Material. The rate shall take into account that this work will have to be carried out in more than one operation depending on the construction programme and traffic accommodation.

The unit of measurement shall be cubic metre (m³).

Add the following new clause:

PSC 8.2.16 DISMANTLE, STORING AND RE-ERECTION OF ROAD SIGNS

- a) Exceeding but not exceeding surface area of 0 - 2,0m²

The unit of measure shall be the number of road signs dismantled, stored and re-erected as instructed by the Employer's Representative.

The rate shall include the cost of dismantling and re-erection of all components of the road sign, the transporting to and from storage, all costs associated with the storage of the road signs, all labour costs involved in the process of dismantling and re-erection and the backfilling, shaping and trimming of any signpost holes.

The unit of measurement shall be number (No).

Add the following new clause:

PSC 8.2.17 REMOVE EXISTING CONCRETE KERBING AND CHANELLING

The rate shall cover the cost of removing, loading, transporting and disposal to spoil of all concrete kerbing and channelling as instructed by Employer's Representative. The rate shall take into account that this work may have to be carried out in more than one operation depending on the Construction programme and traffic accommodation.

The unit of measurement shall be metre (m).

PSC 8.2.18 PARTIALLY DEMOLISH AND BURY STRUCTURES/BUILDINGS

The tendered rate shall include all plant, labour, materials and equipment, for the partial demolition of existing chambers to 1m below the finished ground level as stated in engineering drawings, and transport of all demolished material to a registered landfill site, regardless of distance from the construction site.

The tendered rate shall also include all plant, labour, materials and equipment for burying the portions of chambers to remain following the partial demolition as stated above, by backfilling both internally and externally with material from commercial sources where needed.

The unit of measurement shall be cubic metre of demolition and backfill (m³).

Add the following new clause:

PSC 8.2.19 TEMPORARY EMBANKMENT PROTECTION

The rates shall include full compensation for design, supply, fabrication, installation, removal (if required), labour, materials, equipment, plant and incidentals to provide complete lateral support to the embankment faces, in accordance with PSC 5.9. The rate shall also include inspections,

supervision by safety officers and for maintenance of lateral support. The lateral support shall remain in position for as long as required to complete construction and only removed with the approval of the Employers representative. Where lateral support for excavations is required, cost for excavating material shall not be included, but paid for under separate items.

Payment for this item will be by way of a Sum.

Add the following new clause:

PSC 8.2.20 TEMPORARY SUPPORT

The rates shall include full compensation for design, supply, fabrication, installation, removal (if required), labour, materials, equipment, plant and incidentals to provide complete temporary support to structural elements, in accordance with PSC 5.10.

The rate shall also include inspections, supervision by safety officers and for maintenance of the temporary support. The temporary support shall remain in position for as long as required to complete construction and only removed with the approval of the Employers representative.

Payment for this item will be made by way of a Sum.

PSD EARTHWORKS (SABS 1200 D-1988)

PSD 3 MATERIALS

Add the following new clause:

PSD 3.1.3 GENERAL

Method

The method of excavation shall be at the discretion of the Contractor, provided that the work complies with the specification and the following requirements:

Excavations shall be confined within the limits defined by the drawings or as instructed by the Engineer;

Surfaces in excavations shall be at all times be formed to shed stormwater and groundwater without ponding; where excavation is accomplished by blasting and the material is required for fill, sufficient fragmentation shall be attained to allow the material to be used as fill; and excavated faces in abandoned borrow shall be formed to stable slopes.

Since borrow sites are usually required for future development, the Contractor shall not excavate haphazardly and strict level control shall be maintained at all times. Site design levels will be supplied to the Contractor, and he shall ensure that these levels are strictly adhered to. Where topsoil is to be removed prior to excavation, this will be considered a separate operation and will be measured as such.

The Contractor or his representative shall jointly with the Engineer keep a record of the depths, dimensions and classification of excavation as defined in clause PSD 3.1.

Add the following new clause:

PSD 3.1.4 OVERBREAK

Excavation carried out in excess of the specified depth, unless authorised by the Engineer, shall be made up with concrete class 15/26 or other approved material, as directed by the Engineer, at the Contractor's expense.

Where the sides of foundations are specified on the drawings as being cast against in-situ ground, the excavations shall be carried out to the neat dimensions of the base, and any overbreak shall be backfilled with the same class of concrete as that in the base or with mass concrete fill as specified or directed by the Engineer.

Where the bottoms or sides of excavations, against which concrete is to be cast, are softened due to rain or other causes the softened material shall be removed and replaced by concrete or other approved material as directed by the Engineer at the Contractor's expense provided always that the material forming the sides of the excavation is initially capable of standing unsupported at the required slope.

PSD 3.3 SELECTION

Add the following new clause:

PSD 3.3.3 STOCKPILE SITES

Stockpile sites shall be prepared by clearing and light grading. The contractor shall ensure that windblown sand will be kept to a minimum so as not to constitute a public nuisance.

PSD 4 PLANT

PSD 4.1 GENERAL

Replace with the following:

In the case of backfill against structures, no earthmoving equipment with a mass exceeding 1,000kg shall be used within a zone of restricted placing, normally within 2,5m of any concrete face, unless otherwise specified.

PSD 5 CONSTRUCTION

PSD 5.1.2 EXISTING SERVICES

Add the following:

In all cases where other services are shown on the drawings either crossing or adjacent to the pipe or where ordered by the Engineer, the Contractor shall carefully excavate by hand to expose and prove the position of such service prior to the commencement of any main trenching operations in the area.

Such exploratory work shall at all times be carried out well in advance of normal construction so that any possible changes to the design of the works necessitated by the proving of services can be carried out without delay to the construction programme.

In all cases where underground power or telephone cables, water mains or other services are shown on the drawings, either crossing or adjacent to the pipe, or where from site observations it can reasonably be accepted that such services are likely to exist where excavations are to take place, the Contractor shall, without instructions from the Engineer, carefully excavate by hand, to expose and prove position of such prior to the commencement of the main trenching operations in the area. The cost of this pilot trenching shall be included under payment clause D 8.3.8 – Excavation and Backfilling in All Materials. However, if any buried service is not located by the excavation of pilot trenches in the expected position, the Contractor shall immediately report such a circumstance to the Engineer, who will decide what further searching or other necessary action is to be carried out and instruct the Contractor accordingly. The cost of this additional searching shall be to the Employer's cost and will be paid for under item D 8.3.8- Proving Existing Services.

Should any service be damaged by the Contractor in carrying out the works and should it be found that the procedure 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.

The trench width required for providing services need only be of sufficient width to enable the service to be exposed.

PSD 5.2 METHODS AND PROCEDURES

Add the following:

The plant used for applying the dynamic load, controlling the moisture content and grading or mixing shall be capable of achieving the compaction specified using the materials available for the construction of the Works.

PSD 5.2.1 SITE PREPARATION

PSD 5.2.1.2 Conservation of Topsoil

Add the following:

All topsoil suitable for re-use shall be transported directly to the stockpile area and placed separately from all other materials in order to avoid contamination.

PSD 5.2.2.1 Excavation for General Earthworks And Structures

Add the following:

No concrete or other material shall be built or otherwise placed in the foundation pits until they have been cleaned, inspected and passed by the Engineer. The bottom of the excavation must be compacted to at least 100% Mod. AASHTO density provided that the material in itself is capable of being so compacted and the excavation must be kept free of water at all times.

Where the material at the founding level is soft material, or hard material which deteriorates rapidly on exposure, excavation to final level shall not be made until just before the Contractor is ready to place the blinding layer.

Immediately, the material at the founding level has been approved, and before it is built upon, levels shall be taken and compared by the representatives of the Contractor and the Engineer. Any disagreement is to be checked immediately while it is still possible to do so.

Excavated and stockpiled material shall be deposited so as not to endanger the uncompleted structure either by direct pressure or indirectly by overloading the banks adjacent to the structure or in any other way.

In sub clause a) delete the words "Machinery and Occupational Safety Act" in the third and fourth lines and substitute "regulations to the Occupational Health and Safety Act, 1993."

PSD 5.2.3 PLACING AND COMPACTION

PSD 5.2.3.1 Embankments

Add the following:

Before any placing of fill commences, preparatory work such as site clearing, fencing (where required), and the removal of topsoil and unsuitable ground shall be completed. All drainage structures and culverts shall also be installed unless agreed otherwise by the Engineer. Where the height of fill is 1,0m or less, the natural ground shall be compacted to 100% Mod.

A.A.S.H.T.O., before filling commences, and where the fill height is greater than 1m, compaction shall be to 95% Mod. AASHTO to a depth of at least 150mm in both cases.

Bonding

If the natural ground crossfall is greater than 5% the entire interface between the embankment and the natural ground shall be bonded by scarifying to a depth of 150mm.

The thickness of any one layer of fill up to 1m below the formation level shall not exceed 150mm after compaction using static rollers, or 300mm using vibrating rollers.

The top 1m layer of fill below the formation shall be carried out in layers not exceeding 150mm in thickness.

The standard of compaction required shall be:

- up to 1m below formation level, 95% Mod. AASHTO. density;
- the top 1m layer below the formation, 100% Mod. AASHTO density.

The moisture content during compaction of the top 1m layer below formation, as determined by the Modified AASHTO compaction test, shall be optimum $\pm 2\%$.

After compaction, the layer shall be proof rolled with a vehicle having a minimum wheel load of 20 kN in order to determine any soft spots.

Any layer which becomes soft after being compacted and tested, shall be recompacted to the specified density at the Contractor's expense.

All stones, lumps, etc. shall be broken down to conform to a maximum dimension not exceeding two-thirds of the specified compacted thickness of the layer.

Placing of Fill on Swampy Ground – On swampy ground and at other problem areas but not around structures, the Engineer may permit the pioneering of the embankment by end dumping or bulldozing, but only to the minimum extent necessary to develop adequate facilities for normal placing.

The side slopes shall be trimmed to a plane surface free from loose material and stones larger than 100mm maximum dimension and having no local humps or depressions greater than 150mm. Where the embankment slope is not to receive topsoil, it shall be compacted to provide a stable slope. Where the surface is to receive topsoil, it shall be left with a semi-rough finish free from loose material.

Item coverage shall include for: -

Compacting of natural ground before forming embankments to 95% Mod. AASHTO or 100% Mod.

AASHTO, whichever is applicable to a depth of at least 150mm; and

Allowing for shrinkage and wastage of material.

Trimming of Embankments

Measurements shall be in square metres (m²) measured along the shape of the embankment.

PSD 5.2.3.2 Backfilling of Trenches/Structures or Filling Against Structures

Add the following:

Excavated material containing little or no organic matter, large clay lumps and excluding stones of average dimension exceeding 200mm may be used for backfill. Suitable material arising from excavations for structures, foundations, footings and the like which is suitable for backfilling shall be stockpiled whilst all other materials from excavations shall be disposed of off site. Backfill to structures and that used in the formation of embankments shall be compacted to 95% and 93% modified AASHTO density respectively.

Where rock is incorporated into the backfill material, the use of rockfill techniques will be required for the formation of embankments. The techniques include the use of heavy grid or padfoot rollers and flooding of the fill to achieve compaction. Portion of the rock may be blended with the softer surface materials, which could be set aside for this purpose. All costs which may arise as a result of these requirements are to be included in the rates.

Contractors are to note that no overhaul of backfill material will be measured and backfill quantities will only be measured up to the pay lines as indicated on the drawings. The Contractor shall be responsible for backfilling any working space and excavation slopes, overbreaking, battering etc., beyond the indicated pay lines.

No backfilling behind the reservoir will be allowed until the hydraulic test has been completed.

PSD 5.2.4.3 Maintenance of Grassed Areas

Add the following:

Grassed areas, once reinstated by the Contractor will be required to be maintained by the Contractor for a period of three months. This will include watering and weeding of the planted areas to the satisfaction of the Engineer. The costs of complying with this requirement are to be included in the rates for grass planting.

PSD 5.2.5 TRANSPORT FOR EARTHWORKS

PSD 5.2.5.1 Freehaul

Replace with the following: -

The free haul distance for this contract is unlimited. Contractors are to note that no overhaul will be paid.

PSD 6 TOLERANCES

Add the following:

The allowable tolerances shall be:

- a) the design angle ± 2 degrees for the angle of the cut or fill slope;

- b) not less than the design width for the transverse horizontal embankment width at any level; and
- c) the layer thickness +/- 20mm for topsoil;

For the formation, the Contractor will be required to place level pegs longitudinally at 5m intervals on a road construction contract, and elevation tolerances shall be taken on a section of the works. (When the portion of the works is less than 500m², one tolerance reading per 10m² shall be taken).

In any section, the average of the elevations taken shall be such that the average thickness of the succeeding layer or layers above the formation shall be not less than that specified/nor greater than that specified plus 20mm.

The standard deviation of the differences between the actual and design levels shall not be greater than 10mm.

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.1 BASIC PRINCIPLES

Add the following to D 8.1.1:

Items coverage shall include for-

- 1) Loosening or breaking up unexcavated material before or during excavation;
- 2) Allowing for bulking or shrinkage of material before or during excavation;
- 3) Blasting where required;
- 4) Keeping the earthworks free of water;
- 5) Depositing fill to slope away from vertical drainage layers and providing temporary drainage to prevent surface water from entering such drainage layers;
- 6) Forming and trimming the slopes;
- 7) Restrictions on working at sides of structures;
- 8) Taking precautions to avoid damage to structure, existing sewers, drains and services, including providing temporary supports.
- 9) The drying of material which cannot be placed immediately in the fill embankments as its in-situ moisture content exceeds the limits specified.
- 10) Selecting suitable material of stated types and layering or depositing in locations indicated by the Engineer or in stockpiles.

PSD 8.2 COMPUTATION OF QUANTITIES

Add the following to D 8.2.1.

No allowance will be made for bulking or shrinkage, and excavation will be paid for the volume in place before excavation commenced.

Add the following to D 8.2.3:

Prior to commencement of any excavation, the contractor shall notify the Engineer in good time to ensure that measurements, cross-section, levels of the undisturbed ground, or any other relevant information are taken in order that the excavation quantities can be agreed upon between the Engineer and the Contractor.

PSD 8.3 SCHEDULED ITEMS

PSD 8.3.2(a) BULK EXCAVATION

Delete "The rate..... of the specification" in clause 8.3.2(a) and add the following:

The rate shall cover the cost of complying with the precautions required in terms of 5.1 in addition to the cost of excavation, basic selection, loading, transporting, offloading, stockpiling, re-loading, spreading of backfilling, watering, compacting, final grading, complying with the requirements for tolerances, providing for testing, and disposal of spoil, all in accordance with the requirements of the specification.

The unit of measurement shall be per cubic metre (m³)

PSD 8.3.3 RESTRICTED EXCAVATION BY HAND

Add the following:

Where above or along structural elements of the reservoir, the tendered rate shall include all labour, materials and equipment to excavate soil from the reservoir structure by hand to expose concrete elements, not exceeding 3m in width, for use as backfill or disposal.

The unit of measurement shall be per cubic metre (m³)

PSD 8.3.4 IMPORTING OF MATERIALS

Add the following:

The measured volume of imported fill shall be the difference between the net volume of compacted fill and the net volume of suitable material excavated from the site and actually used as compacted fill. For this purpose, it shall be assumed that one cubic metre of suitable material excavated from within the site forms one cubic metre of compacted fill.

PSD 8.3.5 WORKING SPACE

PSD 8.3.5.1 The rates for bulk earthworks to the reservoir will be inclusive of materials up to the pay line as shown in the drawings. Any additional excavation required is to be included in the tendered rates.

PSD 8.3.5.2 The rates for restricted excavation will include for any required allowance for working space. The volume of restricted excavation will be based on the plan area of the structure or item multiplied by the depth measured from the original ground level or a particular datum level agreed prior to commencing excavation.

PSD 8.3.7 ADDITIONAL LATERAL SUPPORT

Replace with the following:

In compliance with clause D5.1.2, the tendered rate for Excavation and Backfilling shall include for the provision of temporary lateral support where this is required.

All temporary works to be carried out in accordance with the Occupational Health & Safety Act, 1993 (Act 85 of 1993): Construction Regulations 2014 and applicable sections of SANS 1200. The design of any temporary works, including shoring, shall be carried out by a registered professional engineer.

Excavations (to a depth of approximately 10m) for the reservoir structure will be in close proximity to an existing reservoir on the north-eastern side. A minimum distance of 2m from the existing reservoir to the crest of the excavation slope is to be maintained. Additional temporary lateral support may be required for excavation of the reinforced concrete retaining wall, and this will be determined by the engineer on site. Additional temporary lateral support will be required for all existing inlet chambers along the reservoir excavation line.

Contractors are advised that, in the case of the proposed pipelines, the depth of trench may require this temporary lateral support to be provided. Contractors are further advised that in such cases where the main runs parallel to or across existing services, lateral support will be essential.

Where a pipe is to be laid in a vertically sided trench with temporary side support, it is necessary to ensure that the compacted bedding and backfill are hard up against the soil forming the trench side by withdrawing the temporary supports stage by stage as the backfill rises up the trench.

The unit of measurement shall be in metres (m), measured along the excavation line

PSD 8.3.10 TOP SOILING

Delete from "The rate..... in terms of 5.2.4.2" in and add the following:

The rate shall cover the cost of procuring the topsoil from a commercial source, transporting, and spreading in terms of 5.2.4.2

The unit of measurement shall be per cubic metre (m³)

PSD 8.3.11 GRASSING OR OTHER VEGETATION COVER

Replace with the following:

The rate shall cover the cost of the following:

- a) sodding embankments as directed by the Engineer
- b) Sodding/seeding of flat areas as directed by the Engineer

Any grass/sods or other vegetation that fails to grow shall be replaced by the Contractor, at his expense, with fresh grass, sods, other vegetation or seeds, as instructed by the Engineer, until satisfactory cover is obtained.

Add the following new clause:

PSD 8.3.14 RESTRICTED BACKFILL BY HAND

Where above or along the reservoir structure, the tendered rate shall include all labour, materials and equipment to backfill and compact soil onto the reservoir structure by hand.

The unit of measurement shall be per cubic metre (m³)

Add the following new clause:

PSD 8.3.15 BARRICADING

The Contractor shall erect temporary barricading or fencing around open excavations/trenches to prevent visibility and unwanted access. The Contractor shall ensure that the rate includes the purchasing, storing, erecting, and dismantling of the temporary barricading.

The unit of measurement shall be per metre (m).

PSDB EARTHWORKS (PIPE TRENCHES) (SABS 1200 DB-1989)

PSDB 3 MATERIALS

PSDB 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES

Amend this clause to be exactly as described under clause PSD 3.1 of the Variations and Additions to the Standardised Specification for Earthworks (SABS 1200 D – 1988)

PSDB 3.7 SELECTION

Add the following:

Contractors are advised that the stockpiling of excavated material suitable for use as backfilling will be permitted alongside trench excavations where possible. All other excavated material unsuitable for re-use, either as backfill or for the formation of embankments, shall be disposed of at the spoil site. No overhaul will be paid.

PSDB 5 CONSTRUCTION

PSDB 5.1 PRECAUTIONS

PSDB 5.1.4. Existing Services that Intersect or Adjoin Trenches

The requirements of PSD 5.2.4.3 are applicable.

PSDB 5.4 EXCAVATION

Add the following:

General

- (a) Excavation shall be undertaken in whatever material is encountered and to such levels and widths as are indicated on the drawings, in the specification and as instructed by the Engineer. Trench excavation shall be undertaken in narrow trenching conditions with vertical sides necessitating the use of shoring, and open battered trench excavation will not be permitted unless otherwise stated in the Project Specification.
- (b) Control of the dimensions of the excavations shall be by means of boning rods and sight rails, an acceptable base beam device or other approved method. If the first method is used, the Contractor shall erect sight rails over the centre of each manhole or vertical bend and along the length of the excavation with a maximum distance of 30m apart and with a minimum number of 3 for any one length of excavation being undertaken. The centre line of the pipeline shall be denoted on each sight rail, both back and front, by a single vertical line, and either side of the centre line shall be painted with contrasting colours.
- (c) The Contractor shall place a reference peg alongside each sight rail, take the levels and give their values to the Engineer.
- (d) Unless otherwise approved by the Engineer the excavation of trenches shall commence from the lower reaches of the trench system and proceed uphill. The total length of the open trench in advance of the backfilled trench shall be restricted to a maximum of 200m.
- (e) Should the Contractor excavate to a greater depth than specified, he shall, at his own expense, replace the excess material so removed with selected fill compacted to 93% Mod. AASHTO density, or grade 10/26 concrete, if the use of selected fill is not practical.
- (f) Where site conditions permit, all materials excavated and required for backfilling shall be

removed and neatly stacked where possible along the higher side of the trench, care being taken to restrict the area so occupied so as to cause the minimum of obstruction. Care shall be taken to protect existing structures such as walls, fences, gateways and also hedges, trees, gardens, etc., from damage by material so stacked.

Trench Bottom

- (a) For welded steel pipes, the trench shall be widened and deepened over a suitable length at the joints to provide a minimum clearance of 500mm on each side of and beneath the pipe to allow working space for the jointing. This additional excavation is to be included in the tendered rates.

PSDB 5.6 BACKFILLING

PSDB 5.6.3 DISPOSAL OF SOFT MATERIAL

Add the following:

Material which the Engineer considers to be unsuitable for the bottom of the trench shall be excavated to depths as instructed and disposed of as surplus material. The resultant space shall be refilled, as ordered, with approved material and compacted to a 93% Mod. AASHTO density.

PSDB 5.7 COMPACTION

Add the following:

The unit rate for excavation and backfilling in all materials shall include for compacting backfill to 93% Mod. AASHTO density.

PSDB 5.7.2 AREAS SUBJECT TO TRAFFIC LOADING

Replace with the following:

Backfill material shall be compacted to at least 98% Mod. AASHTO + 0.5 S (S = standard deviation). This compaction is only required where the trench is subject to vehicular traffic. Where the trench is not subject to vehicular traffic, compaction shall be to 93% Mod. AASHTO. The additional compactive effort required to meet this requirement is measured under a separate item in the Schedule of Quantities.

- (a) Backfill materials such as cohesionless sand (Umgeni sand or similar, which is easily eroded) are not permitted.
- (b) Bedding materials such as Umgeni sand or similar approved non-cohesive materials shall be compacted to 100% Mod. AASHTO by full saturation or similar methods approved by the Engineer, it being noted that the Contractor shall take all necessary precautions, at his own cost, to prevent the pipes from floating. Compaction of bedding materials to 100 % Mod. AASHTO is required for the entire contract. All costs for providing the water required for the saturation of the material shall be included in the tendered rates.
- (d) Backfill materials for the road crossings shall be unspecified base crushed stone, which the Contractor will be required to obtain from a commercial source. Compaction of the material shall be to at least 96 % Mod. AASHTO + 0.5 S. In addition, the backfill material shall be stabilised by the addition of 2 pockets of cement per cubic metre of backfill.
- (e) In areas where normal compaction is ineffective and/or subsoil seepage is evident, 300mm of the unsuitable material must be replaced with 300mm of approved granular material as directed by the Engineer.

PSDB 5.7.3 SUBSISTENCE POST TRENCH FILLING

Add the following:

Should any subsidence take place in any trench after filling and should the Contractor fail to attend to such settlement within 4 hours of being instructed to do so by the Engineer, then the Employer may take whatever steps are necessary such as erection of barricades, importing fill material, etc., at the Contractor's expense and without relieving him of any of his responsibilities under this contract.

PSDB 7 TESTING

Add the following to DB 7.1:

PSDB 7.1.1 QUALITY CONTROL RECORDS

The Contractor shall maintain accurate and up-to-date records of all materials, processes, process parameters and measurements necessary to ensure compliance with this specification.

The Contractor's quality control records shall be available for inspection at all times. Copies of these records shall be made available on request.

PSDB 7.1.2 QUALITY SUREVILLANCE

The Engineer may appoint an independent body to carry out Quality Surveillance on its behalf. The Contractor shall provide all facilities and access to works at all reasonable times as may be necessary for the independent body to carry out its function.

Quality Surveillance will be undertaken by the Engineer:

- a) when requested by the Contractor
- b) at the discretion of the Engineer after reviewing the results of the control testing.

Advance notice of a minimum of 8 normal working hours shall be given by the Contractor to the Engineer when requesting inspection of any portion of the works for acceptance, and a minimum of 3 working days before commencement of the contract is required.

Notwithstanding any surveillance carried out by the Engineer, the Contractor shall retain full responsibility for the quality of all trench compaction carried out under the contract.

PSDB 7.1.3 DENSITY READINGS

Density readings will be taken at random over the layer. The layer is acceptable should the Quality Surveillance fulfil the following requirements:

$$X \geq A \% + 0,5S$$

where :

X = Arithmetic mean of density readings for the layer.

A = Percentage Mod. AASHTO as defined in the specification for the layer.

S = Standard deviation.

The compaction control testing shall be carried out by the Contractor.

Density

Position	Roadways, Sidewalks	Other Locations
Trench formation	1 No. per 30 linear m	1 No. per 100 linear m
Bedding Cradle & Selected Fill Blanket	2 No. per 30 linear m	1 No. per 100 linear m
Backfill	1 No. per layer per 15m ² or part hereof	1 No. per 2 layers per 50m ² or part hereof

The positions of the tests shall be selected by the Engineer.

The cost of all control testing is covered under the Preliminary and General section of the Schedule of Quantities.

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.1 BASIC PRINCIPLES

Add the following to DB 8.1.2

Separate items shall be scheduled for excavation to accommodate differing pipe sizes when measured by length and also for each length of trench with various depth horizons starting with 0 to 1,5m depth and thereafter in 0,5m increments.

PSDB 8.2 COMPUTATION OF QUANTITIES

PSDB 8.2.4 Add the following:

Except where shoring is specifically ordered or approved by the Engineer, the cost of shoring used, as well as the cost of any additional excavations required to install the shoring, will be deemed to be included in the rates tendered for the excavations.

PSDB 8.3 SCHEDULED ITEMS

PSDB 8.3.2 EXCAVATION

- a) Excavate in all materials, for trenches, backfill compact, and dispose of surplus material

REPLACE “of 1,0 m” IN THE FIRST SENTENCE OF 8.3.2(a) WITH :

“as specified in the Schedule of Quantities”.

- b) Extra over item (a) above for:

ADD THE FOLLOWING AT THE END OF THE EXISTING SUB-ITEM 2:

“No payments will be made under sub-items (1) and (2) in respect of any materials measured and paid for under sub-item 3 below.”

AND ADD THE FOLLOWING NEW SUB-ITEMS IN 8.3.2(b) :

- (3) Hand excavation where ordered by the Engineer in:

(a) Soft material	Unit: m ³
(b) Intermediate material	Unit: m ³
(c) Hard material	Unit: m ³

The unit of measurement shall be the cubic metre of material, measured in place according to the authorised dimensions, which was excavated by hand on the specific prior written instructions of the Engineer; provided always that the Engineer's said instruction shall have stated that measurement and payment for such hand excavation will be in accordance with this item.

The tendered rate shall include full compensation for the additional cost, effort and time resulting from excavating in the respective materials using hand methods only.

The Engineer shall not be obliged to authorise payment under this item in respect of any hand excavation carried out (whether ordered in writing or otherwise), which hand excavation was in any case necessary to achieve compliance by the Contractor of his obligations under the Contract to :

- 1) Utilise construction appropriate to the nature of the specific parts of the Works and/or
- 2) Protect existing structures and/or services; and/or
- 3) Comply with all prevailing legislation and regulations.

- (4) Backfill stabilised with 5% cement where directed by the Engineer Unit: m³

The unit of measurement shall be the cubic metre of backfill material, measured in place after compaction according to the authorised dimensions, which was stabilised on the Engineer's instructions in accordance with Sub-clause PSDB 3.5(c).

The tendered rate shall include full compensation for supplying the cement and for selecting, mixing, backfilling and compacting the stabilised material to 93% of modified AASHTO density.

- (5) Soilcrete backfill where directed by the Engineer Unit : m³

The unit of measurement shall be the cubic metre of soilcrete placed on the Engineer's instructions in accordance with Sub-clause PSDB 3.5(d), measured in place according to the authorised dimensions.

The tendered rate shall include full compensation for supplying the cement and for selecting, mixing and placing the soilcrete as well as for the cost of shuttering if required."

ADD THE FOLLOWING SUB-ITEMS IN 8.3.2 AFTER SUB-ITEM 8.3.2(c):

- (d) Excavate in all materials for stormwater inlet and outlet structures and for manholes, catchpits, valve chambers and the like, irrespective of depth and backfill around structures: Unit: m³

The unit of measurement shall be the cubic metre of material excavated, measured in place according to the authorised dimensions, and excluding the volume of material excavated and paid for under sub-item (a).

The tendered rate shall include the costs of excavating all materials, backfilling, compacting, trimming and tidying of the final surface around the structure, disposing of surplus and unsuitable materials within the freehaul distance and, where applicable, selecting and keeping separate, excavated material suitable for use as backfill.

(e) Excavate open drains in all materials Unit: m³

The tendered rates shall include full compensation for excavating in all materials within the dimensions specified or authorised by the Engineer and to the specified lines and profiles, for the disposal of surplus and unsuitable excavated material where applicable, and in the case of item (d), for backfilling with suitable approved material compacted to 93% of modified AASHTO density around the structures.

(f) Extra-over sub-items (d) and (e) for excavating in:

(1) Intermediate material Unit: m³

(2) Hard rock material Unit: m³

Measurement and payment shall be in accordance with the provisions of 8.3.2(b) of SABS 1200D (as amended)."

(g) All haulage shall be freehaul.

PSDB 8.3.3 EXCAVATION ANCILLARIES

PSDB 8.3.3.3 COMPACTION IN ROAD RESERVES

REPLACE THE HEADING OF THIS SUBITEM WITH THE FOLLOWING:

"PSDB 8.3.3.3 COMPACTION IN ROAD CROSSINGS"

AND REPLACE THE SENTENCE, "The volume will be measured as specified in 8.2.2, 8.2.3 and 8.3.3.1", WITH THE FOLLOWING:

"In the case of gravel roads, determining the volume, the depth will be measured from the underside of the gravel wearing course to the top of the fill blanket, and in the case of bitumen roads, from the underside of the subbase to the top of the fill blanket.

The rest of the trench shall be backfilled as specified in Clauses 5.9.3, 5.9.4 and 5.9.5, as applicable, and payment will be made under item 8.3.6.1."

PSDB 8.3.4 PARTICULAR ITEMS

Add the following as DB 8.3.4

The unit rate for trench shoring to remain in the excavation shall include for-

- (1) The supply and placement of trench shoring and other support measures;
- (2) Maintenance; and
- (3) Additional costs for backfilling and compaction with trench supports left in the trench.

Add the following new clause:

PSDB 8.3.8 EXCAVATION BY HAND AND BACKFILL

The Contractor shall excavate by hand and backfill in pipe trenches where ordered by the Engineer.

The unit of measurement shall be per cubic metre (m³)

Add the following new clause:

Add the following new clause:

PSDB 8.3.9 PROVING OF EXISTING SERVICES

The Contractor shall excavate by hand to prove existing services where a trench intersects with an existing service.

The unit of measurement shall be per cubic metre (m³)

Add the following new clause:

PSDB 8.3.10 BARRICADING OF OPEN TRENCHES

The Contractor shall erect temporary barricading to prevent visibility and unwanted access into any open pipe trenches. The Contractor shall ensure that the rate includes purchasing, storing, erecting and dismantling the temporary barricades

The unit of measurement shall be per metre (m)

Add the following new clause:

PSDB 9 SOILCRETE

Soilcrete shall consist of an approved soil or gravel mixed with 5 % by mass of Portland Cement and only sufficient water to give it a consistency that will permit the soilcrete to be placed, using vibrators. The material used for soilcrete shall be sandy granular material of the following specifications:

Minimum Grading Modulus: 1,2

Maximum Plasticity Index: 10 %

Maximum particle size: 38 mm

Detrimental percentages of silt and clay shall be avoided.

The soilcrete shall be mixed on site using suitable concrete mixers, and the water and cement contents shall be carefully controlled. It shall be placed and thoroughly compacted by means of concrete vibrators so that all voids are filled.

The unit of measurement shall be the cubic metre (m³). The unit rate shall also include for-

- (1) supply of cement and any other materials required;
- (2) All mixing and processing of the material; and
- (3) Complying with any restriction.

PSF PILING (SANS 1200 F-1983)

PSF 7 TESTS

Add the following new clause:

PSF 7.9 APPROVAL

Test piles shall be installed to the same dimensions, using the same methods, personnel, plant, equipment and materials envisaged for production piles, and the installation shall be witnessed by the Employer's representative, and the operation shall be fully documented. The results shall provide the required installation parameters and procedures for compiling the method statements for the production piles. Production piling shall not commence until the Employer's representative has assessed the results, and the contractor shall allow a minimum of 4 weeks after supplying such results for review.

It should be noted that concrete and grout mix design proposals are required to be submitted to the Employer's representative for approval 6 weeks prior to placement for the test pile.

A method statement describing every facet of installation shall be presented to the Employer's representative for his approval, 3 weeks prior to commencement of test piles.

PSF 8 MEASUREMENT AND PAYMENT

Add the following new payment item:

PSF 8.2.27.1 INSTALL MILD STEEL TUBES

The unit of measurement for this item, for the 85 mm nominal diameter mild steel tubes, shall be the metre of approved 3,0 mm thick tubes provided and installed into all designated piles of diameters in accordance with the specification.

The tendered rate shall include full compensation for all materials, plant and equipment required for the installation of the tubes in the designated piles as specified.

Add the following new payment item:

PSF 8.2.27.2 CONDUCT IMPACT FREQUENCY RESPONSE TESTS

The unit of measurement for this item, Impact Frequency Response tests, shall be the number of designated piles tested by the IFR method

The tendered rate shall include full compensation for the establishment on site, procurement, preparation, conducting and supervising the tests and full compensation for the proper evaluation and reporting of the results and findings of the IFR consultant to the Engineer.

Add the following new clause:

PSF 8.2.27.3 CROSS-HOLE SONIC LOGGING TESTS

The unit of measurement for this item, CSL tests, shall be the metre of pile shaft fully tested (for all designated piles) using the Cross-Hole Sonic Logging method.

The tendered rate shall include full compensation for the establishment and removal of all specialised equipment and expert personnel, as well as for all materials, the preparation, execution and supervision of the testing, as well as for the evaluation and reporting of the results, and the interpreted findings/conclusions/recommendations of the CSL consultant to the Engineer.

PSG CONCRETE (STRUCTURAL) (SANS 1200 G-1982)

PSG 2 INTERPRETATIONS

PSG 2.1 SUPPORTING SPECIFICATIONS

Add the following:

SANS 50197-1 OR EN 197-1

SANS 1491 Part I : Ground granulated blastfurnace slag (GGBS)

SANS 1491 Part II : Pulverised Fly Ash (PFA)

SANS 1491 Part III: Condensed Silica Fume (CSF)

PSG 2.3 a) General

Adverse weather

Delete the figure “25°C” and replace with “30°C”

PSG 3 MATERIALS

PSG 3.1 APPROVAL OF MATERIALS

Add the following:

If during the progress of the work, the contractor desires to use materials of proportions other than those originally approved, or if in the opinion of the engineer or his representative, the materials from the sources originally approved change in characteristics, he shall provide evidence satisfactory to the engineer that the new materials and/or new combination of materials will produce concrete meeting the requirements of the specification and will not bring about unacceptable changes in the appearance or other characteristics of the structure. When any changes are made in terms of this subclause, they shall be made at the contractor's expense, and no extra payment will be allowed by reason of such change.

The drying shrinkage of both the fine and coarse aggregate, when tested in accordance with SANS 5836, shall not exceed the following limits:

1) For use in prestressed concrete, concrete bridge decks, slender columns and water retaining structures, the shrinkage of both fine and coarse aggregate shall not exceed 130 % of that of the reference aggregate.

2) For use in other reinforced concrete members, the shrinkage of the fine aggregate shall not exceed 175 % of that of the reference aggregate and the shrinkage of the coarse aggregate shall not exceed 150 % of that of the reference aggregate.

3) For use in mass concrete substructures and unreinforced concrete head walls and wing walls, the shrinkage of both the fine and coarse aggregate shall not exceed 200 % of that of the reference aggregate.

The drying shrinkage of concrete shall not exceed 0,040 %, when tested in accordance with the requirements of SANS 6085.

PSG 3.2 CEMENT

PSG 3.2.1 Applicable Specifications

Replace with the following:

No Ordinary Portland Cement having an equivalent sodium monoxide content (calculated as $\text{Na}_2\text{O} + 0.658 \text{ K}_2\text{O}$) exceeding 0.6% by mass of the cement may be used in any reinforced concrete other than in combination with an approved coarse aggregate, which has been shown by testing to be non-reactive in respect of potential alkali-aggregate reaction.

Cementitious binders shall, unless otherwise specified, be common cements that comply with SANS 50197-1 or be blends of certain common cements and extenders that comply with SANS 1491-1, SANS 1491-2 or SANS 1491-3,

Ground granulated blast furnace slag (GGBS) used on the Works shall be from a source to be approved by the Employer's Agent and shall comply with the requirements of SANS 1491 Part I, as amended.

The type of cement to be used in any concrete element shall take into account the environmental conditions and durability requirements at the location of the site of the works and shall be approved by the Employer's Agent.

PSG 3.2.2. Alternative Types of Cement

Pulverised Fly Ash (PFA) used on the Works shall be from a source to be approved by the Employer's Agent and shall comply with the requirements of SANS 1491 Part II, as amended.

Condensed Silica Fume (CSF) used on the Works shall be from a source to be approved by the Employer's Agent and shall comply with the requirements of SANS 1491 Part III, as amended.

The minimum content of cementitious material shall be not less than 325kg and not more than 400kg per cubic metre of concrete for ordinary Portland Cement or not more than 450kg per cubic meter when cements containing ground granulated blast furnace slag or Pulverised Fly Ash is used.

PSG 3.2.3. STORAGE OF CEMENT

Add the following:

No cement shall be stored on the site for a longer period than 28 days. After this period the Employer's Agent may call for tests to be carried out in accordance with SANS 50197-1 and 2 and if the cement complies it may be used. Cement, if not delivered in bulk for storage in an approved silo, must be stored in a separate room with a raised floor constructed of heavy planks supported on bricks, or similar. This room must be completely damp-proof and well ventilated. The cement sacks shall be closely stocked, not more than 12 sacks high, and shall not be stacked against the walls. The arrangements of stacking shall be such as to facilitate the cement being used in the same order in which it is received. Lumpy cement, broken pockets and sweepings shall not be used. Any bags of cement that show any degree of hydration or setting shall be removed from the site and replaced at the Contractor's expense.

PSG 3.3 WATER

Add the following:

Water shall be obtained from the city water supply where possible and shall be taken from any other source only on the approval of the engineer. Where there is reason to suspect the presence of harmful impurities, the engineer may require the contractor to submit the results of approved tests.

Water for curing of concrete shall not contain impurities in sufficient amount to cause discolouration of the concrete or produce etching of the surface.

No seawater or water containing salts shall be used.

No water shall be added on site to ready mix concrete prior to placing to improve workability. All concrete delivered to the site shall be checked for workability using the slump cone test, and any concrete with a measured slump outside the limit set by the design mix shall be rejected.

Water shall comply to SANS 51008.

PSG 3.4 AGGREGATES

PSG 3.4.1 APPLICABLE SPECIFICATIONS

Replace with the following:

Both the fine and coarse aggregate shall comply with the relevant requirements of SANS 1083.

The nominal coarse aggregate size in the structural concrete shall be in accordance with the specified class of concrete for each portion of the works.

Water demand of sand:

Sand with a water requirement in excess of 200l /m³ when made up into concrete with the intended mix proportions (including admixtures, if any) will not be allowed.

The drying shrinkage of both the fine and coarse aggregate, when tested in accordance with SANS 5836, shall not exceed the following limits:

For use in prestressed concrete, concrete bridge decks, slender columns and water retaining structures, the shrinkage of both fine and coarse aggregate shall not exceed 130% of that of the reference aggregate.

For use in other reinforced concrete members, the shrinkage of the fine aggregate shall not exceed 175% of that of the reference aggregate and the shrinkage of the coarse aggregate shall not exceed 150% of that of the reference aggregate.

For use in mass concrete substructures and unreinforced concrete head walls and wing walls, the shrinkage of both the fine and coarse aggregate shall not exceed 200% of that of the reference aggregate.

The drying shrinkage of concrete shall not exceed 0.040%, when tested in accordance with the requirements of SANS 6085.

PSG 3.4.2 Use of Plumbs

PSG 3.4.2 (g) Add new sub-clause:

The use of plumbs will not be permitted in any of the strength concrete specified on the Works.

PSG 3.4.4 Aggregate Quality

Add New Sub-Clause:

Records of grading analysis tests on all the aggregate shall be kept.

Fine aggregate must be clean, naturally occurring, siliceous sand or approved crushed rock. The broken shell content determined in accordance with SANS Method 5840 must not exceed 30% by mass.

In addition, for water retaining structures the following shall apply: fine aggregate grading is to comply with the table below. It may be necessary to blend two sands in order to meet the grading envelope.

The maximum variance of the fineness modulus (FM) of the fine aggregate shall not exceed 0.2. Revision to the submitted mix design must be carried out where this becomes unavoidable.

Sieve size (mm)	% passing
4.75	90-100
2.36	75-100
1.18	60-96
0.60	40-60
0.30	20-40
0.15	10-20
0.075	5-10 (5-20) *

* If crusher sand

The coarse aggregate shall all be retained on a screen with 4,75mm nominal aperture size with the exception of dust content, which shall not exceed 0.5% by mass. Flakiness indices determined in accordance with SANS Method 5847 must not exceed 30% in the case of 26.5mm aggregate size and 25% in the case of 19.0mm aggregate size respectively.

PSG 3.5 ADMIXTURES

PSG 3.5.1 APPROVAL OF ADMIXTURES REQUIRED

Add the following:

Admixtures may be used with the approval of the Employer's Agent in the design of concrete mixes to modify the properties of the plastic concrete.

The use of admixtures, which have a retarding effect on the rate of hydration of the cement, may not be used when the concrete temperatures are below 20°C.

A retarding admixture shall be used if the temperature of concrete mixes using cements of strength class 42.5 or higher is between 20°C to 30°C or where the ambient temperature is between 20°C to 30°C.

Admixtures containing chlorides shall not be used.

The Contractor must provide the following information for the approval of the Employer's Agent:

- The trade name of the admixture, its source and the manufacturers recommended method of use
- Typical dosage rates and possible detrimental effects of under-dosage or over-dosage.
- The method and accuracy of dispensing the admixture.

All admixtures for concrete shall comply with the requirements of SANS 50934, ASTM C260 or AASHTO M194.

PSG 4 PLANT

PSG 4.1 GENERAL

Add the following:

When considered necessary by the Engineer, stand-by equipment shall be available at short notice.

PSG 4.2 BATCHING PLANT

Add the following:

Reports on the calibration of weight batching plant, clearly stating the date of the test, shall be submitted to the Employer's Agent.

In addition, when concrete is being mixed for water retaining structures the following shall apply:

The batching of concrete shall be done by weigh batching only, volume batching will not be permitted.

The Contractor shall ensure, by regular examination, calibration and tests, that the batching system functions efficiently and accurately, and that hoppers and cement containers are kept dry and clean. Proof of examination and calibration, clearly stating date of test shall be submitted to the Employer's Agent.

No mixed concrete shall be deposited directly onto the ground prior to placing. A board or other suitable platform is to be provided onto which the mixed concrete can be deposited whilst it awaits placing.

Excess concrete from mixing shall be deposited in a designated area awaiting removal to an approved landfill site, or for use in the reservoir embankment.

The Contractor will contain wash water from cement mixing operations, by directing the water into a sump for collection. The material contained in the sump will be removed to an appropriate landfill site or included in the reservoir embankment.

PSG 4.3 MIXING PLANT

PSG 4.3.1 GENERAL REQUIREMENTS FOR MIXING PLANT

Add the following:

When considered necessary by the Engineer, a spare mixer shall be held in readiness to run on 15 minutes notice in case of breakdown of the mixer.

PSG 4.5 FORMWORK AND FALSEWORK

PSG 4.5.1 DESIGN

Add the following:

The design of the formwork and falsework shall be the responsibility of the Contractor and shall be designed and detailed by a registered professional engineer, if required by the special conditions of contract, and submitted for approval by the engineer. All joints shall be either horizontal or vertical.

The formwork shall be designed to limit deflection to a value not exceeding 1/360th of the span between supports.

Chamfer strips 25mm x 25mm shall be provided on all exposed edges.

The design of all proposed formwork and falsework shall be subject to the approval of the Engineer. Such approval shall in no way relieve the Contractor of his responsibility under the contract.

PSG 4.5.3 TIES

Add the following:

The spacing and method of fixing shutters and filling of voids shall be subject to the approval of the Employer's Agent.

For water-retaining structures:

- (a) If sacrificial metal ties are used, they are to be drilled out so as not to extend beyond 60mm of concrete surface on the wet side of the wall and 50mm on the outside.
- (b) If plastic sheaths are used to permit removal of the metal ties, the sheaths are to be removed and the holes are to be completely removed by using an oversized drill bit to ream out the holes.

PSG 5 CONSTRUCTION

PSG 5.1 REINFORCEMENT

PSG 5.1.1 BENDING

PSG 5.1.1.4 WELDING OF MILD STEEL

Add the following:

All welding of mild steel, where permitted, shall be in accordance with BS 5135.

PSG 5.1.2 FIXING

Add the following:

All reinforcement placed in structures within 5 km of the sea should be washed with clean, fresh water after placement in the formwork and not longer than 24 hrs prior to the casting of concrete.

The placing of bars on fresh layers of concrete, as work progresses, will not be permitted. No concrete shall be placed until the Engineer, or his representative has stated that he is satisfied that the reinforcement is correctly positioned as shown on the drawings.

PSG 5.1.3 COVER

Add the following:

All concrete cover blocks used shall be of semi-spherical shape. The concrete cover blocks used shall have the same characteristic 28-day compressive strength as that specified for the respective structural concrete elements. Cover blocks shall not be less than 7 days old at time of installation and shall have been cured by full immersion in water for a period of not less than 3 days.

The minimum cover shall be as specified on the drawings.

PSG 5.2 FORMWORK

The surface of the floor, the internal upper surface of all footings and the upper surface of the roof and the slabs over the valve chamber shall be finished in accordance with clause PSG 5.2.1.1 class 4 – Steel Float Finish.

The surface of the blinding layer shall be finished in accordance with clause PSG 5.2.1.1 Class 3 – Wood Float Finish

All exposed internal and external surfaces of pump station to be finished in accordance with clause PSG 5.2.1 Class 2 – rubbed finish.

The internal surfaces of all walls, columns and the underside of the roof and all exposed surfaces shall be finished in accordance with clause PSG 5.2.1 class 3a – Smooth Finish.

All surfaces in contact with backfill material may be finished in accordance with clause PSG 5.2.1 class 1 – Ordinary Surface Finish.

PSG 5.2.1 CLASSIFICATION OF FINISHES

Replace with the following:

Surface finishes to formed concrete faces shall be classified as hereunder –

Class 1: ordinary finish;

Class 2: rubbed finish;

Class 3: off the form finishes;

(a) smooth finishes,

(b) board marked finishes,

(c) special patterned finishes,

Class 4: exposed aggregate finishes;

(a) brushed and washed finishes,

(b) tooled finishes,

(c) sand blasted finish

(d) aggregate transfer finishes,

Class 5: applied finishes;

(a) rendered finishes,

(b) painted finishes.

Class 1 – Ordinary Surface Finish

This is the finish left on a concrete surface after the removal of the forms and the filling of all holes left by shuttering bolts and the repairs of all defects. The surface shall be true and even, free from stone pockets, depressions and projections.

Class 2 – Rubbed Finish

Immediately after removal of the shuttering all defects shall be made good and the rubbed finish shall be applied within three days as follows:

Class 3 – Off the Form Finishes

Off the form finishes require a very high standard in concrete quality, formwork and technique. The intention is that no after treatment other than treatment of boltholes (which should be placed with regulatory and precision) should be required. Forms shall be unblemished and panels regular. Joints shall be a feature of the pattern and shall be handled with care. Reinforcement cover blocks shall be of semi-spherical shape to minimise their appearance on the finished surface.

- a) Smooth finishes may be obtained from non-absorptive linings to forms, form plywood, shutter board, or plastic faced board in new condition.

Board marked finishes shall be obtained from the use of timber planks, which shall be dressed and thickened unless otherwise specified. When un-planed timber is specified, boards with a

strong grain shall be mixed with boards with a less pronounced grain and not grouped together. The Employer's Agent shall indicate if all boards are not to be horizontal and a patterned panel effect is required.

Special patterned finishes are required to reflect without blemish the surface of patterned hardboard, rubber, thermoplastic or other lining as specified.

Class 4 – Exposed Aggregate Finishes

The purpose of these finishes is to relieve the uniform colour and texture of the concrete by exposing the aggregate, which shall be the normal size concrete aggregate except where otherwise specified. Attention is directed to the necessity for allowing for the material to be removed and ensuring that the requisite cover to reinforcement is maintained.

Tooled finishes may be carried out by the use of bush-hammers, light mechanical chisels or other approved tools, preferably mechanically operated. No tooling shall be done until the concrete has attained an age of at least 14 days after casting when normal Portland cement has been used and 7 days when rapid hardening cement has been used, or longer as may be necessary to prevent the aggregate particles from being dislodged.

The final finish shall show a surface of evenly distributed coarse aggregate particles set in a matrix of mortar, each aggregate particle being in slight relief. After the tooling has been completed, the surface so treated shall be scrubbed down with a stiff brush and washed with water.

Sand blasted finishes shall be obtained by sand blasting the thoroughly cured concrete surface of the same ages as given under (b) Tooled Finishes with hard sharp sand to produce an even, fine, clean surface in which the mortar has been cut away, leaving the coarse aggregate exposed.

Aggregate transfer finishes may be affected by sticking a single layer of selected aggregate onto plyboard or other suitable form liners which have been cut to size and coated with a layer of water-soluble cellulose adhesive mixed with plaster sand. This layer should be just thinner than half the average least dimension of the aggregate. When the glue is set the liners are placed in the forms which are then concreted, care being taken to protect the forms when placing and compacting. Liners shall be stripped after at least 3 days and the adhesive and sand covering the aggregate removed by scrubbing and washing. It is essential that all surfaces on which applied finishes are to be used shall be sound, clean and free of mould oil. Defects shall first be made good.

- a) Rendered finishes require a good key. Unless otherwise specified this may be provided by flicking on to the previously soaked and still moist surface of 1 part cement to 2 parts of sharp sand. This shall be left untouched apart from curing.

The render coat shall consist of 1 part Portland cement, or Portland cement 15, ½ part slaked lime, 4 to 4½ parts of sand by volume and shall not be less than 5mm or more than 16mm in thickness.

If a second coat is required because of the irregularity of the concrete. The surface of the first coat shall be combed with uniform wavy lines to provide a key after it has begun to harden. The second coat may be applied the next day. If a scraped finish is specified the rendering shall be lightly scraped to achieve the desired effect with an old tenon saw blade or similar implement, after it has attained a biscuit like crispness. It shall then be lightly brushed and washed to remove loose particles.

All rendered finishes shall be cured.

Painted finishes of the type specified shall be applied strictly in accordance with the paint manufacturer's instructions. Very smooth surfaces shall be acid washed, lightly sand blasted or rubbed with abrasive stones before being painted. Painting shall be delayed as long as possible and two coats applied unless otherwise specified.

PSG 5.2.1.1 CONCRETE UPPER SURFACE FINISHES

Classification

Surface finishes to exposed (non-formed) concrete faces shall be classified as hereunder:

Class 1 – screeded finish

Class 2 – broomed finish

Class 3 – wood float finish

Class 4 – steel trowel finish

Class 1 – Screeded Finish

Immediately after placing, the concrete shall be screeded with a true edged wooden board working between forms or other guides set accurately to line and level. No mortar shall be added, and noticeable surface irregularities caused by the displacement of coarse aggregate shall be made good by re-screeding after removing or tamping down the interfering aggregate.

Class 2 – Broomed Finish

Immediately after placing, the concrete shall be screeded as in Class 1. Thereafter, when the concrete has begun to dry, the surface shall be broomed with a stiff broom or brush to expose the aggregate. Dust and loose particles shall be gently washed away once the desired relief has been obtained.

Class 3 – Wood Float Finish

Immediately after placing, the concrete shall be screeded as in Class 1. Thereafter, when the concrete has begun to dry, the surface shall be brought to a smooth and even finish using a wood float and including any additional 4:1 sand and cement as necessary.

Class 4 – Steel Float Finish

Immediately after placing, the concrete shall be screeded as in Class 1. Thereafter, when the concrete has begun to dry, the surface shall be brought to a smooth and even finish using a steel float and including any additional 4:1 sand and cement as necessary.

PSG 5.2.2 PREPARATION OF FORMWORK

Add the following:

Shutter release oil or any other contaminants will not be permitted on any of the reinforcing steel.

Wedges and clamps shall be used in preference to nails for securing the form components, and wire ties or tie bolts in reinforced concrete must be capable of complete removal after use, except as otherwise specified. Where oil is used, it shall be applied before any reinforcement is placed in position.

PSG 5.2.5 REMOVAL OF FORMWORK

PSG 5.2.5.2 REPLACE THE ENTIRE CONTENTS WITH THE FOLLOWING:

Where test cubes to determine stripping times are not made, the minimum periods, which shall elapse between the time of the placing of the concrete and the time of removal of the forms shall, unless otherwise agreed with the engineer, be in accordance with the table hereunder, where each day covers a full 24-hour period.

Minimum stripping time in days.

	CEM I	CEM I	CEM II/A & CEM II/ B (MAX 29% EXTENDER)	CEM II/A & CEM II/ B (MAX 29% EXTENDER)	CEMII/B (30-35% EXTENDER)	CEMII/B (30-35% EXTENDER)
TYPE OF STRUCTURAL MEMBER OR FORMWORK	Normal weather (Above 15° C)*	Cold weather (Below 5° C)*	Normal weather (Above 15° C)*	Cold weather (Below 5° C)*	Normal weather (Above 15° C)*	Cold weather (Below 5° C)*
Beam sides, wall or unloaded columns	1	2	2	4	2	6
Slabs, with props left underneath	4	7	5	8	6	10
Beam soffits, props left under	7	12	8	14	10	17
Removal of slab props	10	17	10	17	12	21
Removal of beam props	14	21	14	21	18	28

Average daily temperature of the atmosphere adjacent to the concrete as measured by a maximum and minimum thermometer. When the average daily temperature is between 5°C and 15°C, the minimum stripping times shall be interpolated from the table.

The table assumes that the member concerned is not subjected to any heavy construction loads and that the total force to be supported is not more than half the design load. Where heavier loads are to be carried, no stripping of soffits shall be permitted until the concrete has attained its full strength. Any days during which the average temperature was below 2°C shall be completely disregarded.

In the case of walls and columns, the stripping times shall be determined by means of cube test results in the first instance, so as to ensure that no damage is caused to the structures by removing formwork.

Add the following new clause:

PSG 5.2.5.6 THERMAL SHOCK AND THERMAL CONTRACTION

When it is possible that a temperature differential of 200 °C or more may exist within the concrete or between the concrete surface and its surroundings, special precautions shall be taken by the Contractor to avoid thermal shock or thermal contraction cracking.

In order to minimise and control cracking that may result from temperature changes in the structure, it is desirable that the contractor seek the advice of specialists in the field of concrete technology and their recommendations regarding the control of cracking be implemented within the guidelines provided in the specification.

PSG 5.3 HOLES, CHASES AND FIXING BLOCKS

Add to the Sub-Clause:

Fixing blocks for the attachment of fixtures may be embedded in concrete provided that the strength or any other desirable feature (such as appearance) is not in the opinion of the Employer's Agent, thereby impaired.

PSG 5.4 PIPES AND CONDUITS

Add the following:

The clear space between pipes of any kind embedded in reinforced concrete and the clear space between such pipes and reinforcement shall not at any point be less than 40 mm, or 5 mm plus the maximum size of coarse aggregate, whichever is the greater.

The puddle flanged inlet, outlet, drainage and scour pipes shall be fixed in line and position under and in the walls by the Contractor as shown on the drawings. All pipework shall be cast into walls at the time of pouring. The use of “windows” to cast in pipework at a later date shall not be permitted.

PSG 5.5 CONCRETE

PSG 5.5.1 QUALITY

PSG 5.5.1.1 GENERAL

Add the following:

The exposure conditions at the site of the Works are to be considered as being severe.

The concrete shall, where stated, also comply with the requirements for Durability stated in P.S.G 7.3.8

PSG 5.5.1.4 CHLORIDE CONTENT

Replace the entire contents of the clause with:

The chloride content, measured as Cl⁻, of all concrete in the structure, as measured by BS 1881:124:1988, shall not exceed 0.2% mass cement.

The maximum chloride content of fine aggregate shall be 0.2 % by mass as Cl⁻ as measured by SANS Method 830:1976.

PSG 5.5.1.5 DURABILITY

Add to the Sub-Clause:

The exposure conditions at the site of the Works are to be considered as being severe.

PSG 5.5.1.6 PRESCRIBED MIX CONCRETE

Delete the Sub-Clause and substitute the following:

Unless the Design mix is detailed on the drawings or in the Specification, all concrete shall be Strength concrete.

PSG 5.5.1.7 STRENGTH CONCRETE

Add the following:

Unless otherwise agreed to by the Employer's Agent, the concrete mix is to be designed by an approved laboratory.

At least four weeks before placing any concrete on the Works, the Contractor shall supply and deliver to the approved laboratory, at their own cost, samples of the aggregates he proposes to use in the concrete mix

The minimum content of combined cementitious material shall not be less than 325kg/m³ and the maximum water/cement ratio shall be 0.5. The Contractor shall also submit for

approval the proposed slumps and the proportions in which he proposes to use the materials for each grade of concrete in each type of construction.

In addition, the Contractor shall state the minimum cement / water ratio in terms of total water in the mix for each grade of concrete, and the use of any admixtures.

No structural concrete shall be placed on the job until the contractor has satisfied the Employer's Agent as to the suitability of the mixes concerned.

The laboratory will be bound by the requirements of this Specification which are to guide the Contractor in pricing the grade of strength concrete. The Contractor is to allow in their rate for strength concrete an amount to cover the fees and charges levied by the approved laboratory in designing the strength concrete mix.

Add the following new clause:

PSG 5.5.1.8 BLEEDING

Concrete shall be so proportioned, and the materials so selected that bleeding is kept below 0.30 mm/cm² as measured by the ASTM C232 – 99 test.

Add the following new clause:

PSG 5.5.1.9 SHRINKAGE

The drying shrinkage of concrete shall not exceed 0.040%, when tested in accordance with the requirements of SANS 6085.

Add the following new clause:

PSG.5.5.1.10 TEMPERATURE AND HYDRATION OF CONCRETE

The temperature of the concrete shall be measured when it is delivered to site from a batch plant or a concrete supplier and shall be within the range 10°C and 30°C. Concrete which has a temperature outside of that range shall not be placed in the structure.

If slump loss occurs more than two hours after mixing, the concrete shall be rejected.

Care must also be taken not to cast concrete onto hot steel shutters as this might induce cracking.

The rate of hydration of the cement in the concrete shall be such that the concrete can be placed and properly compacted, 2 hours after the addition of water to the mix even in hot weather. Conversely, the initial set of the concrete must not be unduly delayed by low temperature, inappropriate use of admixtures or cement type, so that bleeding is promoted.

Add the following new clause:

PSG 5.5.1.11 NO FINES CONCRETE

No-Fines concrete shall be composed of cement and coarse aggregate only, the fine aggregate being omitted from the mix.

The stone shall comply with the grading requirements of 19mm single-sized crushed stone to table 7 of SANS 1083.

Only sufficient water shall be added to the mix to produce a smooth grout to completely cover each and every particle of aggregate.

Portions may be varied on site with the approval of the Employer's Agent to obtain a more satisfactory result. The upper surface of the no-fines is to be finished off with a wood float to provide a smooth working surface while adding just sufficient dry mix mortar (1:8) to

close the upper surface of voids in order to prevent the ingress of foreign matter into the interstices.

No-Fines concrete shall be placed within 20 minutes of having been mixed and shall be rodded and hand tamped into position. The use of vibrators will not be permitted.

No traffic shall be permitted to traverse the surface of the no-fines concrete during the three days after placing and then only over planks or boards placed for that purpose.

PSG 5.5.2 BATCHING

PSG 5.5.2.1 CEMENT

Add the following:

No site blending of cement extenders will be permitted.

PSG 5.5.2.2 WATER

Replace with the following:

Dependable equipment shall be provided for measuring the mixing water either by mass or by volume to an accuracy within 2%.

The accuracy of the measuring device provided shall be checked whenever required by the Employer's Agent or their representative by allowing it to discharge into vessels of accurately known capacity.

The total quantity of water allowed for shall include the free water present in the aggregates. The moisture content of the fine aggregate shall be determined at the beginning and halfway through each concreting shift, after showers of rain or at such other intervals as may be required by the Employer's Agent.

PSG 5.5.2.3 AGGREGATES

Replace with the following:

Each size of aggregate shall be measured separately by weighing to an accuracy of 3% except where other methods are authorised or ordered by the Employer's Agent.

Where suitable volumetric methods of measuring proportions of aggregates are permitted, these shall be checked at regular intervals, and shall take full account of bulking of the fine aggregate as delivered to the mixer. These methods shall be designed in such a manner that the consistency of the mix shall be as readily controlled as for mechanical batching.

All measuring devices shall be maintained in good order and condition, and no build-up of material on any part of the equipment shall be permitted.

PSG 5.5.3 MIXING

PSG 5.5.3.1 MIXING AT CONSTRUCTION SITE

Add the following:

Mixing shall continue until there is a uniform distribution of the materials and the mixture is uniform in colour. The minimum period of mixing shall be not less than that recommended by the manufacturers at the recommended speed and not more than 30 minutes. The entire contents of the mixer shall be removed from the drum before the materials for the succeeding batch are loaded.

Where hand mixing is permitted, the quantities of cement used shall be increased by not less than 10% over those determined for the appropriate mix design. The concrete shall be mixed on a clean and watertight platform.

PSG 5.5.3.2 READY MIXED CONCRETE

Add the following:

The concrete batching plant is to be inspected by the Engineer for compliance with SANS tolerances, and his approval is to be obtained in writing before commencement of the concrete works.

A maximum delivery period of 90 minutes from the time water is added to the concrete mix to the actual discharge of concrete on site shall be permitted. The discharge period (including placing the concrete) shall not exceed 30 minutes.

The concrete slump of every truck shall be measured on delivery and shall comply with Clause SANS 1200 G 5.5.1.2 prior to any concrete from that truck is placed.

Where possible, dedicated truck drivers shall be used for the delivery of the concrete to the site.

A detailed computer printout of the constituents of the concrete mix from the batching plant is to be handed over to and retained by the Engineer's representative on site on arrival (i.e. truck registration, mix proportions and the time water was added to the mix). The masses of the concrete constituents of each truck shall be checked against those of those submitted with the trial mix, subject to the batching accuracy as specified in SANS 0100-2: 1992. The arrival time of each truck on site and the time that the concrete discharge is completed shall also be recorded by the engineer's representative. Before any ready-mixed concrete is used on the job, the contractor shall furnish the engineer with a copy of his letter to the suppliers in which he specified – t

- (i) the type of cement;
- (ii) the nominal maximum size of aggregate;
- (iii) the cement / water ratio;
- (iv) the required compressive strength;
- (v) the required slump at the time and place of delivery; and
- (vi) the type of additive.

All these properties shall be as specified in the contract documents.

When required the contractor shall satisfy the engineer that acceptable alternative means of supplying concrete have been arranged to be brought into operation in the event of disruption in the supply of concrete. In this connection, the engineer may require that the alternative means of supply shall commence if the disruption in the supply of ready-mixed concrete has lasted for an elapsed period of 1½ hours.

The use of ready-mixed concretes shall in no way relieve the contractor of any of his responsibilities for providing concrete complying with the specifications.

For grade 35/26 concrete, a CEM I or CEM II cement may be blended with pulverised fly ash (PFA) or ground granulated blastfurnace slag (GGBS) and/or condensed silica fume

(CSF), such that the combined cementitious material comprises not less than 60% cement clinker and a maximum of 40% of extender and/or other additional constituents by mass.

The minimum content of combined cementitious material shall not be less than 325kg/m³ and the maximum water/cement ratio shall be 0,5.

The contractor must submit the ready-mix suppliers concrete mix designs on a D2 Concrete Mix Design form for approval. The required backup documentation in the form of test results shall also be included and is to comply with SANS 1083. Failure to submit the required information will result in the rejection of the concrete mix. The contractor must allow sufficient time to receive the required information and submit it to the engineer for approval.

PSG 5.5.4 TRANSPORTATION

Add the following:

Containers for transporting concrete shall be cleaned of all hardened concrete and foreign material.

During transportation, the concrete shall be protected from wind and sun; shall be prevented from drying out or losing moisture and shall not be subjected to excessive jarring or jolting. Drying out may be prevented by the provision of covers and/or other protective devices.

PSG 5.5.5 PLACING

Add the following:

Where plums are permitted, they shall be deposited by hand.

Freshly placed concrete shall be protected from rain damage.

No concrete shall be placed if the air temperature in the shade is falling and is below 8°C or is rising and is below 5°C. Concreting shall not commence if the air temperature in the shade is above 35°C. The temperature of the concrete at the point of placing shall not exceed 30°C unless otherwise specified.

PSG 5.5.5.5 DROPPING OF CONCRETE (NEW HEADING)

Add to the Sub-Clause:

Dropping concrete freely will only be permitted if the Employer's Agent is satisfied that this is the only practical method of placing.

PSG 5.5.5.9 PUMPING OF CONCRETE

Delete the Sub-Clause and substitute the following:

The placing of concrete by pumping will not be permitted without the written approval of the Employer's Agent. The design concrete mix has to be approved by the Employer's Agent should pumping be allowed.

Add the following new clause:

PSG 5.5.5.10 BLINDING LAYER

Beneath all structural grades of concrete, or where shown on drawings or elsewhere if so ordered by the Employer's Agent, the bottom of the excavation is to be covered by a blinding layer (screed) in Grade 15MPa concrete to a minimum depth of 75mm to prevent disturbance

of the ground and to serve as an even, clean and accurately positioned working floor for setting steel and placing foundation concrete. This blinding layer shall be laid within a day after excavations have been taken out, trimmed to the required depths and have been inspected and approved by the Employer's Agent. Blinding concrete shall be measured per square metre and shall include for formwork and for a Wood Float Finish true to falls.

Add the following new clause:

PSG 5.5.5.11 CONTINUOUS POURS

Add new Sub-Clause:

In the case of continuous walls, these are to be cast in lifts of such height that each lift can be poured uninterrupted in one continuous operation over the entire perimeter of the wall. No vertical or inclined construction joints of any kind will be permitted in continuous walls unless they have been specifically ordered or authorized by the Employer's Agent.

The placing of concrete shall commence at convenient points on the perimeter of the wall and shall proceed both ways simultaneously so that fresh concrete meets fresh concrete. Any rest pauses, such as for meals, shall be avoided as far as possible, and the Contractor may be required by the Employer's Agent to make the operation continuous by working in shifts. A workable arrangement must be made before each concreting operation commences.

Add the following new clause:

PSG 5.5.5.12 STRUCTURAL CONCRETE

During the whole or any time that the placing of concrete is being carried out, the concreting operation shall be under the supervision of a suitably experienced person.

The wall footings shall be cast with wall starters to form a horizontal wall construction joint as shown on the drawings.

Once footings have attained a minimum strength of 18 MPa, but not later than 7 days, the construction of the next lift of concrete may commence.

At least 3 days shall elapse between the casting of concrete in between construction joints.

As soon as possible after the removal of the formwork in vertical joints or after the concrete has set in horizontal joints, the surface laitance of the concrete shall be removed in order to expose the large aggregate and leave a solid surface.

Openings may be left in the formwork on the outside face only for pouring and vibrating of the concrete, provided they are closed properly and do not impair the concrete finish.

When concreting walls, care shall be taken to ensure that there is no loose matter on the concrete surface and that it is slightly wetted in order to assist the new concrete adhering to the existing concrete.

The Contractor's attention is particularly drawn to the fact that the walls of the reservoir form part of a water retaining structure and that no honeycombing will be tolerated. In order to ensure this, the mix proportions of the first 250mm depth of concrete placed in contact with the horizontal joint may be adjusted, with the approval of the Engineer, by reducing the amount of coarse aggregate. The Engineer's representative may instruct the use of

trunking in placing the concrete to avoid losses of fines due to adherence to reinforcement and formwork. The concrete shall be placed evenly over the surface to be covered without reliance on vibration to transport it horizontally. Special care shall be given in order to ensure full compaction at waterstops. All construction joints indicated on the drawings must be adhered to.

The Contractor may propose alternative means of construction, which shall be subject to the approval of the Engineer. If the Engineer accepts any alternative means of construction, it shall in no way result in increased costs.

PSG 5.5.6 COMPACTION

Add the following new clause:

PSG 5.5.6.5 If required by the Engineer, concrete shall be re-worked by re-vibration 1 to 3 ½ hours after placing. The time shall be decided by the engineer, taking cognisance of the mix, the ambient temperature and the workability of the concrete.

PSG 5.5.7 CONSTRUCTION JOINTS

PSG 5.5.7.1 Add the following:

Any additional construction joints required by the contractor shall be approved by the engineer. Where “off the form” finishes are specified, joints shall be arranged to coincide with the edges of boards or panels wherever possible.

Only those construction joints shown on the drawings shall be measured and paid for. The contractor shall allow for in his pricing any additional construction joints that he may require.

PSG 5.5.7.3(b) CONSTRUCTION JOINTS WHEN CONCRETE IS MORE THAN 24 HOURS BUT NO MORE THAN 3 DAYS OLD

Replace with the following:

The surface of the concrete shall be sandblasted or chipped with a light hammer, swept clean and thoroughly wetted. In addition, the first layer of concrete placed in walls over a depth of approximately 250 mm shall be made richer by reducing the amount of coarse aggregate by 25%.

Add the following new clause:

PSG 5.5.7.4 PREPARATION OF CONSTRUCTION JOINTS

a) All horizontal and vertical construction joints shall be cleaned of all dirt and loose particles and shall be prepared to the satisfaction of the Engineer. Formed keys shall be provided if shown on the drawings or if instructed by the Engineer. All intersections of construction joints with concrete surfaces which will be exposed to view shall be made straight and level or plumb and shall be constructed to the details shown on the drawings.

b) The Contractor is to provide a compressor (with oil traps) on site for the whole period during which concreting is in progress, and this must be available for cleaning concrete faces prior to placing fresh concrete or pouring joints. The cost of this plant and operation is to be allowed for in the Contractor's rate for concrete.

c) “Blowing off” may generally be carried out on horizontal surfaces but, under special

circumstances approved by the Engineer, it may be carried out on vertical surfaces. The surface concrete to be prepared shall be between 4h and 8h old after completion of placing and shall be blown off using a mixture of air and water under a pressure of at least 500kPa or by using a high pressure water jet until all dirt, laitance, etc is removed and particles of clean coarse aggregate are exposed sufficiently to produce a rough surface. Any loose particles of coarse aggregate shall also be removed. The success of this method of preparation depends on selecting the correct time (dependant on the type of cement and atmospheric conditions) so that the concrete has set to just the necessary degree of hardness. The operation may therefore require to be undertaken outside normal working hours and at night. When the surfaces are at least 12h old any remaining loose or fine aggregate particles shall be washed off.

d) "Scabbling", which refers to the removal of all surface laitance plus roughening the concrete surface with hand tools in order to expose the coarse aggregate in a uniform pattern, is to be carried out on both horizontal and vertical surfaces. These areas should then be cleaned with a stiff brush under running water. The surfaces to be prepared in this manner shall be at least 12 hours old after mixing the concrete. At least 35% of the roughened surface area shall consist of exposed coarse aggregate.

e) All prepared surfaces shall be kept continuously wet until the next lift of fresh concrete is to be placed against them; the minimum time being 12 hours.

f) No fresh concrete shall be placed on the top surface of concrete which is laterally restrained (e.g. by formwork or by in-situ earth) while the bottom layer of concrete is between 3 hours and 12 hours old after mixing. No fresh concrete shall be placed on top of the concrete with an unrestrained lateral surface while the bottom layer of concrete is between 2 hours and 12 hours old after mixing.

A 1mm thick Hypalon bandage is to be used on walls less than 6,5m and a 2mm thick bandage is to be used on walls greater than 6,5m.

The construction joints on the top (and sides where detailed on the drawings) of the reservoir roof slab are to be sealed with a 75mm wide self-adhesive aluminium foil strip (Bostik "Ditsit" or similar approved) which shall be installed in accordance with the manufacturer's instructions. The "Ditsit" is to be taken over the edge of the roof slab and down the side of the wall for a distance of 500mm.

The construction joints on the soffit of the reservoir roof slab are to be sealed with 2 coats of a 75mm wide application of SikaTop-Seal 107 (or similar approved) applied in accordance with the manufacturer's recommendations. The soffit of the reservoir is to be ground down 1.5 to 2mm with an angle grinder and then wire brushed and sprayed clean with water. The slurry is to be applied to a damp surface.

Add the following new clause:

PSG 5.5.7.5 WATERSTOPS

Waterstops are to be placed in all wall and floor construction joints to the manufacturer's specification. The waterstop in the floor joints will be "rearguard" type "Expandite Supercast Rearguard R" or similar approved, and in the walls will be "dumbbell" type "Expandite Supercast Watafoil" or similar approved as specified on the drawings.

Waterstops, where specified, shall be placed or kept in position as shown on the drawing. Care shall be taken during concreting to ensure that waterstops are not displaced, bent over

or punctured.

All waterstops shall be manufactured from virgin polyvinyl chloride that complies with the following minimum performance requirements:

Tensile strength	12.2MPa	(min)
Elongation at break	250%	(min)
Water soluble content	0,15%	(max)
Softness (BS 2571)	38 to 50	

They shall be of the dumbbell type and eyeleted or supplied with metal clips for the purpose of accurately fixing the waterstop between the reinforcement.

In each construction joint, 150mm wide PVC waterstops shall be placed as shown on the drawings.

All intersection points shall be factory-made pieces.

All joints in straight lengths and between straight lengths and intersection places shall be hot welded in accordance with the manufacturer's instructions. Jointing other than by hot welding will not be permitted.

Waterstops shall be carefully positioned and tied to the reinforcement to prevent displacement. Every precaution shall be taken to ensure maximum compaction around the waterstop. The waterstops shall then be returned to their horizontal positions, ensuring that no voids are formed beneath them.

PSG 5.5.8 CURING AND PROTECTION

Replace entire contents of G 5.5.8 (d) with the following and remove G5.5.8 (e)

Freshly poured concrete surfaces not covered by shuttering shall be covered with an inner hessian membrane and an outer plastic membrane, free from rents and tears and lapping by not less than 150mm. The hessian and plastic membrane are to be firmly secured and kept flush to the concrete surface at all times.

The hessian membrane is to be kept continuously damp.

All curing activities shall be well managed and shall take place under the control of the quality control officer with all activities being logged against a quality control sheet in terms of the quality plan for the Contract

Add the following:

(f) retaining forms in place

(g) steam curing may be used on approval as specified by the Employer's Agent, provided that the rate of increase in temperature does not exceed more than 20°C per hour. Steam curing at higher than atmospheric pressure shall not be permitted if the concrete contains limestone aggregate. Humidity shall be kept between 90% and 100%.

(h) the use of curing compounds will not be permitted

(i) The use of alternative methods is subject to approval of the Employer's Agent.

Delete the last two sentences of G 5.5.8 and replace with:

Whatever method of curing is adopted, its application shall not cause permanent staining, contamination or marring of the surface of the concrete.

The minimum period of curing various types of cement shall be as follows:

1	2	3
Strength class of cement	Minimum curing period, d	
	Ambient temperature	
	15°C and higher	5°C and lower
42.5 R or higher	3	6
CEM I and CEM II A-S, D, P, Q, V, A, W, T, L, LL, M and blends of CEM I with 20% or less ground granulated blast-furnace slag or fly ash	7	14
CEM II B-S, P, Q, V, W, T, L, LL, M, CEM III, CEM IV, CEM V and blends of CEM I with more than 20% ground granulated blast-furnace slag or fly ash	10	20
NOTE When the ambient temperature is between 5°C and 15°C, the curing period shall be determined by interpolation between the given periods.		

During periods of extreme temperatures, these periods may be increased at the discretion of the Employer's Agent. The temperature of concrete shall be retained above 5°C for a period of 3 days after placement. Should the environment in which the concrete is placed be such that temperatures drop below 5°C in the concrete, then use shall be made of insulated formwork to retain the heat generated by cement hydration within the concrete.

Curing methods to be utilised for water retaining structures:

Concrete Element	Curing Method
Reservoir water tank floor slab	PSG 5.5.8, (d) *
Reservoir water tank walls	PSG 5.5.8. (f)*
Top surface reservoir roof slab	PSG 5.5.8 (d) *
Soffit of the reservoir roof slab	PSG 5.5.8 (f) *
Reservoir internal columns	PSG 5.5.8 (d)*or (i)

* - As amended

The rates for "Curing of Concrete" in the Schedule of Quantities will be paid to the Contractor on the successful outcome of the durability tests.

PSG 5.5.9 ADVERSE WEATHER CONDITIONS

PSG 5.5.9.2 Delete reference to 32° and replace with 30°C.

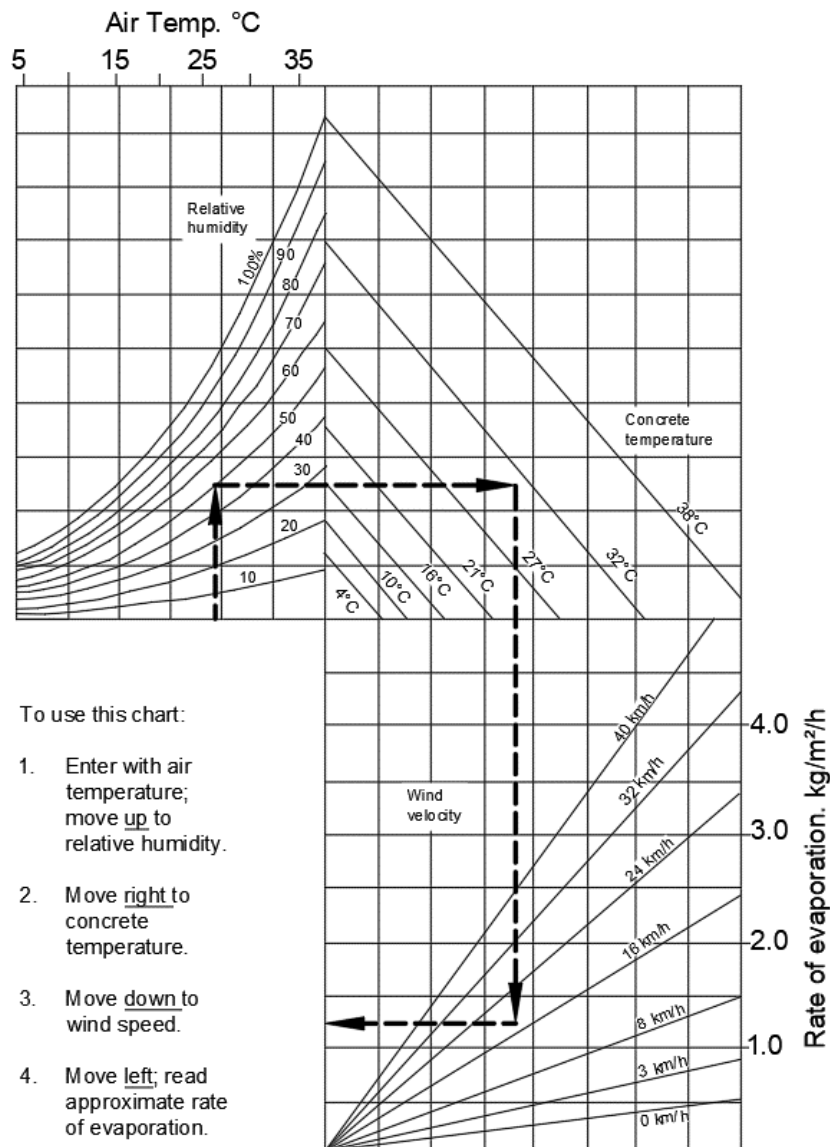
Add the following new clause:

PSG 5.5.9.4 WEATHER STATION

The Contractor is to provide equipment to monitor the light intensity, barometric pressure, humidity, precipitation, temperature, UV level, wind speed, wind direction and ultimately calculate evaporation rates at the site. The equipment must be able to record and store data for a minimum period of 60 days and have download capabilities. Data shall be downloaded by the Contractor and this data shall form part of the quality control data for the Contract.

The figure below taken from **ACI 305R-99, Hot Weather Concrete (2000)**, provides a graphical method for estimating the water loss due to evaporation in various weather

conditions and shall be used by the Contractor to determine and monitor the evaporation rate, particularly when planning for and during concrete placement. The windspeed, temperature and relative humidity shall be measured at least 2m above the evaporating surface.



If the rate of evaporation exceeds 0.5kg/m²/hour, the exposed concrete surfaces shall immediately be protected to prevent plastic cracking. It should be noted that plastic cracking may occur in cool weather with high wind velocities as well as in warmer weather conditions.

If in the opinion of the Employer's Agent, the weather conditions are too extreme and run the risk of adversely affecting the concrete, he may instruct the Contractor not to pour any more structural elements that day.

The Engineer may call for protection against the wind to be provided, or the finished concrete to be covered with a plastic sheet or a fog spray to be utilised. Similarly, if it appears likely to rain, the Engineer may instruct the Contractor not to pour any further concrete. An extension of time (without P& G costs) may be allowed at the Engineer's discretion for delays incurred due to inclement weather. Any additional costs for these delays and/or protective measures are to be allowed for in the Contractor's rates for concrete work.

PSG 5.5.10 CONCRETE SURFACES

PSG 5.5.10.2 Delete and replace with the following:

Where a wood-floated or steel-floated or power-floated finish or a screed topping or granolithic finish is required in terms of the project specification, the concrete shall, unless otherwise stated in the project specification to a degree of accuracy II:

Add the following new clause:

PSG 5.5.10.4 BLOWHOLES

The Contractor shall make every effort to prevent blowholes from appearing on the off-form smooth finish. All noticeable defects shall be repaired to the Engineer's satisfaction.

PSG 5.5.12 CONCRETE IN WET GROUND

Delete the Sub-Clause and substitute:

Where concrete has to be laid in wet ground (e.g. River crossings) steps must be taken to lower the water level to at least 150mm below the bottom level of the concrete, and such level must be maintained for a period of at least two days after the concrete has been poured.

The cost of any necessary drains, sumps and pumping etc. necessary to achieve this shall be included in the tendered rates for the construction work and no separate payment shall be made for such dewatering throughout the construction period.

The Contractor shall be fully responsible for keeping the excavations free from water whilst the construction work is being carried out. The methods by which he proposes to achieve this shall be approved by the Employer's Agent before being implemented.

PSG 5.5.13.1 GROUTING OF PIPES/SPECIALS THROUGH WALL (NEW SUB-CLAUSE)

Add new Sub-Clause:

Where entry holes for pipes/specials have been provided in the walls, the Contractor shall be responsible for the grouting 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 shuttering and boxing remaining in the holes
- Make any alterations required to the position and shape of the holes and reinforcing steel (lacing bars, etc) in the holes
- Thoroughly clean and scabble the sides of the holes so as to obtain satisfactory bond surface for the new concrete

After accurately positioning the pipes/specials in the respective holes, the Contractor shall fix the pipes/specials in a suitable manner to prevent movement.

Immediately prior to grouting being carried out by 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 12mm thick, of mortar consisting of 3 parts concrete sand and 1 part cement.

The concrete ingredients shall be mixed and placed as dry as possible to obtain a dense, waterproof concrete. Where a watertight seal is required, 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 any falling away from pipe/special surfaces of the concrete already placed.

- The hole shall when set, form a dense, homogeneous and waterproof mass.
- A spare vibrator with an independent power source shall be kept as a standby measure to ensure continuity of placing in the event of the breakdown of the duty vibrator.
- Smooth formwork that has been suitably strengthened for use with a vibrator shall be provided for facing the concrete around each pipe/special.

PSG 5.5.13.2 DRY-PACKED GROUT (NEW SUB-CLAUSE)

Add new Sub-Clause:

When dry-packed grout is specified under baseplates etc., only sufficient water shall be added to make the mixture ball when squeezed in the hand. Before any grouting is done with dry caulking, the surfaces between which the caulking is to be placed shall first be thoroughly cleaned and flushed with water.

All surplus visible water shall be wiped or blown away and the dry caulking shall be forcefully rammed or hammered into place using suitable tools. Exposed surfaces shall be finished off neatly with a trowel and extensive exposed areas shall be covered with wet sacking and kept damp for at least 24 hours.

Where additives are required for grouting operations, these shall be brought on to site in the manufacturer's unopened containers and used strictly in accordance with the manufacturer's instructions. The Contractor shall undertake preliminary tests to check the behaviour of proprietary additives under the conditions pertaining to the site.

PSG 5.5.13.3 EPOXY GROUT (EPOXY MORTAR TYPE ONLY) (NEW SUB-CLAUSE)

Add new Sub-Clause:

The manufacturer's instructions shall be observed when an epoxy grout is used.

PSG 5.5.14 DEFECTS

Replace the first line of G 5.5.14.1 with the following:

The concrete shall be homogeneous and free from honeycombing, interstices, planes of weakness and cracks.

Add the following to G 5.5.14.1:

The concrete for the water retaining structures (including the roof) shall be as dense as possible and no honeycombing permitted. If honeycombing is found to be a problem, the Contractor shall re-assess the concrete mix proportions and their concrete placing methods. No additional payment shall be made for adjustments to the concrete mix or placing methods.

Add the following to G 5.5.14.2

All authorized concrete repair work will be carried out as described below taking cognisance of the fact that repair mortars containing PVA Latexes shall not be used in any water retaining structures.

1 Honeycombing:

The area to receive patch material shall be primed with a bonding slurry (e.g. Sika MonoTop 610 or similar approved). The patch will then be built up while the slurry coat is still tacky by means of an approved cementitious polymer modified mortar (e.g. Sika MonoTop 615 HB Prostruct 528 or similar approved).

2 Shrinkage cracks:

A low viscosity solvent free structural epoxy resin is to be used to fill the cracks (e.g. Sikadur 52, ABE Epidermix 365/389 or similar approved).

Add the following new clause:

PSG 5.5.14.3 PATCHING AND REPAIR

Where defects do not warrant the removal of defective concrete, one or more of the following procedures shall be required by the engineer:

(a) Where the structural strength might be affected and must be restored, repairs may be

effected by the application of either pneumatically placed mortar or of a mortar made of silica sand and an approved epoxy formulation mixed and applied in accordance with the manufacturer's recommendations.

- (b) Where there are no fears as to structural strength, all defective material shall be chipped away until a dense, uniform surface of concrete exposing solid coarse aggregate is obtained. Feathered edges shall be cut away to from surfaces perpendicular to the concrete face. Seized shutter bolts shall be cut back to at least 35mm into the concrete. All loose material shall be hosed away, and the surface of the cavity shall be saturated with water for at least 3 hours, after which a thin layer of neat cement
- (c) mortar shall be applied to the surface. The cavity then shall be filled with stiff mortar mixed in the same proportions of cement to sand as that used in the original concrete. The mortar shall be thoroughly tamped into place in layers. The use of up to 30% white cement in place of the normal cement may be required to reduce the darker appearance of a patch. An interval of thirty minutes shall then elapse before a final surface tamping is given to the patch, after which the surface shall be treated to resemble the surrounding concrete as closely as possible. Board marks may be reproduced by striking a suitable piece of timber held against the plastic concrete. The patch shall be neat and workmanlike in appearance, and after completion, it shall be kept wet for a period of at least three days. The cost of repairing any defective concrete shall be to the Contractor's account.

The preparation, application and curing of the above repair materials shall all be in strict accordance with the Manufacturer's instructions.

Add the following new clause:

PSG 5.5.16 BLINDING CONCRETE

Blinding concrete shall be measured per cubic metre and shall include for a steel trowel finish true to falls.

Add the following new clause:

PSG 5.5.17 MANHOLE COVERS AND FRAMES (NEW SUB-CLAUSE)

Manhole frames are to be set into the concrete with the upper edge 10mm above the concrete level to prevent the entry of rainwater.

All areas of damaged galvanised surfaces are to be repaired using a cold galvanising system ('Zinga' or similar approved) as per manufacturer's instruction.

PSG 6 TOLERANCES

PSG 6.2 PERMISSIBLE DEVIATIONS

PSG 6.2.3(a) REPLACE WITH THE FOLLOWING:

Description	Permissible Deviation in mm		
	Degree of accuracy		
	III	II	I
Spacing between two adjacent bars	± 25	± 20	± 15
Dimensional position of bar	± 20	± 10	± 10
Longitudinal location of bends and ends of bars	± 40	± 30	± 20
Cover to reinforcement	0 + 20	0 + 20	0 ± 20

PSG 7 TESTS

PSG 7.1 FACILITIES AND FREQUENCY OF SAMPLING

PSG 7.1.2 FREQUENCY OF SAMPLING

PSG 7.1.2.2 REPLACE THE ENTIRE CONTENTS OF THE CLAUSE WITH:

The Contractor shall provide the following number of sets of three standard metric 150mm metal cube moulds for the volume of concrete poured as per the table below:

Table 4 - Frequency of compressive strength tests

Volume of pour (m ³)	Number of sets
0 – 25	2
26 – 50	4
51 – 100	6
101 – 200	8
+ 201	10 (or as required by the Engineer)

These sets of concrete cubes will be crushed when they are 7 and 28 days old.

Provide sufficient extra cube moulds for 3 days, 7 days, etc, crushing tests to be made as he so requires for his own purposes, i.e. for shutter stripping, post-stressing cables.

Make and cure all cubes on site under the supervision of the engineer, in accordance with SANS Method 863.

Be represented at the crushing test if he so wishes. Transport all cubes to the nominated laboratory between 7:30 am and 11 am on the last working day prior to the date of test. Only the results from this laboratory will be considered and will be the sole basis on which concrete is accepted or rejected.

PSG 7.1.2.4 Delete this sub-clause

PSG 7.2 TESTING

PSG 7.2.3 LABORATORY TESTING

Add to the Sub-Clause:

All test cubes shall be made, cured and tested in accordance with the requirements of SANS Standard Method 5863 and 5864.

Test cubes shall be cured in an approved curing tank.

Delivery of cubes for testing shall take place not less than 24 hours in advance of the specified time for testing.

The Contractor shall keep accurate records of the exact position in the structure of the concrete batch represented by the cube test. All costs connected with sampling and testing of concrete, as described in this section of the project specification, shall be included in the relevant strength concrete rates.

PSG 7.3 ACCEPTANCE CRITERIA FOR STRENGTH CONCRETE

Delete the entire contents of G 7.3.1 and G 7.3.2 and replace with:

PSG 7.3.1 The Contractor is hereby advised that the only basis on which concrete strength will be accepted or rejected is the 28-day cube strength obtained from cubes crushed at the nominated laboratory. Unless the conditions of sampling, cube manufacture, cube curing and record keeping are strictly adhered to, the test results will be meaningless. To this end, it is emphasised that the Contractor must strictly comply with all the concrete test methods specified in SANS Method 861.

Table 5 - Acceptance criteria for concrete strength

Acceptance Category	Strength C_s = Average minimum strength for 3 cubes at 28 days (MPa)
Characteristic strength for water retaining structures	35
Full acceptance	C_s ≥ 37
Conditional acceptable	33 ≤ C_s < 37
Rejection	C_s < 33

The descriptions given in the “Acceptance Categories” column above shall have the following meanings.

Full acceptance -

Concrete shall be accepted unconditionally, subject to the concrete meeting the durability and cover criteria.

Conditional acceptance -

Concrete shall be accepted with a warning that construction methods should be examined to improve the strength. A financial penalty of up to R75/m³ will be applied on a pro rata sliding scale for all concrete poured where the average strength (for 3 cubes at 28 days) test results fall within the conditional acceptable range.

Rejection -

At the discretion of the Engineer, the concrete shall be removed and replaced at the expense of the Contractor.

Core holes -

That test cores shall be drilled from the concrete and tested in accordance with the SANS Method 865 to determine the estimated actual strength and the estimated potential strength of the concrete.

If the results of the core tests show that the concrete meets the test requirements, the structure shall be accepted. If the core tests show that the concrete does not meet the strength requirements, an appropriate full-scale load test, as determined by the engineer, may be applied to the structure containing the defective concrete.

If load tests are, in the opinion of the engineer, impracticable, or where the portions of the structure subjected to such test fail to pass the test specified, he shall have the right to require strengthening or replacement of the portions of the structure concerned.

Upon removal of the core the hole is to be dampened and filled with a stiff mix of an expanding cementitious grout (Sika Grout G.P. or similar approved). Thereafter, an external slurry coat (0.25 x 0.25m) of a polymer modified cementitious coating (Sika Top-Seal 107 or similar approved) is to be applied over the exposed surface of the core hole.

PSG 7.3.5. REPLACEMENT OR STRENGTHENING OF CONCRETE

Delete after the words “the Contractor shall”, and insert

“Make adjustments in order to meet the specified requirements.”

Add the following new clause:

PSG 7.3.6. TABLE 8 – ACCEPTANCE CRITERIA FOR CONCRETE COVER

Acceptance Category	Concrete Cover (mm) (for specified cover of 50mm)
Full acceptance	$70 > C_d \geq 50$
Conditional acceptance	$45 \leq C_d < 50$
Acceptance with remedial measures	$40 \leq C_d < 45$
Rejection	$C_d < 40, C_d > 70$

The descriptions given in the “Acceptance Categories” column above shall have the following meanings.

Full acceptance: Concrete shall be accepted unconditionally, subject to the concrete meeting the strength and durability criteria.

Conditional acceptance: Concrete will be accepted with a warning that construction methods should be examined to improve the cover. A financial penalty of up to R15/m² will be applied on a pro rata sliding scale for each structural element where the average test results fall within the conditional acceptable range.

Acceptance with remedial - Concrete will be accepted if the Contractor measures and undertakes remedial work at his expense, as approved by the Engineer, to improve the durability of the concrete to the criterion described as “full acceptance”,

Rejection - At the discretion of the Engineer, the concrete shall be removed and replaced at the expense of the Contractor.

Notwithstanding Clause 7.6.3 of the General Condition of Contract (Removal of improper work and materials) and Clause 7.7.1 of GCC (Contractor to search), the onus will be on the Contractor to prove to the Engineer the extent of the concrete for which the durability and cover values fall below the Specified Values (in the above tables), and the cost of this searching is to be included in the Contractor's rates for concrete.

An item has been included in the Schedule of Quantities for the making good of core holes as directed by the Engineer.

Where the engineer or his representative has reason to doubt whether the concrete cover over the reinforcement is not in accordance with the requirements of clause PSG 5.1.3, the cover shall be tested with a cover meter. If necessary, the engineer or his representative shall then indicate to the contractor where he must expose the reinforcement to prove the depth of cover.

Add the following new clause:

PSG 7.3.7 COST OF TESTS

The costs of all tests required by the engineer or his representative shall be borne by the Employer, except that the costs of tests as set out hereunder shall be borne by the contractor-

- (a) preliminary tests on materials and mix proportions;
- (b) all tests as may be made necessary by reason of the provisions of clause SANS 1200 G 7.3.5;
- (c) such tests, including concrete coring and load tests, as may, in the opinion of the Engineer, be made necessary by failure on the part of the contractor to meet the requirements of this specification.

Add the following new clause:

PSG 7.3.8 DURABILITY INDEX TESTS

To ensure that the concrete has been placed, compacted and cured correctly, a number of tests will be carried out by a nominated laboratory on the concrete after curing has been completed, i.e. 26 to 30 days after placing the concrete.

- 1) A set of four 68mm diameter cores, 75mm in length, will be drilled at each test location through the covercrete (being the concrete layer between the outermost layer of steel reinforcement and the exposed outer surface of the concrete element) from the constructed concrete element when the concrete has reached 28 days of age. A slice (30mm thick) will then be cut from the outer surface of this core such that the slice is representative of the middle layer of the covercrete (i.e. the middle layer being a 30mm thick slice of concrete, 15mm from the exposed outer surface extending in towards the reinforcement) and tested for: -
 - 1.1) water sorptivity,
 - 1.2) oxygen permeability (tested in the Ballim apparatus), and
 - 1.3) chloride conductivity

The positions at which the cores will be extracted will be indicated by the Engineer.

The oxygen permeability and water sorptivity, and chloride conductivity test procedures shall be carried out in accordance with the following references:

- (1) Guide to the use of durability indexes for achieving durability in concrete structures. (Research Monograph No. 2)
- (2) Concrete durability index testing manual (Research Monograph No. 4)
- 2) The depth of concrete cover achieved will be measured to ensure that the specified values have been achieved.
- 3) The cost of these tests will be borne by the Employer if the results are equal to or exceed the specified value. The Contractor will pay for the tests if the results fall below the conditional acceptance range.

Table 7 - Acceptance criteria for durability testing of structural elements

Acceptance Category	Oxygen permeability index (log scale)	Water sorptivity (mm h)	Chloride Conductivity
Full acceptance	$O_p \geq 9.15$	$W_s \leq 8$	$C_c \leq 0.75$
Conditional acceptance	$9.15 \geq O_p > 9.0$	$8 < W_s \leq 12$	$0.75 < C_c \leq 1.50$
Acceptance with remedial measures	$9.0 \geq O_p > 8.75$	$12 < W_s \leq 15$	$1.50 < C_c \leq 2.50$
Rejection	$O_p < 8.75$	$W_s > 15$	$C_c > 2.50$

The descriptions given in the "Acceptance Categories" column above shall have the following meanings.

Full acceptance: Concrete shall be accepted unconditionally, subject to the concrete meeting the strength and cover criteria.

Conditional acceptance: Concrete will be accepted with a warning that construction methods should be examined to improve the durability. A financial penalty of up to R75/m³ will be applied on a pro rata sliding scale for each structural element where the average test results fall within the conditional acceptable

range.

Acceptance with remedial: Concrete will be accepted if the Contractor measures and undertakes remedial work at his expense, as approved by the Engineer, to improve the durability of the concrete to the criterion described as “full acceptance”,

Rejection: At the discretion of the Engineer, the concrete shall be removed and replaced at the expense of the Contractor.

Add the following new clause:

PSG 7.3.9 WATER TIGHTNESS TESTING

PSG 7.3.9.1 WATER TIGHTNESS TESTING AND DISINFECTION FOR RESERVOIR

Disinfection shall be carried out under the supervision of the Employer's Agent and the Employer and shall comply with Code of Practice for Disinfection of Potable Water Facilities. The Contractor shall keep the pipeline clean throughout the Contract by making use of end caps or other approved methods.

A hydraulic test shall be undertaken on the reservoir structure before backfilling and no backfilling will be permitted before this test and the acceptance of the structure for water tightness.

All interior surfaces of the reservoir shall be broomed, cleaned and hosed down and the cleaning water run to waste.

The reservoir shall then be filled slowly at a rate not exceeding 2m in 24 hours and allowed to stand for 7 days to allow absorption to take place. The Contractor shall allow for adding chemicals to sterilize the reservoir.

The water level will be taken thereafter every 24 hours for 7 days. A maximum drop in surface level of 10mm will be permitted over the full period of 7 days. Should the structure not stand this test the Employer's Agent may order a second test, and should this fail, the Contractor shall be responsible for finding the leaks and taking such measures as necessary and approved by the Employer's Agent to produce a satisfactory test.

Water for testing and disinfection shall be metered.

Water for the second and subsequent tests will be charged to the Contractor at current tariff rates.

The lump sum price for the hydraulic testing of the reservoir shall for cleaning all internal surfaces, adding chemicals and testing.

PSG 7.3.9.2 WATER TIGHTNESS TESTING FOR ROOF SLAB

Water tightness testing of the concrete roof / reservoir roof shall be undertaken upon completion, before filling of the reservoir, by flooding the roof and maintaining a minimum depth of 100mm for 72 hours.

If at any time during the water tightness test the roof shows any sign of water leakage or visible dampness on the soffit or perimeter walls it shall be deemed defective. Defective works shall be dealt with in accordance with the requirements of G 5.5.14, as amended.

PSG 7.3.9.3 WATER TIGHTNESS TEST FOR CHAMBERS AND BUILDINGS

Add new Sub-clause:

All reinforced concrete chambers and buildings shall be constructed watertight with bituminous sealing 1-part polyurethane hydrophilic sealant which swells when in contact with water to seal all types of construction joints and penetrations in concrete and 150mm wide self-adhesive bituminous tape suitable for buried conditions on external face of construction joints.

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 for 24 hours with continuously maintaining the chamber excavation working space periphery to ground level full of water for at least 4 hours. Should there be any noticeable leaks into the chamber, the Contractor shall carry out at their own expense whatever measures are necessary to waterproof the chamber to the Employer's Agent's satisfaction. On completion of successful water tightness test for the chamber, the Contractor shall dewater the excavation before backfilling around the chamber.

PSG 8 MEASUREMENT AND PAYMENT

PSG 8.4 SCHEDULED CONCRETE ITEMS

PSG 8.4.3 GRADE CONCRETE

Add the following:

The tendered rate shall also include the additional cost of cementitious crystalline admixture to concrete elements of the reservoir, in accordance with engineering drawings 60591/031_Rev 0 Sheet 2 to 4.

The unit of measurement shall be per cubic metre (m³)

PSG 8.4.7 CURING AND PROTECTION

Add the following:

The tendered rates shall include full compensation for the supply of all labour, plant and materials to ensure that all concrete shall be protected from contamination and loss of moisture by one or more of the curing and protection methods set out in Clause 5.5.8.

The unit of measurement shall be per square metre (m²)

PSG 8.5 JOINTS

Add the following:

The tendered rate shall include all plant, labour, materials and equipment to install joints on the reservoir elements in accordance with engineering drawing 60591/031_Rev 0 Sheet 4 and PSG 5.5.7.

Payment for this item will be per metre (m).

Add the following new clause:

PSG 8.9 HIGH TENSILE GALVANISED STEEL DOWEL BARS

The tendered rate shall include all plant, labour, materials, equipment, and incidentals to drill and

dowel 1 m long Y16 hot dip galvanized high -tensile steel bars, of 200mm into the existing concrete at 200mm centres in 2 layers, using a SABS-approved cementitious grout epoxy with a minimum of 50 MPa finished compressive strength, to connect new and existing portions of the reservoir.

Payment for this item will be per no. off.

Add the following new clause:

PSG 8.12 MISCELLANEOUS WORK OTHER THAN METAL WORK

The unit of measurement varies as scheduled for separate items.

Separate items will be scheduled for each type of miscellaneous work.

The tendered rates shall include full compensation for providing all labour, materials and equipment required to carry out the work, for all preparatory work, for constructing the work scheduled in a workmanlike manner and for finishing off and cleaning up when the work has been completed.

Add the following new clause:

PSG 8.13 WATER TIGHTNESS TESTING

The tendered rate shall include all plant, labour, materials, equipment, and time to conduct water-tightness testing on the reservoir structure in accordance with PSG 7.3.9

Payment for this item will be by way of a sum.

Add the following new clause:

PSG 8.14 APPLICATION OF CEMENTITIOUS CRYSTALLINE SLURRY INSIDE RESERVOIR

The rate shall include all plant, labour, materials, equipment, and specialist services required to apply PENETRON cementitious crystalline waterproofing coating, or similar approved, to a maximum 2mm thickness inside the existing concrete on the reservoir to improve durability.

The unit of measurement shall be per square metre (m²)

Add the following new clause:

PSG 8.15 APPLICATION OF CEMENTITIOUS CRYSTALLINE SLURRY INSIDE RESERVOIR

The rate shall include the cost of grouting around different sizes of pipework that passes through chamber walls.

The unit of measurement shall be per number (No.).

PSHA STRUCTURAL STEELWORK

PSHA 1 APPLICABLE SPECIFICATIONS:

SABS 1200 H: STRUCTURAL STEELWORK
SABS 1200 HC: CORROSION PROTECTION OF STRUCTURAL STEELWORK

PSHA 2 AMENDMENTS TO SUBCLAUSES OF SABS 1200 H:

PSHA 2.1 SUBCLAUSE 3.1: STRUCTURAL STEEL

The steel shall be Grade 300 W for hot-rolled steel sections (I, H, C, L). All members shall carry the Grade 300W steel symbol to identify steel grade prior to manufacturing.

All other structural elements, tubular profiles, flat bars, squares, rounds, checker ("vastrap") floor plate shall be Grade 43 or as specified on the drawings. The thickness of a checker ("vastrap") floor plate is the under-pattern thickness.

PSHA 2.2 SUBCLAUSE 5.1 AND SUBSUBCLAUSE 5.1.2 : CONTRACTOR PROVIDES SHOP DETAILS

The Contractor shall furnish the Engineer with shop-detail drawings within two weeks of having received the design drawings. The Engineer will check the drawings for conformity with design requirements and will return the drawings with additions and corrections, if any, within one week of having received them. Detailed checking of shop details for dimensional accuracy and installation fit will not be done by the Engineer.

PSHA 2.3 SUBSUBCLAUSE 5.2.3: CUTTING

The edges of flame-cut plates shall be ground smooth.

PSHA 2.4 SUBSUBCLAUSE 5.6.1 : GROUTING RESPONSIBILITY

Grouting shall not be done by the steel contractor.

PSHA 2.5 SUBSUBCLAUSE 5.3.4: WELDING

(a) All welders shall be coded welders.

The Contractor shall submit welding procedures by an approved welding authority for approval and shall produce evidence acceptable to the Engineer that welding procedures and welders have been tested in accordance with the requirements of SABS 044, Parts III and IV.

Approved splicing of members will be subject to non-destructive testing. The cost of testing shall be borne by the Contractor.

(b) The Engineer may, at his discretion, identify welds for non-destructive testing by an approved authority, the cost of which will be borne by the Contractor.

PSHA 2.6 SUBSUBCLAUSE 8.3.6: MEASUREMENT OF AND PAYMENT FOR PROTECTIVE COATING

Surface preparation, priming, shop and site painting shall be measured in m² of surface treated.

PSHA 2.7 SUBCLAUSE 7.1: TEST CERTIFICATES

Test certificates pertaining to the steel to be used shall be submitted to the engineer by the contractor before fabrication commences.

The engineer reserves the right to inspect all structural steel in the workshop before it is delivered to the site.

PSHA 2.8 SUBSUBCLAUSE 6.2.2: OTHER TOLERANCES

Degree of accuracy II shall apply unless indicated otherwise elsewhere.

PSHA 3 ADDITIONAL CLAUSES:

PSHA 3.1 PROTECTIVE TREATMENT AND PAINTING

PSHA 3.1.1 GENERAL

PSHA 3.1.1.1 All paint shall be delivered at the workshop as well as on the site in the original containers that display the manufacturer's name and trademark, as well as the SABS mark. The Engineer may, at his discretion, prescribe the manufacturer and the type of paint.

The coating system shall be from one manufacturer only. The paint manufacturer's instructions shall be strictly adhered to.

PSHA 3.1.1.2 Surfaces in contact with each other after assembly or erection shall receive the primer beforehand, except for faying surfaces for friction-grip fasteners.

PSHA 3.1.1.3 The application of the final coats of paint before erection will be permitted by the engineer only in special circumstances or where specified elsewhere.

PSHA 3.1.1.4 After erection of the steelwork, the specified paint system shall be reinstated in all areas where it has been damaged. All fasteners shall also be treated in accordance with the specified paint system.

PSHA 3.1.1.5 No painting on the site shall be done in inclement weather or when humidity or frost is liable to cause wet or damp conditions on the surface to be painted.

PSHA 3.1.1.6 No painting shall be done if the temperature falls below 7 °C.

PSHA 3.1.1.7 Welded seams shall be thoroughly steel-brushed before painting. Permission shall be obtained from the Engineer before slag residue may be neutralised with acids or alkalis.

PSHA 3.1.2 SURFACE PREPARATION IN THE WORKSHOP

SIS 05 59 00 or ISO 8501 shall apply and shall be referred to in respect of this clause.

PSHA 3.1.2.1 MANUAL SCRAPING AND WIRE BRUSHING

This treatment shall normally be applied in all circumstances except if and where blast cleaning is specified.

- Prior to treatment, the steel surface shall be cleaned of dirt and grease.
- Heavier layers of rust shall be removed by chipping.
- All loose mill scale, rust and foreign matter shall be removed by very thorough scraping, wire-brushing, machine-brushing, grinding, etc.

- Finally, the surface shall be cleaned by a vacuum cleaner, with clean, dry compressed air, or with a clean brush.
- The surface shall have a pronounced metallic sheen with an appearance equal to or better than that shown on the prints designated ST 3 in SIS 05 59 00 or ISO 8501.

PSHA 3.1.2.2 BLAST CLEANING

This treatment may be used but is not obligatory unless so specified hereinafter. If blast cleaning is preferred to normal scraping and wire brushing, the final surface shall be equal to or better than that specified in sub subclause 3.1.2.1.

PSHA 3.1.3 PAINT SYSTEM

The paint system shall be applied in accordance with the specifications given in Table 3.1 below. Application may be by brush, roller or sprayed. Red lead may not be used.

All structural steel which is not visible, e.g. purlins, rafters and trusses, shall receive only the primer coat. All visible steel shall receive the full appropriate paint system treatment.

In all cases, the manufacturer's specification for any paint product must be followed.

Table 3.1 Paint system for new steel surfaces for unpolluted inland environments (not suitable for temperatures above 90 °C)

Coat No	Place of application	Time of application	Min thickness in μm	Types	SABS-Specification
1. Primer	Workshop	Within 4 hours of surface treatment	50	Zinc phosphate Plascoprime 182 QD (Plascon) or D193-1029 (Dulux)	(None)
2. Two final coats; colour as specified elsewhere	Site	After erection. 2nd coat within 48 hours of 1st	Each coat 25 to 40	High-gloss enamel or structural steel paint	630 Type I 684 Type A

PSHA 3.2 PAINT SYSTEM FOR NEWLY GALVANISED SURFACES

PSHA 3.2.1 RECOMMENDED SURFACE PREPARATION

- Degrease with Plascon Aquasole Degreaser GR 1 or similar approved. Any cement or foreign material must also be removed from the metal surface.
- Rinse with clean running water while protecting the floors and walls.
- Wash with Galvanised Iron Cleaner GIC 1 by Plascon, or similar approved.
- Rinse with clean running water and allow to dry. Protect the floors and walls.

PSHA 3.2.2 Apply one coat of Plascon Aquafast Etch Primer no EMS 18 or similar approved to a total dry thickness of 35 microns. Must be overcoated within 72 hours to avoid excessive hardening.

PSHA 3.2.3 Two final coats as specified in Table 3.1

PSHA 4 HOT DIPPED GALVANIZING (SEE ALSO SUBCLAUSE 5.9 IN SABS 1200H)

Steelwork described as “hot dipped galvanised” shall be galvanised after manufacturing and before delivering to the site by means of the hot dipped process complying with the minimum requirements of SABS ISO 1461, 2000, latest amendment. Structural steel members shall be given an 85 micron thick galvanised coating or such other thickness as may be specified in accordance with SABS ISO 1461. (Table 1)

Damaged surfaces must be thoroughly cleaned, and if welding has been carried out, all slag must be removed, preferably by the use of a chisel hammer.

Before galvanising, all surfaces of the metalwork shall be thoroughly cleaned of all scale and rust by shot-blasting in accordance with SABS 064 or by pickling and then fluxed ready for galvanising.

The zinc coating shall be even and continuous over all surfaces, free of bare spots, dull or rough patches, blisters or other imperfections. The zinc coating shall show no signs of peeling and shall be uniform in thickness.

All M8 and greater bolts, nuts, screws and other threaded components shall be hot-dip galvanised to SABS ISO 1461 (previously articles type C).

Repairing damaged coatings

Plant Repairs

Should any black spots or uncoated areas greater than 5 mm² (individual) or 25 mm² (collective) per m² or per m run be present after galvanising, the coating shall be repaired. This is to be carried out using abrasive blasting followed by zinc metal spray. The zinc metal spray shall be applied at least 25 % thicker than that specified and shall overlap the damaged area by 20-25 mm. The finished coating shall be wire brushed to remove any excess metal spray.

Hot patch soldering is an alternative at the plant but is seldom used, as the method needs to be conducted while the product is still hot before quenching.

Site Repairs

Zinc metal spray as set out above.

The recommended alternative is to use a zinc-rich paint, provided it has at least 90 % zinc in the dry film, by mass. The paint should be a zinc-rich epoxy in conformance with SABS 926. A single pack zinc-rich paint, such as Plascon’s “Plascozinc Polygalv Primer” or equal, can be applied.

PSHA 5 CONSTRUCTION

PSHA 5.2.6 HANDRAILS

Add the following:

Handrails to be top mounted hot-dip galvanised mild steel Mentis type handrails (design and supply) inclusive of knee rails, kicker plates, base plates and stainless steel chemical anchors.

PSHA 8 MEASUREMENT AND PAYMENT

PSHA 8.3 SCHEDULED STRUCTURAL STEEL ITEMS

Add the following new clause:

PSHA 8.3.7 NEW FENCING AND ACCESS GATE

The Contractor shall erect a new perimeter fencing and access gate around the reservoir site as per the Engineer's drawings. The Contractor shall ensure that the tendered rates include the purchasing, transportation, temporary storage, erecting, and installation of the new perimeter fencing and access gate.

The unit of measurement shall be per linear metre (m)

Add the following new clause:

PSHA 8.3.8 MISCELLANEOUS STRUCTURAL STEEL ITEMS

The Contractors' rates for these structural steel items shall include full compensation for the purchasing, fabrication, transportation, temporary storage, and installation as well as all associated material and labour costs.

The unit of measurement shall be the number (No.) of each item.

PSL MEDIUM PRESSURE PIPELINES (SABS 1200 L-1983)

PSL 3 MATERIALS

PSL 3.1.1 MATERIALS CONTROL (NEW SUB-CLAUSE)

PSL 3.1.1.1 CHECKING MATERIAL LIST AND DRAWINGS (NEW SUB-CLAUSE)

Add new Sub-Clause:

Not more than 4 weeks after the contract has been awarded, the Contractor shall check the Materials Lists against the drawings and advise the Employer's Representative in writing of any shortages or omitted items.

If any variations in the contract are authorised, the Contractor shall ensure that any additional items to be supplied by the Employer and the Contractor are ordered in good time so as not to cause delay to the works

The Contractor shall check the delivery timing at all times and ensure that it is in line with the Contract programme. Any critical items that could be delivered late are to be brought to the attention of the Employer's Representative.

The delivery status of materials is to be checked and followed up upon by the Contractor throughout the contract.

PSL 3.1.1.2 MATERIALS CONTROL-GENERAL (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor is held responsible for the inspection and control on-site of all the materials and equipment for the duration of the contract. Once material and equipment have been accepted, any subsequent damage shall be made good to the satisfaction of the Employer's Representative at the expense of the Contractor. Damage to internal linings and external coatings that are necessary and incidental to good welding practices and the manufacturing of pipe specials is excluded.

Any item damaged beyond repair shall, at the discretion of the Employer's Representative, either be replaced at the Contractor's expense or the value reimbursed in full to the Employer.

PSL 3.1.1.3 ACCEPTANCE OF PIPES, FITTINGS AND MATERIALS (NEW SUB-CLAUSE)

Add new Sub-Clause:

Before acceptance of any pipes, fittings or other items of equipment, the Contractor is to carry out a thorough inspection to ensure that the materials have been delivered undamaged and are as ordered.

Pipes shall be checked for:

- Identification
- Certification
- Soundness of internal lining
- Ends beveled correctly
- Circumference according to specification and within tolerance
- Quantity agrees with the advice note

Inspection of pipe fittings, valves and other equipment shall include, but is not limited to:

- Identification
- Certification
- Material, schedule and rating
- Lining where specified
- Coating where specified
- Circumference according to specification and tolerance
- Damage to items - example flange faces

Defective items shall not be accepted, but marked, quarantined and immediately reported to the Employer's Representative.

If accepted, the Contractor shall take the required steps to ensure that all delivery documentation, together with signed acceptance notes, is filed in the construction dossier.

PSL 3.1.1.4 MATERIAL STORAGE (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor shall store all items so that no damage occurs whilst awaiting installation. Where practical, items are to be stored in lockable containers for protection from the weather and pilferage.

All piping, pipe fittings, and equipment stored outside or awaiting installation are to be protected from the weather, storm water and soil wash, using plastic sheeting and storing the same on pre-prepared concrete surfaces. Pipes taken over from the Employer shall receive the required attention in order to ensure safe storage in yards, protected from fires, vandalism and incidental damage that can reasonably be prevented.

PSL 3.1.1.5 HANDLING PIPES, FITTINGS AND EQUIPMENT (NEW SUB-CLAUSE)

Add new Sub-Clause:

Strict supervision shall be maintained by the Contractor at all times when handling pipes and equipment. Particular attention is to be given to correctly rated lifting gear, slings and lifting beams. All lifting gear is to be inspected regularly for signs of wear and tear in terms of the relevant Safety Legislation and Clauses. Equipment is to be lifted at the recommended points specified by the manufacturer. Pipe is to be lifted with a lifting beam and slings, which shall be fitted at quarter points around the pipe. Due care shall be taken when fitting and placing slings to ensure that ancillary items do not get crushed during lifting. Pipe coating is to be protected by padding or otherwise from scuffing damage during lifting.

The equipment utilised for lifting pipes must be approved by the Employer's Representative for the purpose of ensuring that the lifting equipment is appropriate and will not damage the pipe coating. It is prohibited to handle pipes with chains or any other device involving metal contact with the pipe coating.

The Contractor shall ensure that all lifting equipment complies with the relevant safety regulations.

PSL 3.1.1.6 STACKING OF PIPES AND PIPE SPOOLS (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor shall take due care when stacking pipe or pipe spools at the workplace. Pipes must never be placed directly on the ground but shall be stacked on dunnage according to approved methods and shall be separated from one another by the use of applicable methods approved by the Employer's Representative.

PSL 3.1.1.7 SEGREGATION OF SPECIAL ITEMS (NEW SUB-CLAUSE)

Add new Sub-Clause:

All items/equipment which are to be used as paired items shall be marked as “special items” by the Contractor. Examples of this are valve mating flanges, flat-faced flanges, etc.

The Contractor shall take special care when storing items that are marked “special items” in order to ensure that they are not utilised by mistake as bulk items.

PSL 3.1.1.8 CONTROLLED ISSUE OF LINED PIPE (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor shall establish a database of pipe material which will reflect each and every pipe number under his control, together with the pipe data of each of the pipes, next to the pipe number. The pipe data will clearly indicate the grade of steel and the wall thickness for each pipe number.

The Contractor shall control the issue of lined pipe using cutting lists, in order to minimise scrap metal and avoid unnecessary field butts. The Contractor shall ensure that pipe identification marks are transferred in a controlled manner onto cut sections of pipe to ensure 100% future traceability. The cutting of pipes and the transferring of identification marks shall be carried out under the close supervision of the Contractor's Quality Control Officer. The Contractor shall, at any stage as required by the Employer's Representative, produce the pipe database on site in order for the Employer's Representative to verify the origin of the section of pipe built into pipe specials.

The Contractor's rates for compliance with his obligations in terms of quality control shall be deemed to include the establishment of the required database and the control of pipe material on site.

The Contractor shall take note that any cutting of the standard length of pipe, for the purpose of making the pipe more manageable in restricted areas, will not be compensated for by payment for additional field joints.

PSL 3.1.1.9 SURPLUS MATERIAL (NEW SUB-CLAUSE)

Add new Sub-Clause:

Surplus material is to be returned to storage and not left at the work face. All material must be cleaned and protected as required prior to storage

Each pipe and fitting is to have the relevant identification marks, clearly marked in waterproof paint, before being returned to storage as surplus material.

Each item of equipment, for example, valves, is to have a weatherproof label firmly wired to it, detailing the Order Number and Reference Number.

The Contractor shall maintain a register of surplus material during the contract. This register shall be checked and agreed with the Employer's Representative from time to time and handed over to the Employer's Representative at the completion of the Works as part of the Construction Dossier.

PSL 3.1.1.10 SCRAP MATERIAL (NEW SUB-CLAUSE)

Add new Sub-Clause:

Material deemed as scrap by the Employer's Representative and as stated in writing shall be collected and returned to the Employer. The receiving section of the Employer is called the Disposal Unit at the Electricity Department, and they are situated on Electron Road, Springfield. The returned scrap material must be accompanied by an MRS (Material Returned to Store) form as issued by the Employer.

PSL 3.1.1.11 EMPLOYER SUPPLIED AND CONTRACTOR MATERIAL CONTROL (NEW SUB CLAUSE)

Add new Sub-Clause:

All materials must be checked and listed against their respective material and test certificates to ensure that they can be readily identifiable and traced to their material certificates and listings.

PSL 3.1.1.12 CLEANING OF THE INSIDE OF THE PIPE (NEW SUB-CLAUSE)

Add new Sub Clause:

The Contractor shall, on instruction by the Employer's Representative, clean the internal surface of the pipe with a high-pressure cleaning system which can pressurise the water to a minimum pressure of 130 Bar.

PSL 3.4 STEEL PIPES, FITTINGS AND SPECIALS

PSL 3.4.1 GENERAL

Add the following:

The steel pipes and steel pipe specials to be laid under this contract are from DN80 up to DN400.

Steel pipes less than DN600 to be supplied by the Contractor shall be grade X42, 4.5mm thick, plain-ended, and will be Three-Layer Polyethene (3LPE) coated on the outside and cement mortar lined internally, unless stated otherwise.

Steel fittings and specials to be grade X42 coated and lined to project specifications. Plate thickness shall not be less than 4.5mm, or the thickness that results in a working stress not exceeding 75% of the allowable maximum working stress for the steel grade.

For all branch connections, the plate thickness of the barrel and branch shall be such that the maximum stress shall not be greater than that for an uncut pipe of the theoretical minimum thickness. Where it is more economical to provide external reinforcement in the form of collar-type rings or crotch plates, these forms of reinforcement shall be used to achieve the same results.

PSL 3.4.2 PIPES OF NOMINAL BORE UP TO 150 MM

Delete the Sub-Clause.

PSL 3.4.3 PIPES OF NOMINAL BORE OVER 150 MM

Delete the Sub-Clause.

PSL 3.4.4 FITTINGS AND SPECIALS

Add the following:

The lining and wrapping of specials, which are to be butt-welded, are to be terminated 100 mm from the end of the pipe. The lining of specials which are to be sleeve welded shall be taken to the end of the pipe, and the wrapping is to be terminated 100 mm from the end. On flanged specials, the wrapping and lining are to be taken to the end of the pipe.

All specials shall be protected in accordance with clauses PSL 3.9.8. All electrodes used for welding of joints shall comply with SABS 455.

Tee pieces shall be fabricated in accordance with Table 9 of BS 534 (1990). All other specials shall be fabricated in accordance with the relevant clauses of BS 534 (1990).

All even curvature bends shall be long radius and fittings for diameters up to and including DN200 shall be in accordance with ASME/ANSI, B16.9. unless otherwise stated in the Bill of Quantities or drawings.

All reducers to be cast reducers and shall be in accordance with ASME/ANSI, B16.9. unless otherwise stated in the Bill of Quantities or drawings. Any fabricated reducers shall be fabricated based on the formula: Face to Face length = $(D-d)*4$ where "D" is pipeline diameter and "d" is the diameter of the water meter and shall not have more than two longitudinal weld seams.

The pipe manufacturer shall obtain and make available to the Employer's Representative a certificate or certificates from the steel manufacturer covering all steel used, showing by which process the steel was made and giving the chemical analysis of the steel and its physical properties. A record shall be kept of pipe serial numbers and the cast numbers of the steel used.

The pipe manufacturer shall supply written confirmation that all hand welding was carried out by coded welders.

PSL 3.4.4.1 FLANGES

Add new Sub-Clause:

Use SANS 1123: 2007, Table 3 only. Where SANS 1123: 2007 (Table 3, for the different pressure classes) does not provide specifications for a particular diameter and class of flange, then specify BS EN 1092.

PSL 3.4.4.2 SEGMENTED BENDS

Add new Sub-Clause:

This clause applies to segmented bends equal to or greater than 300 mm in diameter. All segmented bends shall be fabricated in accordance with the criteria in Table 1.

Table 1:

Total Deflection Angle	Number of Segments	Number of miters
0 to 15	0	1
16 to 30	3	2
31 to 45	4	3
46 to 60	5	4

61 to 75	6	5
76 to 90	7	6

For bends up to 15 degrees, the pipe shall be scarfed.

Bends greater than 90 degrees shall be fabricated from combinations of the above. Shop drawings of these bends shall be submitted to the Employer's Representative for approval prior to manufacture.

The maximum angular deflection at any mitre shall be 15 degrees, and where the first and last segments are to be half of the maximum angle. Unless otherwise indicated on the drawings, the minimum radius of the segmented bends shall be:

- DN 300 to 450: According to Table 8 of BS 534 (1990)
- DN 500 to 1600: 2.0 x pipe diameters

All segmental bends shall be fabricated with bevelled plain ends suitable for butt welding or with square, plain-faced ends where slip-on flanges are to be welded to the special.

The tendered rate for the manufacture and supply of segmented bends, compound or simple, shall include cutting, bevelling, welding (welding of flanges if required will be an extra over item), NDT testing, surface preparation, lining and coating, laying and bedding and holiday detection tests.

PSL 3.4.5 TOLERANCES OF PIPES

Add new Sub-Clause:

The Contractor's attention is drawn to the required tolerance and method of measuring as described in Sections 5 and 6 of SANS 719.

PSL 3.8.2 FLEXIBLE COUPLINGS

Add the following as L 3.8.2:

Flexible couplings shall conform generally to Clause 15 of BS 534 for slip-on type couplings and shall be of approved manufacture, manufactured from rolled steel, and fitted with rubber rings suitable for jointing plain-ended pipes. 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 from being blown out under pressure or sucked in under vacuum.

The rubber jointing rings shall be manufactured from first-grade natural rubber to B.S. 2494 Class D. All bolts and nuts shall comply with SABS 135 or SABS. 136. Each sleeve shall be fitted with a centre register unless stated otherwise in the Project Specification.

Each coupling shall permit a repeated movement of 10 mm to cater for thermal expansion and contraction of the pipe, and allow for the following angular deflections:

- 6° up to and including 600 mm diameter;
- 5° over 600 mm up to and including 750 mm diameter;
- 4° over 750 mm up to and including 900 mm diameter;
- 3° over 900 mm up to and including 1 200 mm diameter;
- 2° over 1200 mm diameter.

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.

Couplings shall be protected by an approved epoxy coating system such as "Cupon KSIR88". The plain end of the steel pipe shall be properly prepared before corrosion protection so as to accept the flexible coupling.

PSL 3.8.2.5 RESTRAINED FLEXIBLE COUPLINGS

Add new Sub-Clause:

Special restrained or anchoring flexible adaptor joints or flanged adaptor joints ("Viking Johnson" or similar) for connecting plain-ended steel pipes to flanged joints are to be supplied complete with bolts, nuts, washers, gaskets, etc, for connecting the flanged joint to the anchoring flange.

Anchoring or restraining flange to be welded approximately 300mm from the plain end of the pipe. Restraining flange adaptor to use a minimum of 4 grade 4.8 restraining bolts, equally spaced around the circumference of the flanges. Restraining flange to be to the manufacturer's specification and approved by the Employer's Representative.

PSL 3.8.3 FLANGES AND ACCESSORIES

Add the following:

Gaskets shall be manufactured from "Klinger 200" or other approved material which complies with the requirements for Grade B of B.S. 2815.

All gaskets shall be 3 mm thick.

All gaskets shall be purpose-made. Hand cutting and trimming of gaskets on-site will not be acceptable.

Care should be taken to ensure that all gaskets are packed properly and are not damaged by bending. For larger sizes, the gaskets shall be suitably supported by wooden frames during transit and while in store.

PSL 3.8.8 BOLTED CONNECTIONS

Add new Sub-Clause:

PSL 3.8.8.1 BOLTED CONNECTIONS SHALL COMPLY WITH THE FOLLOWING

All pipes larger than 150mm diameter, connected to equipment or fittings, or where specifically indicated, shall be flanged to SANS 1123-2011 as amended, table 1600, 2500 or 4000 as scheduled. All flanges shall be truly at right angles to the axis of the pipe or fitting and shall be drilled with bolt holes off centre.

All plate flanges for welding shall be Type 3, and blank plate flanges shall be Type 8.

Puddle flanges shall be a minimum of the same diameter and thickness as the end flanges and shall be undrilled unless otherwise shown on the drawings.

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.

Any item of pipework that is found to have flanges that are incorrectly drilled shall be rejected. Reaming of bolt holes to oversize dimensions in order to make a particular piece fit shall not be permitted.

PSL 3.8.8.2 MATCHED FLANGES

Matched flanges shall correspond in construction and dimensions to flanges on equipment. Matched flanges shall be provided with the correct bolts, nuts and packing rings. All peening shall be clean before connections are made.

The 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 buildup in flange bolt holes that could snag bolts will not be permitted.

PSL 3.8.8.3 INSULATED FLANGES

Bolts, nuts and washers used on insulated flanges shall be as for the steel flanges shown on the standard drawing.

Bolts and nuts connecting mild steel flanges to stainless steel flanges, or stainless steel flanges to stainless steel flanges, shall be Grade 304 stainless steel.

PSL 3.8.8.4 LENGTH OF BOLTS

The length of each bolt shall be such that, after the bolt has been tightened, the end of the bolt is flush with the outside of the nut, or projects above the nut by not more than two full threads. Tie-bolts on restrained/anchoring couplings shall be fitted with “backing nuts” and washers.

PSL 3.8.8.5 END-COVERS

Satisfactory temporary end-covers shall be provided by the Contractor for protection of flanges, prepared ends of open-ended pipes and fittings and screwed ends, to prevent damage to internal lining during transportation and during handling on site.

The end-cover on a pipe end or fitting shall remain in place during the entire installation process until the completion of a joint requires a cover to be removed.

PSL 3.8.8.6 BOLT AND BOLT THREADS

Bolts and tie bolts to be grade 4.8. Bolts, nuts and washers shall be hot-dipped galvanised to SANS 121:2000/ ISO 1461:1999.

All bolt torque sequences, and torque values are to be agreed with the Employer's Representative. 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” as described in elsewhere.

PSL 3.9 CORROSION PROTECTION

Add to Clause:

The tendered rates for the laying of pipe, effecting of butt, fillet and collar welds of pipe joints, the manufacturing of pipe specials and the fitment of all fittings to the pipe line system, or any activity during the construction process which could damage corrosion protection coatings and linings, or activities which result in the bare pipe surfaces to be included into the permanent Works, are deemed to include for all the corrosion protection mechanisms required to reinstate the pipe work with a fully functional corrosion protection coating and lining, outside and inside.

Holiday detection is specified for the coatings and linings at different phases of the work in order to ensure that the pipeline is laid and commissioned without any holidays in its external coating or internal lining.

A control test will be done on the pipeline, once constructed, in order to verify that the pipeline coating is holiday-free.

PSL 3.9.2 STEEL PIPES

PSL 3.9.2.1 STEEL PIPES OF NOMINAL BORE UP TO 150 mm

Replace the clause with clause 3.9.2.2 unless otherwise specified on drawings or bill of quantities.

PSL 3.9.2.3 REPAIRS TO COATINGS AND LININGS

Replace the clause with the following:

FBMDPE, fusion-bonded epoxy-coated and solvent-free liquid epoxy-lined or cement-mortar-lined pipe shall be repaired as specified in this clause.

A. EXTERNAL REPAIRS

1. Detection of Defects in FBMDPE and Epoxy Coating by Holiday Tests

Each pipe length shall first be placed on suitable dunnage adjacent to the trench. The Contractor shall then arrange for Holiday tests to be undertaken on the accessible portion of the pipe coating surface by the non-destructive testing firm appointed in terms of this contract document or the Employer's Representative, whichever is applicable. It shall be a requirement of this contract that the Holiday testing device utilised be calibrated and approved by the Employer's Representative prior to conducting any Holiday tests.

2. Surface Preparation in accordance with specification PSL 3.9.7

a) Defects in epoxy coating detected by holiday testing:

At each pinhole detected by the Holiday test, the surrounding area shall be abraded to 25 mm beyond the defective area. It is noted that any cluster of pinholes within a radius of 25 mm shall be regarded as one defect. The abrasion shall be carried out with clean emery paper of 80 to 100 mesh so as to provide a suitably rough surface profile without causing the removal of excessive amounts of coating material.

- b) Damage to FBMDPE and epoxy coating caused by welding, damage at joints and bends and damage at scour and air valve tees, crotch plates and buried valves to be surface prepared in accordance with specification PSL 3.9.7.
- 3. Cleaning of Area to be Repaired in accordance with specification PSL 3.9.7.
- 4. Methods of Repair to be Carried Out

- a) Defects in epoxy coating detected by Holiday tests

- i. The roughened area of coating and the defect shall be repaired by the application of a two-part solventless epoxy repair kit (e.g. "Cupon Hycote 151", "Arc 982" or similar approved) to a minimum dry film thickness of 300 microns. The epoxy repair material shall be applied in accordance with the manufacturer's instructions and allowed to dry for 24 hours.
- ii. 24 Hours after the application of the epoxy repair material described above, the pipes may be placed in the trench and rotated so that the underside of the pipe, which was not Holiday tested at the side of the trench, may be tested.
- iii. The pipe coating, any defects detected on the now uppermost surface of the pipe, shall be prepared in accordance with the requirements of A.2(a) and A.3 above.
- iv. The prepared surface shall then be primed and patched in accordance to specification PSL 3.9.2.3.1 Making Good of Field Welded Joints, Repairs and Puddle Pipes.
- v. The dielectric resistance of the tape cover strip shall not be less than that of the FBMDPE (10,000 V) or fusion-bonded epoxy coating (3,500 V).

- b) Defects in FBMDPE and solvent-free epoxy coating detected by Holiday tests

Where the repair area is less than 650 mm², the application of a hot spatula shall be used to repair the defect, provided there is a residual layer of polyethylene still adhering strongly to the steel surface.

- c) Defects in FBMDPE and solvent-free epoxy coating other than those detected by Holiday tests

Any single repair area less than 0.1m² shall be carried out in accordance with A.4.b above. The number of repairs shall be limited to three per pipe or fitting. The length of such repair shall not exceed the nominal pipe diameter in the circumferential direction, nor twice the nominal pipe diameter in the longitudinal direction.

- d) Patch Repairs to Pipes Damaged by Welding

Patch repairs to pipes damaged by welding shall be carried out in accordance

with the requirements of A. 4. a (iv) and A. 4. a (v) above.

e) Patch Repairs to Pipes that will be Exposed to Ultra-Violet Light

- i) Repairs shall be carried out in accordance with the requirements of A. 4. a (i) above, with due allowance being made for the 24-hour curing period.
- ii) The pipe surface shall then be coated in accordance to specification PSL 3.9.8.5.

f) Joint repairs (including bends) on pipes that are to be buried

- i) Repairs shall be carried out in accordance with the requirements of A. 4. a (iv) and A. 4. a (v) above.
- ii) No airgap will be permitted between the tape and steel surface, and tape width and application tension shall be such as to ensure that the tape “dresses down” over steel surface irregularities. This applies particularly to bell-end pipes.
- iii) Gusseted bends requiring two or more welded joints shall be fully externally wrapped, extending 150 mm outside the two outermost welded joints.

g) Scour and air valve tees and crotch plates

- i) Scour and air valve tees and crotch plates that are to be buried shall be protected in accordance with the requirements of A. 4. a (i) above, with due allowance being made for the 24-hour curing period.
- ii) Exposed specials in chambers, including valves, flanges, crotch plates, flexible couplings, etc, shall be protected by the application of “Cupon Hycote 151”, “Arc 982” or similar approved epoxy coating to a minimum dry film thickness of 300 microns. Surface preparation and application shall be strictly in accordance with the manufacturer’s instructions.
- iii) When coating valves, care shall be taken to prevent the epoxy coating from covering the descriptive name plates and flow direction indicators on the valves by masking off these plates.

h) Buried Valves

Buried valves or other appurtenances with intricate shapes will be inappropriate for wrapping with a tape system. Such items shall be protected by the application of a zinc-rich epoxy primer such as “Berger Master”, “Zinc Anode 304”, followed by two coats of a pitch-extended epoxy resin coating such as “Fosroc Nitocote ET550”, “Epilux 5 Coal Tar Epoxy” or similar approved to a minimum dry film thickness of 250 microns.

Alternatively, a petrolatum system “Denso” type or similar approved may be employed and then wrapped in polythene sheeting to the approval of the Employer’s Representative.

B. INTERNAL REPAIRS – EPOXY LINED PIPES

1. Detection of Defects in Epoxy Lining by Holiday Tests

Each pipe length shall be first placed in position in the trench, welded to the preceding pipe and the lining at the joint reinstated (see B.2.b of this Clause). Once all work is complete in a particular length of pipe, the Contractor shall arrange for the testing of the pipe with a “wet sponge” detector set at 90 Volts in order to detect any electrical insulation defects.

2. Surface Preparation in accordance to specification PSL 3.9.7.

a) Defects in epoxy lining detected by holiday testing

At each pinhole detected by the Holiday test, the surrounding area shall be abraded to 25 mm beyond the defective area. It is to be noted that any cluster of pinholes within a radius of 25 mm shall be regarded as one defect. The abrasion shall be carried out with clean emery paper of 80 to 100 mesh so as to provide a suitably rough surface profile without causing the removal of excessive amounts of coating material.

b) Epoxy lining damaged by construction operations, joint repairs (including bends), lining to scour and air valve tees, access openings, stubs and valve bypasses

i) In order to avoid damage to the pipe lining occurring as a result of construction activities, all possible care shall be exercised during construction, the following procedures being required:

- Wet sacking or rubber matting shall be placed on the pipe invert at areas where welding or flame cutting operations are in progress to prevent damage to coating from weld spatter or molten metal. This requirement shall be strictly enforced.
- Foam shall be provided for the placing of tools etc on the internal pipe surface.
- Soft-soled shoes shall be worn by all personnel working inside the pipe.

ii) All damaged and blistered epoxy lining shall be removed back to sound epoxy by mechanical grinding or other approved means.

3. Methods to Repair to be Carried Out

a) Defects in epoxy coating detected by Holiday tests

i) The roughened area of lining and the defect shall then be repaired by the application of a solvent-free epoxy repair material (such as “Cupon Hycote 151”, “Arc 982”, “Arc 855”, or similar approved) to a minimum dry thickness of 300 microns.

A “halo” of 1 to 2 mm of the abraded material shall be left uncovered around the repair.

The patch material shall be of a different colour to the pipe lining material.

ii) 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.)
 - Overcoating time
 - Temperature range for application
 - Mix proportions of activator to base. This shall be strictly enforced, and splitting of manufacturer-supplied packs shall be allowed only if subsequent bending is carried out strictly by mass to the correct proportions.
 - 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.
- iii) After the repair has been adequately cured, the repair and the surrounding 250 mm of epoxy lining shall be tested for electrical insulation defects. No defects will be permitted.
- b) Patch Repairs to Pipes Damaged by Construction Operations and Joint Repairs (including Bends)
- i) The roughened area of lining shall be repaired as described in B.3.a(i) above.
 - ii) The requirements of Clauses B.3.a(ii) and (iii) above shall then be complied with.
- c) Lining to scour and air valve tees, access openings, stubs and valve bypasses
- i) The repair procedure shall be as described in B.3.a(i), (ii) and (iii) above.

The epoxy repair material shall be applied to overlap the existing sound cement mortar lining by 25 mm at access openings, valve bypasses and scour tees.

The repair of EPOXY internal linings on manufactured pipe specials, welded joints where a flange has been welded to the pipe, crotch plates, collar plates, or where pipe specials have been welded to the pipe, the internal lining shall be repaired by means described above and with the relevant two part EPOXY repair kit, according to the manufacturer's specification, after suitable surface preparation of the steel surface in terms of Clause PSL 3.9.7.

C. INTERNAL REPAIRS – CEMENT-MOTOR LINED PIPES

Add new Sub-Clause:

- a) Pipes DN600 and smaller (Where joints cannot be reached by hand)
- 1. Surface Preparation in accordance with specification PSL 3.9.7. The internal surface of the bellmouth is to be power or hand wire brushed from the pipe end to the cement mortar lining to remove dirt, scale, rust and other foreign matter.
 - 2. Any grease and oil shall be removed from the pipe surface with a non-volatile solvent (e.g. "Aquasolve", "Arc Nr 261 Safety Solvent Cleaner" or similar approved). The surface shall then be cleaned with water and dried, and a 50 mm wide x 20 mm thick band of "Epidermix 338" or similar approved shall be

applied internally on the uncoated steel adjacent to the cement lining.

3. The plain end of the adjoining pipe shall be pushed into the bellmouth in such a way that the Epidermix band is compressed and makes contact with the transverse face of the concrete lining of both pipes. The excess lining material which is squeezed into the pipe shall be removed by drawing a plug which is 5 mm smaller in diameter than the bore of the pipe, across the joint. The plug shall be so shaped as to apply a smooth even surface to the lining material at the joint.
 4. When fabricating steel specials (e.g. gusseted bends, tees, etc.), any cement mortar lining which de bonds or spalls from the internal steel surface shall be removed back to sound mortar and made good with "Epidermix 338", or similar approved, neatly formed to meet the adjacent cement mortar, after preparation of the bare steel surface according to Clause PSL 3.9.7.
- b) Pipes larger than DN600 (Where joints are reachable by hand)
1. Surface Preparation in accordance to specification PSL 3.9.7. The exposed steel surface shall be power or hand wire brushed to remove dirt, scale, rust and other foreign matter. Burrs, weld spatter etc shall be filed away.
 2. Any grease and oil shall be removed from the pipe surface with a non-volatile solvent (e.g. "Aquasolve", "Arc Nr 261 Safety Solvent Cleaner" or similar approved), flushed with potable water and completely dried.
 3. The joint shall then be made good with "Epidermix 338" or similar approved, neatly formed to meet the adjacent cement mortar.
 4. The requirements of Clause C (a).4 shall similarly apply to pipes larger than 600 mm diameter.

D. TRANSITION ZONE REPAIR – CONCRETE MOTAR LINING TO EPOXY LINING

Add new Sub-Clause:

At transition zones, where for any specific reason the internal lining changes from cement mortar lining (CML) to an EPOXY lining, at, for example, reducers, flanges, weld on flanges or fabricated specials which do not require cement mortar lining internally, the transition zone shall be specially prepared and reinstated with Epidermix 338 or similar approved.

The cement mortar lining shall be inspected for spalling, disbonding and or hairline cracks, and any such portions of the lining shall be removed in terms of this specification. Existing EPOXY in the transition zone shall be inspected for disbonding, and should this be found, the damaged EPOXY shall be ground down to bare metal.

The bare metal shall be degreased and grit blasted to specification (PSL 3.9.7).

Epidermix 338 shall be applied in the transition zone in such a manner that it starts as a thin layer of 1mm thick, over the EPOXY with an overlap of 10mm onto the Epoxy and feathered to the cement mortar lining in order to form a smooth transition.

PSL 3.9.2.3.1 MAKING GOOD OF FIELD WELDED JOINTS, REPAIRS AND PUDDLE PIPES

Add new Sub-Clause:

This specification is based on “Denso” products. Alternative products may be accepted at the discretion of the Employer’s Representative. Once welding is complete and all weld splatter and burnt coatings have been removed, all welded pipe joints shall be prepared and wrapped in the following manner:

Surface Preparation

The bare metal shall be cleaned and wire brushed to St.2 standard and, if necessary, degreased with white spirit. The adjacent coating shall be cleaned to a minimum of 300mm on either side of the joint.

Primer

The pipe barrel at the joint shall be degreased with white spirit and primed with “Denso Primer D” (or equal approved) extending 200mm onto sound coating. The primer shall cure for 30 minutes prior to the application of a tape system.

Profiling Tape

Apply 1,0mm x 75mm wide “Ultraflex sealing tape (yellow)” to the full circumference of the weld bead and steel interfaces. Care shall be taken to ensure a smooth profile and to avoid air bubbles being trapped beneath the tape. The tape shall not be stretched.

Tape System

Tape joint shall be wrapped with “Denso Ultraflex 1250/300 (Blue)” (or equal approved) (55% overlap) extending 150mm onto sound coating. Even tension shall be applied throughout the wrapping procedure, and care shall be taken to prevent air bubbles from being trapped beneath the tape.

Repairs

Damaged pipe coating shall be repaired in the same manner, with the repair extending at least 150mm on either side beyond the edge of the damaged coating. “Spot” tape repairs will not be acceptable. Damage caused by the Contractor shall be repaired at the Contractor’s expense. Damage caused prior to the Contractor accepting responsibility for the pipes shall be repaired under this contract.

Puddle Pipes

All puddle pipes shall be primed and wrapped in accordance with the above procedure. The wrapping shall extend from (but shall not include) the puddle flange to 150mm beyond the concrete surface.

Hot- Dip Galvanising

Hot-dipped galvanising shall be done in accordance with the requirements of SANS 763 – 1977, as amended. On-site fabrication processes such as welding, drilling, threading, etc., are to be avoided. All hot-dipped galvanised items shall be passivated immediately after hot dipping.

PSL 3.9.5 CORROSION PROTECTION TO BURIED JOINTS, COUPLINGS, AND FLANGES

Delete the contents of the Sub-Clause and replace with the following:

All buried flanges and flexible joints shall, in addition to being epoxy/ thermoplastic powder/ Rilsan coated or fusion-bonded epoxy-coated, be protected as described below.

This specification is based on a “Denso” system. Alternative products will be subject to the approval of the Employer’s Representative.

PSL 3.9.5.1 SURFACE PREPARATION

The entire joint area and at least 500 mm of pipe on either side of the joint shall be cleaned of mud and other deleterious matter.

PSL 3.9.5.2 PRIMER

The cleaned joint and pipe shall be primed with “Denso Priming Solution”, or if moisture is present, “Denso S105 Paste”. The priming shall extend to at least 400mm beyond either side of the joint.

PSL 3.9.5.3 MASTIC BLANKETS

Narrow strips cut from “Denso Mastic Blankets” shall be applied to the joint to achieve a smooth profile with a 50mm 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 joint until the joint is completely enveloped.

PSL 3.9.5.4 DENSO WRAPPING

The ends of the blanket shall be bound to the barrel of the pipe on each end with 100mm wide “Denso Petrolatum Tape”. “Denso Petrolatum Tape” overlaps shall be 50mm and shall extend 100mm onto the blanket and 150mm onto the pipe barrel. All exposed bolts on flexible couplings and flange adaptors are to be wrapped.

PSL 3.9.5.5 POLYETHYLENE WRAPPING

The entire joint shall be wrapped with a 350 micron polyethene sheeting, which shall end 400mm beyond the joint. The protective sheeting shall be secured to the pipe barrel and along the seam with 48mm wide “Denso Adhesive Tape” or similar approved.

PSL 3.9.5.6 SPARK TESTS ON COMPLETED WRAPPED JOINTS (NEW SUB-CLAUSE)

Spark tests shall be performed on each and every wrapped joint and the results shall form part of the required Quality Control sheets. The tendered rates for the laying of the pipeline and the preparation of Quality Control documentation shall be deemed to include for all spark tests required.

PSL 3.9.7 PREPARATION AND CLEANING PIPE

Add new Sub-Clause:

PSL 3.9.7.1 PREPARATION OF PIPE

The following specifies the applicable method for preparation of all exposed steel surfaces for application of a repair for internal lining and/or external coating. This specification is applicable to all pipe steel surfaces which have been stripped of their corrosion protection layer, internally or externally, as a result of the manufacturing of specials, construction activities or pipe laying, welding and/or damages caused by handling or latent defects in application.

The surfaces of all pipes and specials to be lined and coated, irrespective of the lining and coating type used, shall be prepared in accordance with the following requirements:

- a) All damaged and blistered lining and/ or coating caused by welding shall be removed back to sound lining or coating by mechanical grinding or other approved means.
- b) The exposed steel surface shall be power or hand wire brushed to remove dirt, scale, rust and other foreign matter.
- c) Weld splatter shall have been removed by chipping or grinding to a smooth surface flush with the surrounding steel.
- d) Weld seams shall have a smooth contour, free from sharp edges, protrusions and undercuts.
- e) Sharp edges and protrusions shall have been removed by grinding to a smooth radius of curvature of not less than 3mm.
- f) The surrounding sound coated surface shall be abraded beyond the defective area. The abrasion shall be carried out with clean emery paper of profile without causing the removal of excessive amounts of protective material.
- g) All pipes for coating shall be in rust condition A to C of Swedish Standard SIS 05 5900. Pipes in rust condition D will be rejected.

PSL 3.9.7.2 CLEANING OF PIPE

PSL 3.9.7.2.1 DEGREASING

Any bare metal surface shall be degreased in order to remove grease and oil from the pipe surface as a first step in the preparation process, before grit blasting and or power brushing starts. Degreasing shall be done with a non-volatile solvent (e.g. "Aquasolve", "Chesterton Nr. 261 Safety Solvent Cleaner" or similar approved). The surface shall then be cleaned with potable water and left to dry completely before the next step is taken.

PSL 3.9.7.2.2 BLAST CLEANING

The surface of the pipe to be coated or lined shall be blast cleaned by centrifugal or air blast cleaning methods, then vacuum cleaned or blown off to achieve the following standards:

The profile produced by blast cleaning shall be angular and shall have an average peak-to-valley height of 60 to 100 microns when tested in accordance with SANS method 772.

Hackles shall be removed with coarse abrasive paper. Residual dust and debris shall not exceed 0.2% when tested in accordance with SANS Method 769.

Any laminations revealed by blast cleaning shall be ground out and re-blast cleaned to meet the above requirements. If grinding penetrates the steel to a depth greater than 3.5% of the nominal wall thickness, the pipe shall be rejected.

The pipe surface shall not be contaminated by oil, grease or other harmful contaminants.

PSL 3.9.7.2.3 POWER BRUSH CLEANING – EXTERNAL COATING REPAIR

Power brushing of any 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 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. The surface finish, once power brushing has been completed, shall conform to the minimum St3 standard.

PSL 3.9.7.2.4 HANDLING OF CLEANED PIPE

After cleaning, the pipe surface shall not be contaminated in any way. Operators shall wear clean gloves, and all surfaces in contact with the pipe surface shall be clean and free from oil, grease, grit, dirt and other contamination.

PSL 3.9.7.2.5 CUT BACK OF COATED PIPE

The blast cleaned surface shall be stopped off or cut back by suitable masking, which shall not contaminate the cleaned surface as follows:

- All pipes up to & including 200mm nominal diameter - 80mm from both ends of the pipe.
- All pipes from 250mm nominal diameter up to and including 500mm nominal diameter - 50mm from the belled end of the pipe and 50mm from the plain end of the pipe.
- All pipes 600mm nominal diameter and larger - 50mm from both ends of the pipe.
- The maximum cut-back shall be 100mm.

PSL 3.9.8 COATING AND LINING OF FABRICATED STEEL SPECIALS

Add new Sub-Clause:

All fabricated bends and specials supplied under this contract shall be coated and lined with an epoxy coating, thermoplastic powder coating or Rilsan coating for Steel Pipes and Specials.

The mating flange shall then receive one coat of rust inhibitor (Plascon Rustix 84 or equal approved). The flange profiling shall be clearly visible, and no runs or drips will be permitted.

Following the coating and installation of the pipe, the coating is to be free from all electrical insulation defects.

PSL 3.9.8.1 THICKNESS OF COATING

The Target Thickness of lining and coating for pipes and pipe specials for **solvent-free epoxy lining and coatings** shall be 600 microns (minimum 500 microns and maximum thickness 800 microns) and shall be free from sags and runs. Maximum dry film thickness per coat of 125 microns to 250 microns should be achieved.

The Target Thickness of lining and coating for pipes and pipe specials for **fusion bonded lining and coatings** shall be 400 microns (minimum 300 microns and maximum thickness 500 microns).

PSL 3.9.8.1.1 CORROSION PROTECTION COATING AND LININGS FOR STEEL SPECIALS

The following table lists the materials and corrosion protection system to be applied to various components of the works:

Environment	Material	Corrosion Protection System	Min DFT (µm)
Pipe specials ≤ DN500 or ≤1500mm long	Mild Steel Grade X42	Coating: Rilsan or Plascoat PPA 571 Aqua or similar approved Lining: Rilsan or Plascoat PPA 571 Aqua or similar approved	300
Pipe specials ≤ DN500 or >1500mm long	Mild Steel Grade X42	Coating: Two Pack Epoxy Lining: Two Pack Epoxy	500
Pipe specials > DN500 or ≤1000 mm long	Mild Steel Grade X42	Coating: Two Pack Epoxy Lining: Two Pack Epoxy	500
Pipe specials > DN500 or >1500mm long	Mild Steel Grade X42	Coating: Two Pack Epoxy Lining: Two Pack Epoxy	500
Valves and Water Meters	Manufacturers Standard	Fusion Bonded Epoxy (FBE)	Manufacturers standard
Flange adaptors and couplings	Low Carbon Steel	FBE or Two Pack Epoxy	Manufacturers standard
Weld on flanges	Mild Steel	Two Pack Epoxy (excluding flange face)	500
Nuts, bolts and washers Anchor bolts	Mild Steel	Hot dipped galvanised carbon steel to SANS 1461	65
Buried Bolted connections and couplings		Petrolatum tape wrapping (Denso or similar approved)	N/A

PSL 3.9.8.1.2 SOLVENT FREE EPOXY LINING

The requirements for a solvent free epoxy coating system are identical to the requirements for the solvent free epoxy lining system.

Pipes and fitting to be externally coated and internally lined with a two component cross linked epoxy that complies with the requirements of SABS 1217.

The cure rate of liquid epoxy coating is very dependent upon temperature, the rate of cure being very slow below 10°C and the reaction generally ceased below 5°C. Contractors tendering for this type of coating are therefore expected to have a heated shop or warm air blowers with suitable heat insulating tunnels to enable the temperature of the coating to be maintained at not less than 15°C from the time of application until full cure has taken place. Adverse weather conditions will not be accepted as a reason for delay in the programme or for solvent retention in multi-coat solvent borne systems.

The two components shall be thoroughly and completely mixed in the proportions specified by the manufacturer. Application shall be two component hot airless equipment or by single component airless equipment, as appropriate and as recommended by the material manufacturer. The coating shall be applied in a uniform manner and, when cured, shall comply with all the appropriate requirements of the specification.

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.

Only solvent free Epoxy repair kits shall be utilized to repair the internal linings of the pipeline.

The specified thickness shall be achieved in one application for solvent free epoxies. In the event of the thickness being less than the minimum specified the coating shall be removed and the pipe length shall be re-blasted and re-coated to comply with the specification.

The Contractor's tendered rates for the laying of the pipe and fabrication of specials shall be deemed to include for all the Two Part Epoxy repairs that have to be applied in order to deliver a serviceable and acceptable pipeline.

PSL 3.9.8.3 THERMOPLASTIC POWDER COATING AND LINING

A thermoplastic powder coating and lining is to be used such as "Plascoat PPA 571 Aqua". The requirements for the "Plascoat PPA 571 Aqua" thermoplastic powder coating system are identical to the requirements for the thermoplastic powder lining system.

The preferred means of application of the coating and lining is by either Electrostatic Spray (ES) or Fluidised Bed Coating (FB) and Flame Spraying (FLS) to be used for field repairs.

Where pipe specials fitted with flanges are to be coated with "Plascoat PPA 571 Aqua" special methods shall be utilized to ensure that "Plascoat PPA 571 Aqua" is not applied to the flange face. Under no circumstances shall scraping or grinding of "Plascoat PPA 571 Aqua" on flange faces be allowed.

PSL 3.9.8.4 RILSAN COATING AND LINING

The requirements for the "Rilsan" or similar approved fusion bonded powder system are identical to the requirements for the "Rilsan" lining system. The surface preparation of the substrate, the application and curing of the product shall be in terms of the supplier's specifications and recommendations.

Where pipe specials fitted with flanges are to be coated with Rilsan, special methods shall be utilized to ensure that Rilsan is not applied to the flange face. Under no circumstances shall scraping or grinding of Rilsan on flange faces be allowed.

Repair work to Rilsan coated pipes and pipe specials shall be limited to the absolute minimum. Should Rilsan be affected by welding which in turn requires repairs to be affected, the Rilsan shall be removed by grinding up to a point where the Rilsan coating is sound and adheres to the pipe material without traces of disbonding, spalling or flaking.

The 25mm edge of Rilsan, onto which repair epoxy is to be applied, will be abraded with 80 or 100 grit emery paper to ensure adhesion of repair epoxy in the area. The bare metal, where repair epoxy has to be applied shall be grit blasted to render a surface finish of St2 before the application of the epoxy.

All steel pipes of nominal bore up to and including DN300, to be used for the manufacture of pipe specials and fittings, shall be coated and lined with Rilsan or similar approved.

PSL 3.9.8.5 PROTECTIVE UV COATING AND COATING OF PERMANENTLY EXPOSED PIPE

All pipes and specials coated which are to be permanently exposed or above ground shall be over-coated with three or more coats of “Carboline, Carbothane 134 Clear Coat” or similar approved light coloured UV protection acrylic polyurethane resistant coating to a total minimum dry film thickness of 100 microns for UV protection. The pipe surface shall be prepared and the coating applied in strict accordance with the manufactures instructions or shall 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.

PSL 3.9.9 REQUIREMENTS OF COATINGS AND LININGS

Add new Sub-Clause:

PSL 3.9.9.1 REQUIREMENTS OF SOLVENT FREE EPOXY LININGS ANF COATINGS

PSL 3.9.9.1.1 PERFORMANCE CRITERIA

Applied coatings and linings shall comply with all the requirements given in Table 1 below:

Table 1: Requirements of Solvent-Free Epoxy

TEST	PROPERTY	REQUIREMENT	TEST METHOD
1	Visual	Smooth, glossy, or semi-glossy finish, free from excessive runs, sags, orange peel, occlusions or other visible defects.	Use an experienced observer.
2	Coating Thickness	Refer to PSL 3.9.8.1	SANS Method 141. Take a minimum of 2 readings per m ² of surface up to 300mm nominal bore, or 1 per m ² over 300mm nominal bore.
3	Electrical Insulation Defects	<u>Solvent-free</u> : Nil defects at 90 Volts, 10 Mega-ohm.	SANS 1217, Section 8.12.1

TEST	PROPERTY	REQUIREMENT	TEST METHOD
4	Impact Resistance	No defect at 1 Joules	SANS 1217, Section 8.7 but modified as given in Note 1.
5a	Degree of cure: Static Test	No softening or discolouration when fully cured.	SANS 1217, Section 8.9. Cure time shall be in accordance with the manufacturer's data. 50 Double rubs with cotton wool swab soaked in MEK. Cure time shall be in accordance with the manufacturer's data.
5b	Dynamic Test	No softening or discolouration when fully cured.	
6	Adhesion (Hot water soak)	Not more than 15mm disbonding from point of V.	Immerse in water at 75°C for 48 hrs. Make V cut at 30° angle. Test adhesion when panel has cooled to 25°C.
7	Cathodic Disbonding	Total disbonded area not to exceed 40mm diameter after 30 days. Current flow not to exceed 5mA.	ASTM G8 Method B - Magnesium Anode - 20°C - 7mm holiday.
8	Cathodic Disbonding (Accelerated)	Total disbonded area (including holiday) not to exceed 20mm diameter.	Impressed current - 3,5 volts potential at 75°C for 48 hrs. 3mm artificial holiday.

NOTE 1: Impact resistance shall be carried out on a sample of production pipe firmly clamped and choked (to be rebound free) to a rigid base. No electrical insulation defects shall be detected at the point of impact when tested at 1 Joule.

PSL 3.9.9.2 REQUIREMENTS OF FUSION BONDED AND THERMOPLASTIC POWDER LININGS AND COATINGS

PSL 3.9.9.2.1 PERFORMANCE CRITERIA

Applied coatings and linings shall comply with all the requirements given in Table 2 below:

Table 2: Requirements of Fusion Bonded and Thermoplastic Powered

TEST	PROPERTY	REQUIREMENT	TEST METHOD
1	Visual	Smooth, glossy, or semi-glossy finish, free from excessive runs, sags, orange peel, occlusions or other visible defects	Use an experienced observer.
2	Coating Thickness	Refer to PSL 3.9.8.1	SANS Method 141. Take a minimum of 2 readings per m ² of surface up to 300mm

TEST	PROPERTY	REQUIREMENT	TEST METHOD
			nominal bore, or 1 per m ² over 300mm nominal bore.
3	Electrical Insulation Defects	Nil defects at 3,500 volts. For conditions for repair, see Clause 3.9.2.3	SANS 1217, Section 8.12.2
4	Impact Resistance	No defect at 2 Joules	SANS 1217, Section 8.7 but modified as given in Note 2.
5a 5b	Degree of cure: a) Static Test b) Dynamic test c) Thermal characteristics	No softening or discolouration when fully cured. No softening or discolouration when fully cured. Chemical conversion shall be not less than 90%	SANS 1217, Section 8.9. Cure time shall be in accordance with the manufacturer's data. 50 Double rubs with cotton wool swab soaked in MEK. Cure time shall be in accordance with the manufacturer's data.
6	Adhesion (Hot water soak)	Not more than 5mm disbonding from the point of V.	Immerse in water at 75°C for 48 hrs. Make a V cut at a 30° angle. Test adhesion when the panel has cooled to 25°C.
7	Cathodic Disbonding	Total disbonded area not to exceed 40mm diameter after 30 days. Current flow not to exceed 5mA.	ASTM G8 Method B - Magnesium Anode - 20°C - 7mm holiday.
8	Cathodic Disbonding (Accelerated)	Total disbonded area (including holiday) not to exceed 10mm diameter.	Impressed current - 3,5 volts potential at 75°C for 48 hrs. 3mm artificial holiday.

NOTE 2: Impact resistance shall be carried out on a production pipe. The inside of the pipe shall be supported by a wooden block fitted vertically across the internal pipe diameter and chocked so as to fit tightly and immediately beneath the point of impact. Damage to the coating shall be assessed by measuring electrical insulation defects at the point of impact. No defect is permitted after impact at 2 joules. Alternatively, the test may be carried out on a sample cut from the pipe and rigidly supported beneath the point of impact.

PSL 3.9.9.3 FREQUENCY OF TESTING

Tests 1 to 3 of TABLE 1 shall be applied to each and every pipe or pipe special.

Tests 4, 5(a) and 5(b) of TABLE 1 shall be applied to at least one pipe selected at random from the first day's production or from each batch of liquid epoxy, whichever is more frequent.

Tests 6, 7 and 8 of TABLE 1 shall be applied to at least one pipe or pipe special selected at random from the first day's production of each item.

Should the Contractor experience difficulties in achieving this specification, additional tests may be required by the Employer until the problem(s) has been identified and rectified.

Such additional tests shall be to the Contractor's account.

PSL 3.9.10 HOLIDAY TESTING (NEW SUB-CLAUSE)

Add new Sub-Clause:

All Holiday Testing shall be carried out with an instrument approved by the Employer's Representative. The sparking detection test shall conform to the standards as set out in SANS 1217:2001.

The Contractor shall familiarise himself with the dielectric strength (breakdown strength) of all the coatings and linings he works with for the different pipe sizes. The Contractor shall also have an in-depth knowledge of the Holiday Testing equipment he works with, in order to calculate the Corona discharge effect for the typical brush being utilised, with reference to the specific ambient conditions for any specific test.

All Holiday Testing will be executed at a voltage which is set at 50% of the value of the dielectric strength of the lining or coating being tested for the required nominal DFT of applied coating. 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 utilised as a testing voltage applied to the surface of the coating.

Method statements for the process of holiday testing shall be submitted to the Employer's Representative for approval.

The Holiday Test equipment is to be calibrated for the required "closed circuit" voltage on site on commencement of testing. Each piece of equipment shall have a unique identification number, with calibration certificates, and details of the equipment utilised shall be submitted to the Employer's Representative for approval.

The Holiday Test voltage shall be adjusted every 30 minutes for battery condition and operating efficiency or every time a test at a different location is started.

The correct equipment for the type of application will be utilised. For example, where pin holes have been repaired and retesting for the effectiveness of repair work is being done, the Contractor shall utilise the correct equipment to affect the 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 utilised shall be brass-bristle cone brushes. The typical brush speed shall be 200 to 300 mm/sec when doing spark tests.

Wet sponge tests shall be done to detect holidays on internal linings of the pipeline.

The Contractor shall, at his expense, test each and every surface area, that is internal epoxy lining as well as external coating, during construction as per this specification. Testing for holidays shall be done after inclusion of materials, manufactured specials and equipment, as well as pipes, into the permanent works. Any defects found shall be repaired, and the costs for remedial work shall be deemed to be included in the tendered rates for the construction of the pipeline. These tests and results shall be recorded on the quality control plan as approved by the Employer's Representative.

PSL 3.9.10.1 EXTERNAL HOLIDAY DETECTION ON PIPE COATING

PSL 3.9.10.1.1 HOLIDAY TESTING OF PIPE AT WORK FRONTS

The coating of each pipe shall be inspected and holiday detected by the Contractor, immediately prior to being laid, and these inspections will be witnessed and signed off by the Employer's Representative or an appointed third-party inspection authority. Two-thirds of the circumference will be inspected outside the trench, after the pipe has been transported to the construction site, where the pipe will be laid, and the balance of the circumference will be inspected once the pipe has been laid into the trench and rotated 180°. All testing shall be marked on the pipe from the start of the test point to the completion of the test point. All remedial work shall be effected immediately upon detection of any holidays. The cost of holiday testing and effecting remedial work to the coating of the pipe at the installation location, as a result of construction or transportation damage by the Contractor, shall be deemed to be included in the tendered rates for the laying of the pipe.

PSL 3.9.10.2 EXTERNAL HOLIDAY DETECTION ON TAPE WRAP SYSTEMS

Each and every external coating repair at welded joints, which are repaired with a tape wrap system, shall be holiday tested and approved in terms of the relevant Quality Control Plan. All the costs for holiday detection and any costs for effecting remedial work shall be deemed to be included in the tendered rates for applying tape wrap systems.

PSL 3.9.10.3 EXTERNAL HOLIDAY DETECTION ON TAPE WRAP SYSTEMS

All pipe specials being corrosion protected with an external coating shall be holiday tested before being incorporated into the works, as well as holiday tested after inclusion into the works. All the costs of holiday detection and any costs for effecting remedial work on such pipe specials shall be deemed to be included in the rates for the laying of the pipe.

PSL 3.9.10.4 EXTERNAL HOLIDAY DETECTION ON CORROSION PROTECTION SYSTEMS FOR FITTINGS AND MANUFACTURED SPECIALS

The corrosion protection systems on all fittings and manufactured specials shall be holiday tested once included in the permanent works. All the costs of holiday detection and any costs of effecting remedial work on corrosion protection systems shall be deemed to be included in the tendered rates for the laying of the pipe.

PSL 3.9.10.5 INTERNAL HOLIDAY DETECTION ON PIPE LININGS

The appropriate wet sponge tests shall be conducted on the internal surfaces of all epoxy linings, reinstated joints of manufactured specials and repairs to linings, before final cleaning of sections of the pipeline that are completed. All the costs for wet sponge holiday detection and any costs for effecting remedial work on internal linings shall be deemed to be included in the rates for the laying of the pipeline.

Should the Contractor feel that some of the holidays detected in the lining are a result of the manufacturing process at the point of manufacture, this should be brought to the Employer's Representative's attention for evaluation, before the pipe is removed from the pipe yard. The Employer's Representative's decision in this regard will be final, and should it be decided that the holidays are in fact a result of the manufacturing process, the Contractor shall be required to repair the same at the cost of the Employer.

PSL 3.10 VALVES

Add the following to the end of the Sub-Clause:

All valves DN600 and less shall be wedge gate valves to SANS 664 of type "AVK" / "VAG" or equal approved. Valves of size DN350 and larger shall be supplied complete with gearboxes.

All Valves shall be anticlockwise closing when the spindle is viewed from above and supplied with cap tops unless otherwise specified on the drawings or bill of quantities. All valves where the cap top is buried deeper than 0.5 m shall have a spindle extension installed with the valve unless otherwise directed by the Employer's Representative. All spindle extensions shall be hot-dipped galvanised to SANS 121:2000/ ISO 1461:1999.

Types of valves required in the works shall be as stated in the schedule of quantities and on the drawings. Where a particular make of valve is stated, the contractor may offer an equivalent alternative, provided full details are submitted at the time of tender.

PSL 3.13 MECHANICAL WORKS

PSL 3.13.1 GENERAL

All mechanical equipment shall be manufactured and supplied in accordance with the relevant approved Standard Specifications governing the product.

Equipment must meet the performance specifications required by the design, and the contractor must supply full details of the equipment offered and the applicable specifications and quality control certification related to the manufacture of the items.

PSL 3.13.2 VALVES

Types of valves required in the works shall be as stated in the schedule of quantities and on the drawings. Where a particular make of valve is stated, the contractor may offer an equivalent alternative, provided full details are submitted at the time of tender.

PSL 4 PLANT

PSL 4.1 HANDLING AND RIGGING

Add the following to L 4.1:

The Contractor shall supply, operate and maintain an adequate fleet of vehicles including cranes to be used for the safe conveyance of the pipes, specials and fittings. The pipes and specials shall be handled with care at all times to avoid damage to them or to the protective coatings. The equipment for the purpose of loading, transporting, unloading and moving and the manner in which they are handled shall be subject to the approval of the Employer's Representative.

During transport, the pipes and specials shall be supported on suitable pipe saddles such that all pipes and specials shall be separated so as not to bear against each other and shall be handled with care at all times to avoid damage to them or to the protective coatings. The equipment for the purpose of loading, transporting, unloading and moving and the manner in which they are handled shall be subject to the approval of the Employer's Representative.

The use of bare cables, chains, hooks or narrow skids will not be permitted and the Contractor shall supply canvas slings, padded skids, and ramps of a sufficient width to prevent damage to the protective coating. The dragging or skidding of pipes and specials in contact with the ground shall not be permitted.

When handling 12 m pipe lengths, the pipes shall be lifted with band slings (minimum 300 mm wide) placed centrally around the pipe at two points 6 metres apart.

PSL 5 CONSTRUCTION

PSL 5.1 LAYING

PSL 5.1.1 GENERAL

Add the following to L 5.1.1:

The Contractor will be held fully responsible for the care and safety of all pipes and fittings, etc, on site, and shall bear the cost of all renewals, which may be necessary to make good losses, damages or breakages. Furthermore, he shall be fully responsible for handling and reloading material at the storage areas and for transporting and offloading of all such materials to the Site of the Works.”

Pipes and specials shall be lowered gently and carefully into the trench without jarring or bumping by crane, derrick, or other approved lifting tackle, and care shall be taken not to damage the pipe or its sheathing. Pipes and specials with soft sheathing shall be supported in stout, wide canvas slings, and no wooden blocks shall be used to support such pipes, either on the side or in the trench. Any supports required shall be formed with fine sand or gravel.

The Contractor shall ensure that all pipe barrels are evenly supported over the whole of their length and that no weight is taken by the joints. The trench bottom shall, where necessary, be accurately trimmed by hand, and each pipe shall be firmly bedded down before backfilling is commenced.

The Contractor's special attention is drawn to the requirements for detailed fabrication drawings, working in confined spaces and for shoring of trenches.

PSL 5.1.1.1 PIPELAYING PERSONNEL

Add new Sub-Clause

The laying of all pipework items shall be performed only by qualified and experienced persons or who are registered as artisans in the plumbing, pipefitting or drainlaying trades or who are qualified by reason of having attended and passed the course on pipelaying of the Civil Engineering Industry Training Board.”

PSL 5.1.2 DAMAGE

Add the following to L 5.1.2:

All pipes, specials, valves and fittings shall be carefully examined by the Contractor for internal and external damage at the following stages:

- A. on arrival at laying site;
- B. prior to laying;
- C. after laying;
- D. prior to backfilling; and
- E. during backfilling.

All damage or defects of any kind shall be repaired by the Contractor to the satisfaction of the Employer's Representative or an appointed third-party inspection authority immediately after detection at any of the above inspections.

Where, in the opinion of the Employer's Representative, satisfactory repairs are not

practicable, the damaged materials shall be replaced by the Contractor at his own cost.

PSL 5.1.3 KEEPING PIPELINES CLEAN

Add the following:

Stacking of Pipes and Specials

The Contractor shall ensure that all pipe work is installed internally, free of any contaminants. All traces of dirty water, slag, splatter, sward, 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. At steep slopes, the mat is to be restrained from sliding down the pipe. Care must also be taken on steep slopes to restrain equipment and hand tools from sliding down the pipe during construction.

The relevant safety procedures are to be followed when entering pipes.

The Contractor shall ensure that all dust, grit and powder that accumulates in the pipe as a result of grit blasting for the repair of internal linings is removed from the pipe in an acceptable manner before the internal lining repair kits are applied.

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 no flushing of the completed pipeline will be allowed after construction has been completed, and therefore, clean housekeeping practices will be required under all circumstances during construction. The tendered rates for pipe laying shall include the clean housekeeping practices required.

The Contractor shall, where approved by the Employer's Representative, be allowed to construct Access Tee's at the bottom of steep inclines to retrieve dirt, dust, tools and loose gear and /or other objects that fell down the pipeline where construction took place along steep grades. A variation order for such work has to be issued by the Employer's Representative, as these Access Tees are not specifically indicated on the drawings, as they will be constructed as and where required.

PSL 5.1.3.1 CLEANING OF VALVES AND FITTINGS

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 Employer's Representative.

PSL 5.1.3.2 INSPECTION OF PIPE INTERNALS

Add new Sub-Clause:

Each section of the pipework is to be internally inspected and passed by the Employer's Representative, once construction has been completed. If the pipe work is not satisfactory, the Contractor shall clean the pipe at his own expense until the pipe is passed as clean. The Employer's Representative reserves the right to utilise cameras or any other means to inspect

inaccessible angles.

PSL 5.1.6 EQUIPMENT FOR INSPECTING INTERNAL SURFACES OF PIPELINES

PSL 5.1.6.1 CCTV

Add:

Weld and Internal Lining Inspections

The internal pipe joint is to be checked with a suitable CCTV camera if it is too small for physical entry. External welds are to be checked in accordance to project specification PSL 7.2.

The internal surface of the pipe is to be checked for any local damage. Internal and external photographs of the joint repair and weld are to be taken, identified with adjoining pipe numbers and recorded. Weld and internal lining approval is to be signed off by representatives of the Contractor and the Employer's Representative.

Any defects of the weld or internal lining repair must be fixed in accordance to the specification and inspected again with a CCTV camera at the Contractor's expense.

PSL 5.1.7 END CAPS

Add new Sub-Clause:

The Contractor shall, at the end of each day's work, fit end caps to the open ends of the pipeline under construction. The end caps shall be manufactured in such a manner that they can be fitted to seal off the pipeline to the extent that it is totally dust and water-proof. The end cap must be able to withstand a pressure of 0.5 Bar when fitted.

End caps shall be maintained during non-working periods.

End caps shall be fitted to all scour Tees to prevent ingress of water and or animals or reptiles.

The tendered rates for the laying of pipe shall be deemed to include the supply, fitment and maintenance of the end caps.

PSL 5.1.8 MARKER POSTS

Add new Sub-Clause:

Pre-cast concrete marker posts shall be installed on either side of the meter assembly as well as above the buried meter and where otherwise indicated by the Employer's Representative.

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 all necessary excavation, mass concrete footing and formwork.

PSL 5.2 JOINTING METHODS

PSL 5.2.2 FLANGES (STEEL PIPELINES)

Add the following to L 5.2.2:

Before being brought together, the ends of the pipes, fittings, couplings and all flanges are to be inspected and cleaned to ensure that all parts forming the joint are undamaged and clean.

Flanges to fittings or joints will generally be to SABS 1123. It is possible, however, that the Employer may supply valves with flanges which have not been drilled according to these standards. The Contractor shall be responsible for checking the flange drilling of all fittings supplied by the Employer and for supplying flanges drilled to match. Contractors are to note that generally, matching flanges or jointing material to gate and butterfly valves are supplied by the Employer, but not always. No additional payment is to be made for this work, and the Contractor is to allow for such in his rates.

Contractors are to allow in the rates for the supply and installation of mild steel pressed washers (two per bolt) for all flanged fittings. The washers shall have an ID of 2 mm greater than that of the bolt. Tenderers are to ensure that the length of the bolt includes allowance for the washers.

All bolts, nuts and washers to be in accordance with PSL 3.8.8.

Wherever loose or slipped-on flanges are welded onto pipelines, the Contractor shall ensure that the flange is lined and coated to project specifications and that all repairs to the lining and coating are in accordance with the project specification.

PSL 5.2.3 WELDING (STEEL PIPELINES OF DIAMETER 600 mm OR GREATER)

Delete the title and replace it with "Welding (Steel Pipelines)."

Add the following to the end of the Sub-Clause:

Unless otherwise indicated on the drawings, field jointing by butt welding is required for all pipelines.

Field welding of steel pipelines shall be carried out in accordance with the relevant requirements of the latest version of API 1104. The Contractor shall, prior to commencement of welding, 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.

The pipe ends are to be prepared in accordance with the relevant requirements of the latest version of API 1104.

Site-welded butt joints are to be tested by radiographic examination and/or other approved method (e.g. dye penetration) as ordered by the Employer's Representative.

Site-welded fillet joints (for sleeved or "bell-end" pipes) are to be tested by dye penetration tests as ordered by the Employer's Representative.

In the event of any welded joint proving unsatisfactory when the pipeline is subjected to the radiographic, dye penetration or hydraulic tests, the Contractor shall be held responsible for all costs involved in repairing the joint or cutting it out and welding in a new section of pipe, as may be ordered by the Employer's Representative, thereafter restoring the lining and wrapping, if these have become damaged, all to the satisfaction of the Employer's Representative.

After joining and testing, the protective lining and wrappings are to be rendered continuous in the manner specified. Holiday detection tests shall be carried out in the field to ensure

continuity of lining and wrapping.

PSL 5.2.3.1 PROCEDURE QUALIFICATION TESTS

Add new Sub-Clause:

The qualification tests for welding procedure shall be carried out generally in accordance with the requirements of API 1104. The detailed procedure to be adopted during manufacture shall be established. Prior to commencement of welding, the current qualification of each welder must be established in accordance with the welding procedure. Should constant repairs be required on welds carried out by one particular welder, the Employer's Representative may request that the welder be re-tested or removed from the project.

The Contractor shall maintain a record of all welders employed on the works giving particulars of each individual welder's qualification tests carried out in terms of API 1104, the cost of which shall be borne by the Contractor. Qualification testing of welders shall be conducted in the presence of the Employer's Representative or his representative.

Before a welder is employed on tack or root welds, he shall carry out a test tack and root weld on a pipe of the same materials and under conditions as close as possible to those experienced on the actual pipeline.

The tests are to be carried out either before the manufacture of the pipes to be supplied under this contract is commenced or before the manufacture of pipes in excess of a number previously agreed by the Employer's Representative is carried out.

The coupon plates shall be prepared either from plates of the same material as the pipe and welded in a similar manner to that to be used during production, or by cutting suitable specimens from a pipe selected at random by the Employer's Representative from the first production pipes. The coupon plate for the tensile weld test and those for the guided cold bend tests shall be prepared in accordance with the requirements of SABS 719.

The qualification tests shall be considered satisfactory if:

- a) The weld has a joint efficiency greater than 95% of the minimum specified tensile strength of the parent metal and,
- b) The bend test specimens are capable of being bent around a former with a diameter equal to six times the nominal thickness of the plate to an angle of 180 degrees without developing a crack, except at the ends of the specimen, of length or width greater than 3 mm.

Failure to pass the above qualification tests shall result in the rejection of any pipes welded with the procedure used and the preparation of a new qualification procedure test.

Any changes in the electrode case type used or change of flux used shall require a qualification test before approval of the procedure is granted.

PSL 5.2.3.2 WELDING PROCEDURE

Add new Sub-Clause:

All welding shall conform to the approved welding procedures, which must be submitted to the Employer's representative for approval.

The minimum number of root bead welds, the minimum number of second bead welders and the type of clamp used (internal or external) shall be given in the description of the welding

technique as specified above.

All welding procedures shall incorporate the power brushing of all welds after having deposited each and every layer. It is a condition of this specification that each and every weld run be power brushed before the next run is deposited.

Welding shall not be performed under conditions that could affect the quality of the welded joint (e.g. high moisture or windy conditions). Wind and rain shields may be used where practical.

NOTE: Should the Contractor want to utilise shorter lengths of pipe than those supplied, for construction purposes, in order to work in confined areas, a detailed method statement in motivation for such cutting shall be submitted to the Employer's Representative for approval. Pipes shall not be cut into shorter lengths for construction purposes, unless approved by the Employer's Representative. The costs associated with any additional welds at joints, as a result of cutting pipes into shorter lengths as approved by the Employer's Representative, shall be borne by the Contractor.

PSL 5.2.3.3 CLEARANCE

Add new Sub-Clause:

The minimum clearance around the pipe during welding shall be 600mm. When welding in the trench, "foxholes" will be required to provide adequate working space for the welders.

PSL 5.2.3.4 VISUAL INSPECTION

Add new Sub-Clause:

100% of each joint will be examined, and the following criteria will be met:

All welds shall be substantially uniform in appearance, with the inner and outer weld beads not exceeding 1 mm and 3 mm, respectively, in height above the pipe surface.

The weld, heat-affected zone and surrounding parent metal shall be free from cracks, porosity and trapped slag.

All weld splatter must be removed prior to the application of corrosion protection.

PSL 5.2.3.5 PREPARATION OF JOINT

Where scarf cutting of the pipe ends is required in the field, the pipe ends shall be prepared by machining or machine flame cutting. Hand flame cutting shall not be permitted except under the following circumstances.

PSL 5.2.3.5.1 FIELD WELDING

Steel pipes may be cut by hand flame as follows:

- a) In the case of cement-lined steel pipe, the cement lining shall be chipped back 50 mm after the initial cut, and the pipe then re-cut ± 10 mm from the original cut in order to remove any "blow-back".
- b) In the case of epoxy-lined steel pipe, all damaged lining shall be removed and reinstated in compliance with Clause 3.9.2.3.
- c) All flame cuts shall be made good by grinding to form the correct gap between

steel sections prior to welding.

- d) Bevels may be cut by flame, provided they are made good by grinding.

When jointing pieces by butt-welding, the number of tack welds applied shall be kept to a minimum to be effective in holding the pipe ends securely and to maintain the required root gap prior to welding, but shall in any case be not less than four.

PSL 5.2.3.6 WELDED ATTACHMENTS

Add new Sub-Clause:

Where it is necessary to weld attachments to pipe work (e.g. Cathodic Protection Lugs and Pipe Support Brackets and Trunnions), the material of the attachment is to be compatible with the pipe work and be welded on by an approved welder using approved welding procedures.

Welded attachments onto pipe work are to be subjected to the same level of NDT as the pipe work.

PSL 5.2.3.7 ALIGNING

Add new Sub-Clause:

The alignment of abutting ends will be such that the offset does not exceed 1.5 mm. Line-up clamps may be used for joint “fit-ups.”

“Dogs” and wedges for the alignment of pipe work for butt when fitting up before welding shall not be allowed as a rule. Should the Contractor require the use of “dogs” and wedges, approval from the Employer’s Representative shall be obtained. The Contractor shall, upon removal of any “dogs” and wedges, pay attention to the following repair requirements:

- Where “dogs” and wedges have been removed from the pipe, the damage to the metal surface of the pipe shall be ground clean.
- The required number of welding runs shall be performed in order to fill the hole with welded material.
- The filled area shall be ground smoothly in order to ensure that the repaired area is level with the original pipe material.
- A dye penetrant test or whichever is most applicable shall be executed on the repaired area before repairing the external coating.
- The repair to the outer coating shall be effected in terms of the accepted procedure for coating repair.
- The repair to the inner lining at the point of removal of “dogs” and wedges shall be effected in terms of the accepted procedure for lining repair.

PSL 5.2.3.8 WEATHER CONDITIONS

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). Wind and rain shields may be used where practical.

PSL 5.2.3.9 QUALITY CONTROL

Add new Sub-Clause:

Records of which welds were carried out by each individual welder, as well as the respective

results of non-destructive testing, shall be submitted to the Employer's Representative at each monthly site meeting. Should there be repetitive or serious welding defects, this information shall be forwarded to the Employer's Representative immediately.

Each weld and welder shall be given a unique number, which shall be logged against each weld. This data will be used for reference on construction records, drawings, reports, radiographs and NDT records.

PSL 5.2.3.10 SCREENS FOR WELDING

No welding or cutting equipment liable to cause sparks or flashes shall be used at or above ground level unless the operation is carried out within a suitable enclosure, or unless suitable screens are erected in order to shield passers-by from the emitted light and/or sparks.

PSL 5.2.3.11 MANUFACTURING OF CROTCH, SADDLE PLATES, WRAPPERS AND GUSSETS

The Contractor shall pay careful attention to the details when crotch and saddle plates, and/or gussets and wrappers are manufactured. All plate material for any one of these items shall, where it has to be welded together or welded onto pipe specials, be bevelled to the extent that full penetration welds would be possible under all circumstances. The Employer's Representative is to be requested to inspect all applicable fit-ups for approval before welding commences. (This is required for workshop fit-ups as well as field fit-ups.) 100% NDT testing or other applicable test methods will be required on all welds to crotch and saddle plates, gussets and wrappers. The tendered rates for the manufacturing of pipe specials which require crotch plates, saddle plates, gussets or wrappers shall be deemed to include all the material to be supplied, the welding and NDT testing as required by this specification.

All Crotch plates are to be manufactured from Grade X42 steel plate or Grade 300WA steel plate for all sectors.

Saddle plates and Wrappers shall be manufactured from pipe supplied by the Employer as Free Issue material (hereafter called donor pipe material). The saddle plates and wrappers shall be manufactured from the same grade of donor pipe and the same diameter as the pipe on which the saddles or wrappers are to be fitted. Coating on the pipe, onto which saddles or wrappers are to be fitted, shall be removed, and saddles or wrappers shall be cut from the donor pipe material to the required dimensions. The donor pipe material shall be slightly heated and then hammered into shape onto the accepting pipe in order to take up the required diameter.

All saddle plates are to be manufactured from free issue pipe material of the same DN and grade as the main pipe, in terms of the drawings for the specific pipe special.

All crotch plates are to be manufactured from material procured by the Contractor, in terms of the drawings for the specific pipe special.

PSL 5.3 SETTING OF VALVES, SPECIALS AND FITTINGS

Add the following:

Valves and fittings shall be installed in accordance with the manufacturer's instructions. Where valves are supplied by the Employer at Municipal depots, they shall be collected by the Contractor at such depots and transported to the laying site.

Valves are to be set correctly in the positions indicated and supported on concrete stools, except where not so required by the Employer's Representative and shall be installed with

their operating spindles vertical. Valve spindle guide brackets and stays, where provided, shall be secured into position against concrete work, and these must be set and carefully adjusted in order to give true vertical alignment of the spindle. The Contractor shall supply the insertions and bolts necessary for the installation of the valves.

PSL 5.3.1 THE STORAGE, COMMISSIONING AND INSTALLATION OF BUTTERFLY VALVES

Add new Sub-Clause:

Butterfly valves shall be stored, installed and commissioned so that the valve blade seal is protected at all times from oxidation, ozone attack and the ingress of dirt. All butterfly valves are to be installed such that the disc is installed horizontally to the flow direction with the hand wheel on the right-hand side of the flow direction.

PSL 5.3.2 STORAGE

Add new Sub-Clause:

- The valve is to be stored in the vertical position.
- The valve should be stored in the cracked position (i.e. not shut).
- The valve should not be stored in the vicinity of electrical equipment.
- The valve should be stored under cover and protected from temperature extremes.

PSL 5.3.3 INSTALLATION AND COMMISSIONING

Add new Sub-Clause:

- Prior to the installation of the valve, all dust and dirt should be washed off the valve, particularly the seal, seat and any tapped holes in the valve body.
- The seals of all valves shall be checked for complete closure when the valve blade is in the fully closed position. (See seal adjustment below).
- The valve must not be lifted by the hand lever, valve actuator or the handwheel.
- The valve must not be used for lining up the pipework.
- The valve should be left in the fully open position after installation and prior to commissioning of the system.
- The valve is to be installed such that the disc opens in the direction of flow and is horizontal to the flow.
- The valve is to be installed such that the hand wheel is on the right-hand side of the pipeline in the direction of flow.

PSL 5.3.4 SEAL ADJUSTMENT

Add new Sub-Clause:

To adjust the seal, a 0,004" feeler gauge and an Allen key are required.

With the valve in the fully closed position, it should be possible only with difficulty to introduce the feeler gauge between the valve blade seal and the seat.

If, due to seal movement during storage, the feeler gauge can easily pass between the seal and seat, then the clamp ring socket head cap screws in the vicinity of the gap should be

finger tightened with the Allen key so as to push the seal out and close the gap.

PSL 5.3.1.4 PAYMENT

All costs incurred for the seal adjustment as stipulated above shall be included in the respective rates for installation of the valves.

PSL 5.5 ANCHOR/THRUST BLOCKS AND PEDESTALS

In the fourth line of the Sub-Clause, delete "15 MPa/37,5 mm" and replace with "20/19"

PSL 7 TESTING

PSL 7.1 GENERAL

Add the following to L 7.1:

Inspection

Facilities shall be provided to the Employer's Representative so that he may be able to inspect, during the process of welding, any layer of weld metal. He may require any defective welds to be either cut out and re-welded or repaired at his discretion. The Contractor shall clean thoroughly all welds prior to inspection. The Employer's Representative may require a number of completed joints, selected at random, to be cut for mechanical tests or to be selected for visual inspection, micro examination or examination by other means. When the Employer's Representative orders the Contractor in writing to cut out and test joints, the Contractor shall be paid for such work at day work rates.

If, as a result of inspection and testing, the work of any welder is found to be unsatisfactory, the welder shall not be permitted to continue welding under this contract.

Standards of Acceptability

The completed welds shall comply with the requirements of Clause 6.0 of API 1104. Work on which unauthorised repairs have been carried out may be rejected.

Repairs to Minor Faults

Faulty welds shall be rectified in accordance with clause 7.0 of API 1104.

All costs relative to the repair of faulty joints, including removal and replacement of the backfill and making good the wrapping and lining, shall be borne by the Contractor.

PSL 7.1.2 NON-DESTRUCTIVE TESTING (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Company or individuals appointed to execute NDT testing shall have an approved accreditation with the National controlling authority, and the Contractor shall allow for this in their rates for welding.

The standard method for Non-destructive Testing of butt welds is X-Ray testing. Under certain circumstances, however, X-ray testing of welds is not possible as a result of limited access. The Contractor shall allow in his rates for alternative test methods of welds where required (Example: Ultrasonic, Magnetic Particle Inspection, Dye Penetrant Tests, Etc).

The standard method for Non-destructive Testing of fillet joints (sleeve or “belled end” pipe joints) is dye penetration testing.

In the event of any welded joint proving unsatisfactory when the pipeline is subjected to the radiographic, dye penetration or hydraulic tests, the Contractor shall be held responsible for all costs involved in repairing the joint or cutting it out and welding in a new section of pipe, as may be ordered by the Employer’s Representative, and thereafter, for the costs of retesting the final weld and restoring the lining and wrapping, if these have become damaged, all to the satisfaction of the Employer’s Representative.

After joining and testing, the protective lining and wrappings are to be rendered continuous in the manner specified. Holiday detection tests shall be carried out in the field to ensure continuity of lining and wrapping.

The tendered prices for uplifting at the pipe yards, transportation to the work front, handling, laying, jointing and testing of pipes are to include all the work described above and for the supply of all necessary materials, including welding, all necessary plant and labour, etc.

PSL 7.2 INITIAL TESTS ON WELDED STEEL PIPES

PSL 7.2.1 DYE-PENETRANT TEST

Add the following:

100% of all fillet welds and other welds shall be dye penetrant tested. Any reduction in the percentage of welds to be tested shall be at the sole discretion of the Employer’s Representative

PSL 7.2.2 RADIOGRAPHIC EXAMINATION

Add the following:

100% of all butt welds shall be radiographically tested. Any reduction in the percentage of welds to be tested shall be at the sole discretion of the Employer’s Representative.

PSL 7.2.2.1 RADIOGRAPHIC PERSONNEL

Radiography and handling of associated equipment shall only be carried out by qualified and approved Radiographers.

The Radiographers shall be in attendance and patrol the perimeter of the Radiographic Area at all times during “bombing”.

PSL 7.2.2.2 MARKING OF RADIOGRAPHIC AREA

Areas where Radiography is going to take place shall be clearly marked off with recognised tape and warning signs. Generally, this shall be a strip of about 6m wide on each side of the trench and 15m radius elsewhere. The location of the source shall be clearly marked by a red flashing light, and the boundary shall be marked by yellow flashing lights.

No person except approved Radiographers shall be allowed to enter the marked off area during radiography exposure.

The Contractor shall ensure that there is easy access for Radiography personnel to minimise

their exposure to radiation.

PSL 7.2.2.3 WARNING OF COMMENCEMENT OF RADIOGRAPHY

When radiography exposure is about to commence, adequate warning to persons in the vicinity will be given by flashing lights and audible signals, whereupon all persons within the marked area shall immediately move to a safe position outside the marked area.

Before commencing radiography, the Radiographer shall carry out a thorough inspection to ensure that all personnel have left the area.

PSL 7.2.2.4 COMPLETION OF RADIOGRAPHY

Completion of radiography shall be indicated by the switching off of all flashing lights and an audible signal.

Warning tape and warning signs shall be removed immediately upon completion of radiography in order to allow general work to proceed as planned.

PSL 7.2.2.5 STORAGE OF RADIOACTIVE SOURCES

Radioactive sources may only be brought onto the site with the approval of the Employer's Representative. The Radiographers must demonstrate that they have a recognised, safe and secure method of storing such sources.

PSL 7.3 STANDARD HYDRAULIC PIPE TEST

Add the following:

The Contractor shall be required to submit to the Employer's Representative a proposed methodology of how he intends to undertake the pressure testing of this pipeline, with attention given as to how the water used for the hydraulic testing of one section can be reused for filling and testing of the following section. The position of the required metered filling points also needs to be agreed with the Authority responsible for the water supply systems of the region.

All potable water used from the metered points for construction and for the hydraulic tests will be charged at the current rate per kilolitre. The Contractor will be compensated for the first filling of the pipeline for hydraulic testing. Any subsequent fills required as a result of re-testing due to failures will be for the Contractor's account. The tendered rates for the construction of the pipeline and the testing thereof are deemed to include the cost of water for construction purposes and fillings, subsequent to the first fill.

Filling of the pipeline for hydraulic testing shall be carried out under the supervision of the Employer's Representative at a rate not exceeding 200 litres per second.

PSL 7.3.1 TEST PRESSURE AND TIME OF TEST

Replace L 7.3.1.1, 7.3.1.2, 7.3.1.3 and 7.3.1.4 with the following:

Static Test

When the pipeline is filled with water, all scours and hydrants shall be opened fully for one minute or until the water emerges clean.

Pressure Test

A suitable pump shall be connected to the pipeline at a mutually agreed point.

The pressure in the pipeline under test shall be raised slowly by means of the pump and measured by a pressure gauge connected to the pipeline.

PSL 7.3.1.2 FIELD TESTING

PSL 7.3.1.2.1 FIELD TESTING OF DN600 STEEL PIPELINES

The required test pressure for all STEEL pipework shall be 2500 KPa measured at the lowest point of the pipeline(s) unless otherwise stated by the Employer's Representative.

The pressure tests on the pipeline shall not be carried out against closed valves. All terminal ends on the pipeline sections being tested shall be capped with blank flanges, bull nose ends, or "spade" pieces as instructed by the Employer's Representative. Bull noses against which pressure testing is done shall be welded onto the pipeline with full penetration welds as per the same specification as for a butt welded joint for the specific diameter.

Shorter sections of pipeline may be tested at the discretion of the Contractor. Should the Contractor opt to test the pipeline in shorter sections, he shall so state in his tender and make due allowance for the additional time required in the construction programme and in the rates for temporary capping or flanging and any other ancillary costs incurred. The pipe shall not be tested until the associated structural concrete has cured for 28 days or until such concrete has attained the specified design strength.

In the case of cement mortar-lined pipelines. once filled, the pipe shall be left for 24 hours to permit maximum saturation of the cement mortar lining.

The section of pipeline to be tested shall be pressurised to the "TEST PRESSURE" given above and left for 24 hours, during which period, the pressure drop (if any) shall be monitored with the permissible leakage for pipe = 0 litre/m.

Should there be a pressure drop after two hours, the pipe shall be re-pressurised to the "TEST PRESSURE" and the make-up water volume carefully noted.

The make-up volume (if any) shall be compared to the volume of water collected at visible leaking points (see PSL 7.3.4). Should the make-up volume not be equal to the volume collected at the visible leaking points, the pipe section will have failed the hydraulic test. Should there be a pressure drop with no visible leaks or should a significant increasing trend in make-up water be apparent, the pipe section will have failed the hydraulic test.

The logistics and strategy for filling and hydraulically testing the pipeline need to be planned in detail and agreed with the Employer's Representative at the early stages of this contract. Arrangements need to be agreed with the Employer (eThekweni Water Services) for making available metered water supply points for filling the sections of the pipeline that need to be tested.

The Contractor shall be required to submit for the approval of the Employer's Representative, a detailed plan of the logistics for transferring the water from a section of the pipeline that has been successfully hydraulically tested, into the next section, so as to minimise the amount of water that might otherwise have to be discharged to waste.

Commissioning of any Section of the pipeline shall only proceed after the pipeline hydraulic testing is successfully completed.

Bull-nose ends may be fabricated from off-cuts of pipe supplied for the relevant section of the pipeline to be tested and will become the property of the Employer once the tests are successfully completed.

The rate for pressure testing is deemed to be inclusive of fabrication and installation of bullnoses, scouring, supplying and installing blank flanges, spade pieces, etc, for the hydraulic test and for removing these items on completion of the successful tests.

On successful completion of the pressure test as per above, the Contractor is to remove all temporary blank flanges, spade pieces, etc. and pressurise the line to maximum working pressure against closed valves. Should any valve not be drop tight at this pressure, the Contractor is to advise the Employer's Representative in writing of all defects encountered. The duration of this test shall be 2 hours. The rate for the testing against closed valves is deemed to be inclusive of the pressure testing rate.

All tests shall be carried out in the presence of the Employer's Representative at such times and in such manner as he may direct.

Provision shall therefore be made by the Contractor for the supply of all necessary bullnoses and blank flanges.

Water for testing shall be made available free of charge in the first instance, but for subsequent tests, shall be charged to the Contractor's account.

A water connection will be provided by eThekweni Water for filling the pipeline for testing purposes.

The Contractor shall, at his own cost, provide a suitable means of conveying water from this connection to the mains to be tested, as well as a connection on the new pipeline, in order that it may be filled. This connection shall be capped or removed to the satisfaction of the Employer's Representative upon completion of the hydraulic test. Payment of this shall be allowed under the rates for the hydraulic testing of the pipeline.

PSL 7.3.4 INITIAL FILLING OF PIPELINE (NEW SUB-CLAUSE)

Add new Sub-Clause:

The entire procedure for filling the pipeline at any time during testing shall be carried out under the instruction of the Employer's Representative and subject to the approval of the entity responsible for the bulk water supply systems of the region from where the supply feed is being drawn.

Under no circumstances will the Contractor be allowed to carry out filling of the pipeline without the supervision of the Employer's Representative, nor shall he permit any other persons to carry out such filling without the written permission of the Employer's Representative, as the operating pressures of the filling system may be too high for the pressure applicable to the section of this contract.

Any damage to the pipeline caused by non-compliance with this clause shall be rectified at the Contractor's expense.

The cost of the water for the initial filling of the pipeline for the execution of the hydraulic test shall be borne by the Employer. Any subsequent fillings required as a result of the Contractor having to rectify workmanship shall be for the cost of the Contractor.

PSL 7.3.5 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 if required, at his own expense. Such remedial measures shall in no way compromise the original pipeline specifications.

PSL 7.3.7 DRAINING OF PIPELINE (NEW SUB-CLAUSE)

Add new Sub-Clause:

Before commencing to fill such sections of the pipeline for testing purposes, the interior surfaces of the pipes will have been cleaned thoroughly of any dirt. The housekeeping during construction of the pipeline must ensure that, once the pipeline has been filled with water, no special steps will be required to disinfect the pipeline. The interior surfaces of these sections of the pipeline will be inspected jointly by the Contractor and the Employer's Representative before the pipeline cleanliness is passed by the Employer's Representative for filling and hydraulic testing.

Nevertheless, the pipeline may have to be drained for the Contractor to carry out remedial measures that may manifest during the hydraulic test. Should this be required, the pipeline shall be drained from scour valves in a controlled manner that does not cause erosion of any stream bed, does not create surface damage to farm lands or private property or negatively impact the environment in any way. Any such drainage of the pipeline shall be carried out under the supervision of the Employer's Representative.

The cost of the water for retesting, should this be required, shall be borne by the Contractor. For pipelines of diameters where it is practically not possible to gain human access for inspection of the internal cleanliness of the pipeline, the Contractor shall ensure that any open ends are firmly closed at the end of each day to minimise the risk of foreign matter entering the pipeline.

PSL 7.4 TESTS ON EPOXY COATINGS

Add the following to L 7.4:

Wet sponge test of SFE lining.

The Employer, on submission of the originals of the test results and respective invoices to the Employer's Representative, will reimburse the Contractor for the cost of all successful tests.

Holiday testing of the tape wrapping and epoxy coating of the pipeline shall be carried out on site by the Contractor. However, at the Employer's Representative's discretion, quotations may be called for holiday testing of the epoxy coating of the pipeline for quality assurance purposes, from a reputable non-destructive testing firm.

- a) Notwithstanding the requirements of any other specification contained in or referred to in this document, the holiday testing of the epoxy coating shall be performed with the apparatus set at 10,000V for FBMDPE coating and 3,500V for FBE and SFE coating.
- b) The holiday testing of the tape wrap system shall be performed with the apparatus set at 3,500V.

It shall be the responsibility of the Contractor to ensure that all test points along the pipeline are individually referenced and that this reference be reflected on the reports. Each test point (e.g. pipeline joints, butt joints in pipe specials, etc.) shall be indelibly marked on the pipe and cross-referenced to the pipeline chainage.

A DCVG survey will be carried out by the Employer after the issue of the Completion Certificate, and the Contractor will be required to repair all defects discovered by the survey at his own cost.

The cost shall include excavation, repair materials, bedding, backfill and reinstatement to the satisfaction of the Employer's Representative.

The Contractor shall ensure that the full length of the pipe to be placed in the trench is patched and holiday-tested prior to the pipe being laid in the trench. Holiday testing of the joints in the trench shall be carried out on completion of the welding and the required non-destructive testing by the Contractor.

PSL 7.5 FITTINGS AND SPECIALS

Add new Sub-Clause:

PSL 7.5.1 EXAMINATION OF SHOP WELDS

The Contractor shall include in his prices for the supply of pipes, fittings and specials, the cost of carrying out, under the supervision of the inspector appointed by the Employer, examination of shop welds on the following basis:

- ONE HUNDRED per cent radiographic examination of all welds deposited manually or semi-automatically in fittings and specials, which cannot be hydraulically tested prior to the fittings and specials being installed in the pipeline.

The Employer's Representative 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 Employer's Representative 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 Employer's Representative. To avoid unnecessary delay, at the option of the manufacturer, radiographs may be approved by the manufacturer's inspectors, subject to them being subsequently approved by the Employer's Representative.

When a section of the weld is shown by radiography to be unacceptable and if the limits of the deficient weld are not defined by the radiograph, additional radiography shall be carried out at the Contractor's expense until the limits of the deficiency are determined.

Repairs shall be made to defective welds at the Contractor's expense. All repair welds shall be identified with a stamp marking, indicating which welder conducted the repair. Repaired welds shall be radiographed at the Contractor's expense, but after any repair welder has had ten consecutive repairs approved, the extent of the radiography of the repairs conducted by the welder may be decreased by agreement between the Employer's Representative and the Contractor.

PSL 7.5.2 COATING AND LINING TESTS

Add new Sub-Clause:

Refer to Tables of PSL 3.9.9.

PSL 7.6 COMMISSIONING (NEW SUB-CLAUSE)

Add new Sub-Clause:

The pipeline will be considered commissioned and practically complete once all associated structures are sufficiently complete to carry out their structural and/or hydraulic function, and the hydraulic test of the entire pipeline is successfully completed.

PSL 8 MEASUREMENT AND PAYMENT

PSL 8.2 SCHEDULED ITEMS

PSL 8.2.1 SUPPLY, LAY AND BED PIPES COMPLETE WITH COUPLINGS

Add to Sub-Clause:

The rates tendered shall cover the cost for supplying, manufacturing, off-loading, handling, installing, laying, bedding, supporting, non-destructive testing, jointing, cutting, welding of joints and all internal lining and external coatings, coating and lining repairs and field wrapping to specifications and all connectors, bolts, nuts, washers, gaskets, etc.

The Contractor shall include in his rates for every eventuality, covering steep grades, restricted access, confined spaces, high traffic volumes, working in road reserves, or whichever condition might present itself during construction.

PSL 8.2.1.1 PREPARATION AND BUTT WELDING OF STRAIGHT JOINTS IN PIPELINE (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor shall include in his rate for welding of straight joints in pipeline, the supply of materials, labour, plant, equipment and supervision required at each joint.

1. Butt welding of straight joints in pipeline (Diameter Nominal specified) Unit: No

PSL 8.2.1.2 PREPARATION AND WELDING OF SINGLE MITRED JOINTS IN PIPELINE (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor shall include in his rate for preparation of single mitres in order to effect a mitred joint in terms of the construction drawings, the welding of the single mitred joint in the pipeline, the supply of materials, labour, plant, equipment and supervision at each joint.
Preparation and butt welding of single mitred joints in pipeline (max 15 degrees)

Unit: No

PSL 8.2.1.3 ONSITE EXTERNAL TAPE WRAPPING AND INTERNAL LINING REPAIR OF WELDED JOINTS IN PIPELINE (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor shall include in his rate for the supply of all materials, labour, plant, equipment, supervision and QQA/QC for onsite external tape wrap and internal lining repair in terms of

the specification, of straight butt welded joints and butt welded single mitred joints as well as straight and single mitred joints in bell ended pipe or pipe jointed by welded collars.

On-site external tape wrapping and internal lining repair of welded joints in the pipeline (specified by nominal diameter)

Unit: No

PSL 8.2.2 EXTRA-OVER 8.2.1 FOR THE SUPPLYING, LAYING AND BEDDING OF THE IN-LINE SPECIALS

Add to Sub-Clause:

The rates tendered for the fabricating and installation of in-line pipe specials, shall cover the cost for supplying, manufacturing, off-loading, handling, installing, laying, bedding, supporting, non-destructive testing, jointing, cutting, welding of joints, flanges as well as welding into position and all internal lining and external coatings, coating and lining repairs and field wrapping to specifications where required for:

- 1) In-Line Tees
- 2) In-Line Reducers
- 3) In-Line Elbows and Bends
- 4) In-Line Flanges
- 5) Bull Noses
- 6) Segmented Bends
- 7) Slip on flanges
- 8) Other In-Line Specials such as spacers, spool pieces, etc., as specified.

The rate will also be inclusive of gaskets, fasteners, washers, bolts, nuts, painting and field wrapping of joints.

All fabricated pipe specials are to be marked with item numbers which correspond to test certificates. All items are to be supplied with quality control documentation.

PSL 8.2.5 SUPPLY AND INSTALLATION OF OTHER SPECIALS

PSL 8.2.5.1 SUPPLY OF OTHER SPECIALS

Delete the Sub-Clause and replace it with the following:

The rate shall cover the cost of fabrication, supply, handling, uplifting and transporting to the contractor's store, storage, cutting and welding, gaskets, flanges, fasteners, washers, bolts, nuts, marking, Non-Destructive Testing, inspections, all internal lining and external coatings to specifications.

All fabricated pipe specials are to be marked with item numbers which correspond to test certificates. All items are to be supplied with quality control documentation.

Unit: No

PSL 8.2.5.2 INSTALLATION OF OTHER SPECIALS

The rate shall cover the cost of installation, including handling, uplifting and transporting from Contractor's store to site, installing, laying, bedding, supporting, jointing, coating and lining repairs and field wrapping of joints to specifications.

Unit: No

PSL 8.2.8 REMOVING OF EXISTING PIPEWORK AND VALVES

Delete the sub-clause and replace it with the following:

The Contractor shall remove all pipework, valves and fittings from chambers as per the Engineer's drawings. The Contractor shall ensure that the valves and fittings are cleaned and inspected prior to returning to the Employer's stores or depot. The rate shall cover the cutting, removing, cleaning, inspection, and temporary storage until the valve is returned to the Employer's stores or depot.

The unit rate shall be measured per metre of pipework (m)

PSL 8.2.11 ANCHOR BLOCKS/THRUST BLOCKS AND PEDESTALS

Add the following:

The tendered rates shall cover the cost of formwork, concrete, reinforcement (if any), and screeding to top surfaces.

The tendered rate shall also include the wrapping of uPVC pipes and fittings with Densopol 80 or a similar approved material where the pipes and fittings come into contact with concrete.

Unit: m³

PSL 8.2.16 PIPELINE MARKER POSTS

Add new Sub-Clause:

Payment shall be per cost installed and shall include the uplifting and transporting to the site from the Municipal depot, handling, excavation, installation, backfilling and painting.

Unit: No

PSL 8.2.17 CUTTING INTO EXISTING STEEL PIPELINE

Add new Sub-Clause:

The rate shall cover the cost of the cutting of the existing steel pipe, end preparation and making good of the lining and coating.

The rate shall also cover preventing the deformation of the ovality of the existing pipe once cut. All temporary or permanent supports are deemed to be inclusive in the rate for cutting of existing steel pipe.

The rate shall allow for everything necessary to carry out the removal of existing pipes and installation of new connections to follow existing pipes. Rates are to include for: carefully exposing the existing pipelines, making arrangements with eThekweni's staff to temporarily shut off water on the existing pipelines to facilitate making the connection, cleaning pipelines, preparing the pipes for cutting, cutting pipes, dealing with all water (including that from leakages), preparing the pipe end for pipe jointing/welding and connecting the new pipework, making good internal lining and external coatings, recommissioning the pipeline and including all temporary supports, bedding and backfilling.

Loading and transporting removed sections to the eThekwini water depot at Electron Road, Springfield, is covered elsewhere. The whole installation is to be completed within 8 hours. (All new pipes, valves and fittings required are measured elsewhere).

Unit: No

PSL 8.2.18 CUTTING AND CONNECTING TO EXISTING AC PIPE

Add new Sub-Clause:

The rate shall cover the cost of the cutting of the existing pipe and end preparation in accordance with Construction Regulations, 2014, Asbestos Regulations, 2001 and Environmental Management Plan, PEM 5.11 Hazardous Waste bound in the Document.

Allow for everything necessary to carry out the removal of existing pipes and installation of new connections to following existing pipes: Rates are to include for carefully exposing the existing pipelines, making arrangements with eThekwini's staff to temporarily shut of water on the existing pipelines to facilitate making the connection, cleaning pipelines, preparing the pipes for cutting, cutting pipes, dealing with all water (including that from leakages), preparing the pipe end for pipe jointing/welding and connecting the new pipework, making good internal lining and external coatings, recommissioning the pipeline and including all temporary supports, bedding and backfilling.

Loading and transporting removed sections to the eThekwini water depot at Electron Road, Springfield, is covered elsewhere. The whole installation is to be completed within 8 hours. (All new pipes, valves and fittings required are measured elsewhere).

Unit: No

PSL 8.2.19 CUTTING INTO EXISTING PVC PIPELINE

Add new Sub-Clause:

The rate shall cover the cost of cutting the existing and end preparation.

The rate shall allow for everything necessary to carry out the removal of existing pipes and installation of new connections to follow existing pipes. Rates are to include for: carefully exposing the existing pipelines, making arrangements with eThekwini's staff to temporarily shut of water on the existing pipelines to facilitate making the connection, cleaning pipelines, preparing the pipes for cutting, cutting pipes, dealing with all water (including that from leakages), preparing the pipe end for pipe jointing/welding and connecting the new pipework, making good internal lining and external coatings, recommissioning the pipeline and including all temporary supports, bedding and backfilling.

Loading and transporting removed sections to the eThekwini water depot at Electron Road, Springfield, is covered elsewhere. The whole installation is to be completed within 8 hours. (All new pipes, valves and fittings required are measured elsewhere).

Unit: No

PSL 8.2.21 METER PROTECTION SLEEVE

The tendered rates shall cover the cost of all works required for the supply and installation of meter protection sleeve pipe as depicted on the drawings for Type 1 and Type 2.

Unit: No

PSL 8.2.22 HYDRAULIC TESTING (NEW SUB-CLAUSE)

Add new Sub-Clause:

The rates shall cover all the costs of all the required materials, equipment, connections, personnel and procedures for filling, testing and draining of the pipeline where required, or sections of the pipeline during hydrostatic testing. The rates shall cover the cost of the water required for hydrostatic testing.

PSL 8.2.23 INSPECTION OF EXISTING VALVES (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor shall conduct a comprehensive inspection of the existing pipework, valves and fittings as per the Engineers drawings. The Contractor shall document the condition of the valve and shall inform the Employer and Engineer if it can be reinstated for use or if it must be replaced with a new valve.

The unit of measurement shall be per number (No.)

PSL 8.2.24 REPLACEMENT OF PIPEWORK, VALVES AND FITTINGS (NEW SUB-CLAUSE)

Add new Sub-Clause:

The Contractor shall replace pipework, valves and fittings of chambers as instructed by the Engineer. The rate shall include the purchasing, storage, and installation of the new valve assembly.

The unit of measurement shall be a provisional sum (Prov. Sum)

PSLB BEDDING (PIPES) (SABS 1200 LB-1983)

PSLB 3 MATERIALS

PSLB 3.1 SELECTED GRANULAR MATERIAL

Add the following to LB 3.1:

All the material to be used for the bedding material (that is, for the cradle and the blanket material) surrounding the pipe shall fall within the following requirements:

GRADING ANALYSIS RANGE

SIEVE SIZE (mm)	PERCENTAGE PASSING
9.500	100
6.700	90 to 100
4.750	80 to 90
2.360	65 to 80
1.180	50 to 65
0.600	35 to 50
0.425	25 to 35
0.300	15 to 25
0.150	5 to 15
0.075	0 to 5

The material shall be free of organic matter and shall have a compactibility factor of not more than 0.4.

The material should be classified as a silty fine sand having a stiffness ratio of not less than 5.0 MPa. The larger grains (4.0 to 7.0 mm in size) must be rounded and not sharp and angular.

The Contractor shall be required to supply samples of the sand to be used as bedding material to the Employer's Representative for approval. Only after the Contractor has received written approval from the Employer's Representative may he proceed with placing sand as selected granular material.

The Contractor will carry out his own quality control testing of the bedding material to ensure that it meets the specification. At least one grading analysis should be carried out for every 250m of pipeline installed. The results of these tests must be given to the Employer's Representative within 24 hours of completion of the test.

If any material used in the bedding of the new pipes is found to be outside the specification, the Contractor will remove and replace this material with approved sand at his own cost.

Bedding materials (for cradle and blanket material), such as Umgeni River sand or similar approved non-cohesive materials, shall be compacted to 100% Mod. A.A.S.H.T.O., either by full saturation or mechanical means, or a combination of both, approved by the Employer's Representative.

The Contractor will be required to supply samples to the Employer's Representative of the bedding material to be used in the cradle, as well as for blanket material, inclusive of the

analysis of the characteristics of the material. Only after the Contractor has received written approval from the Employer's Representative may he proceed with the placement of selected granular material bedding.

The Contractor shall carry out his own quality control testing of the proposed bedding material to ensure that it meets this specification.

At least one grading analysis should be carried out for every 250 metres of bedding placed. The results of these tests shall be forwarded to the Employer's Representative within 24 hours of completion of the test. Should the material not comply with the specification, the Contractor shall remove and replace the material not complying with the specification with approved material at his own cost.

Should the Contractor change the source of the bedding material, samples of the proposed material shall be supplied to the Employer's Representative, inclusive of the analysis of the characteristics of the material. Only after the Contractor has received written approval from the Employer's Representative may he proceed with placing the new selected granular bedding material.

The costs for the grading analysis tests shall be included in the tendered rates for the supply, placement and compaction of the selected granular material.

PSLB 3.2 SELECTED FILL MATERIAL

Add the following to LB 3.2:

Only clean sand containing no particles of diameter exceeding 20mm, having a Plasticity Index (PI) not exceeding 6 and free from vegetation and lumps shall be used for the selected fill blanket. It is anticipated that most of the fill material will have to be provided from an off-site source.

A pipeline is to be constructed beneath the existing road.

In this case, the selected fill material shall be taken to the underside of the proposed new layerworks construction, where the new road will match the existing road layers or will be constructed to a new design specification. In this case, the selected fill material will be placed from the top of the pipe bedding to the bottom of the road subgrade level and compacted to a minimum 97% Mod AASHTO density. Thereafter, the structural road layers will be constructed. This procedure is necessary to limit settlement beneath roads.

PSLB 3.3 BEDDING

Add the following to Sub-Clause:

Steel pipelines shall preferably be bedded as per Drawing LB-3 (d) of SANS 1200LB, where the cradle material and the blanket material up to 300mm above the crown of the pipe consist of selected granular material.

Joint holes (pockets) shall be provided in the bedding, as per Drawing LB-2, at each pipe joint or coupling. No sharp-edged stones shall be allowed to come into contact with either the pipes or the couplings (joints). No extra payment will be made for forming joint holes (pockets).

Portions of the pipeline may warrant the need for soilcrete and will be prepared, placed and compacted as per the relevant drawings.

PSLB 3.4 SELECTION

PSLB 3.4.1 SUITABLE MATERIAL AVAILABLE FROM TRENCH EXCAVATION

Add to Sub-Clause:

Notwithstanding the requirements of sub-clause 3.7 of SANS 1200 DB and sub-clause 3.4.1 of SANS 1200 LB regarding the use of selective methods of excavating, the Contractor shall use selective methods of excavating and shall provide and use plant that will enable him to avoid burying or contaminating material that is suitable and is required for bedding.

PSLB 3.4.1 SUITABLE MATERIAL AVAILABLE FROM TRENCH EXCAVATION

Replace the words “(but is not required)” in the fifth line with the words “at his own cost”.

PSLB 5 CONSTRUCTION

PSLB 5.1.2 DETAILS OF BEDDING

Delete and replace with:

The cradle thicknesses shall be as follows:

For DN600 and smaller

- a) Cradle thickness to be 200mm

For greater than DN600

- b) Cradle thickness to be 300mm

The blanket material thickness above the crown of the medium-pressure pipe shall be 300mm for all diameters of pipe.

Cable ducts shall be regarded as flexible and shall be bedded in accordance with drawing no. LB-2 of SANS 1200LB.

PSLB 5.1.3 PLACING OF BEDDING

No loose rocks or stones shall be permitted to rest against the pipe barrel during the placement and compaction of the bedding cradle or blanket. In addition to the provisions of clause 5.1.3.3, hand equipment shall be used to compact the bedding material under the haunches and immediately next to the pipe. No vibratory mechanical equipment shall be allowed to make contact with any part of the pipe or be used on the bedding blanket directly above the pipe.

PSL 5.1.3.3 ADD THE FOLLOWING:

Hand equipment shall be used to compact the bedding material under the haunches and immediately next to the pipe. No vibratory mechanical equipment shall be allowed to make contact with any part of the pipe, and no heavy-duty vibratory mechanical equipment shall be allowed on the bedding blanket directly above the pipe.

The ground vibrations that are generated during the compaction of the bedding (selected granular material) and subsequent layers of selected fill and normal/common backfill shall be monitored where the pipeline is under construction in close proximity to the following:

- a) Existing pipelines and other related buried services

- b) Existing buildings
- c) Generally built-up areas such as commercial and residential areas, and
- d) Archaeological and Historical sites

In these areas, the peak particle velocity (ppv) value recorded by ground vibration monitoring equipment shall not exceed 15 mm/second, measured by placing the instrument on the ground immediately above the existing pipeline/service, or on the nearest part of the superstructure/building within a maximum radius of 20metres of the new works where compaction is being carried out.

Archaeological and other very sensitive historical sites, which are deemed to be least tolerant to ground vibrations, should be thoroughly inspected and their general condition noted before construction of the pipeline commences. All evidence of existing damage on these structures, such as cracks, deflections of walls, localised damage, etc, should be recorded both in written and photographic format to provide a record for later comparison after construction if required.

PSLB 5.1.4 COMPACTING

Delete and replace with:

Bedding materials (for cradle and blanket material), such as Umgeni River sand or similar approved non-cohesive materials, shall be compacted to 100% Mod. A.A.S.H.T.O., either by full saturation or mechanical means, or a combination of both, approved by the Employer's Representative.

The placement and compaction of the blanket material need to be carefully controlled in order to avoid any ovality. Blanket material shall be brought up evenly on either side of the pipe barrel in layers not exceeding 200mm measured loose and compacted to the required density utilising the required compaction method. Movement and deflection of the pipe shall be avoided.

Particular attention shall be paid to compaction of material in the pipe haunch area. Compaction shall be achieved by hand punning horizontally and obliquely with a suitably sized and shaped hand tool. The Contractor shall take the necessary precautions not to inflict damage to the pipeline coating when compacting the cradle and the blanket material.

Compaction of bedding materials (for cradle and blanket material) to 100% Mod. A.A.S.H.T.O. is required for the entire contract, unless approved otherwise by the Employer's Representative.

All costs for providing the water required for the saturation of the material, temporary retaining measures to prevent backfill material from " flowing " away from the point of application, and or retaining measures to terminate a specific backfill section for whatever reason, shall be deemed to be included in the tendered rates for supply, place and compact of bedding material.

The fill directly above the pipe must not be compacted until the depth of cover to the pipe is at least 300 mm, unless otherwise specified by the Employer's Representative.

PSLB 5.2 PLACING AND COMPACTING OF RIGID PIPES

PSLB 5.2.2 CLASS "C" BEDDING

Delete the third, fourth and portion of the fifth lines of the Sub-Clause and substitute the following:

"The pipes shall be bedded on a layer of compacted granular bedding material on which a 25mm thick layer of uncompacted granular bedding material has been placed and spread. Loose granular bedding material lying next to the pipe shall be placed into the haunch area and compacted with suitable hand tools, and additional selected granular material shall be added and compacted in layers until levels for the bedding cradle as shown on Dwg LB - 1 (c) are reached. The remainder of the bedding, i.e. the selected fill blanket, shall be placed in layers up the sides of the pipe, each layer being compacted until levels are reached as shown on Dwg LB-1 (c)."

PSLB 5.2.5 STONE BEDDING

Add new Sub-Clause:

In areas where waterlogged conditions exist or where ordered by the Employer's Representative, special drains consisting of a 150mm thickness (See PSDB 5.5) of single-sized stone with a geofabric filter surround ("Bidim" Grade A4 or similar approved) extending the full width of the trench shall be provided below the bedding to the pipes. The excavation for these drains will be measured in cubic metres at the contract rate applying to unsuitable excavation below the bottom of the trench. The stone filling will be paid for per cubic metre, and the geofabric filter will be paid for per square metre. All measurements in this connection will be to a width equal to the base widths and depths ordered.

PSLB 5.3(b) SELECTED FILL BLANKET

Delete "200mm" from the title of the Sub-Clause.

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.1 PRINCIPLES

PSLB 8.1.1 SUPPLY OF BEDDING MATERIALS MEASURED SEPARATELY

Add the following to LB 8.1.1:

The measurement for bedding shall be the total through length along the centre of the pipeline measured HORIZONTALLY with deductions made for line valve chambers or meter protection sleeves.

PSLB 8.2 SCHEDULED ITEMS

PSLB 8.2.1 Excavation PROVISION OF BEDDING FROM THE TRENCH EXCAVATION

Delete the Sub-Clause and substitute the following:

Without the need for screening:

1) Selected granular material (Provisional Quantity)	Unit: m ³
2) Selected fill material (Provisional Quantity)	Unit: m ³

The rates shall cover the cost of acquiring, from any point along the trench excavation as may be selected by the Employer's Representative, bedding that complies with the relevant requirements of the specification, of delivering it to points alongside the trench spaced to suit the Contractor's methods of working, and of making good any backfill deficiency from points

where backfill has been acquired.

Extra Over for screening:

1) Selected granular material (Provisional Quantity)	Unit: m³
2) Selected fill material (Provisional Quantity)	Unit: m³

The rates shall cover the cost of screening or otherwise treating excavated material, at any point along the trench excavation as may be selected by the Employer’s Representative, in order to produce bedding that complies with the relevant specification, delivering it to points alongside the trench, spaced to suit the Contractor’s methods of working, of making good any backfill deficiency there may be from points where screened backfill material has been acquired.

The rate provided against the volumetric unit shall be applicable to the volume of material produced in terms of the required specification and not the volume of material screened in the first instance.

PSLB 8.2.2 SUPPLY ONLY OF BEDDING BY IMPORTATION

PSLB 8.2.2.3 FROM COMMERCIAL SOURCES (PROVISIONAL)

Including for screening and/or other treatment:

1) Selected granular material	Unit: m³
2) Selected fill material	Unit: m³

The rates shall cover the cost of acquiring, loading, transporting, offloading, screening or otherwise treating excavated material in order to produce bedding that complies with the relevant specification, delivering it to points alongside the trench spaced to suit the Contractor’s methods of working and of disposing of displaced material.

NOTE: The rate for the supply and laying of pipelines covers the cost of handling the bedding material from alongside the trench, placing it under the pipeline, forming joint holes and completing the bedding around and over the pipeline.

PSLE STORMWATER DRAINAGE (SABS 1200 LE – 1982)

PSLE 3 MATERIALS

PSLE 3.1 A) PRECAST CONCRETE PIPES

Add the following:

All concrete pipes shall have rubber ring spigot and socket joints.

PSLE 3.1 D) SKEWED ENDS

Where required, pipes may be cut on site to form skewed ends prior to the construction Of the manhole or headwall.

PSLE 5 CONSTRUCTION

Add the following:

PSL 5.5 CATCH PITS, MANHOLES, INLETS AND OUTLET STRUCTURES

PSLE 5.5.3 PLASTER

Add the following:

Drop Inlets are to be plastered internally with a steel trowel finish.

PSLE 5.5.5 PRECAST MANHOLES

Add the following:

Or as shown on the Drawings.

PSLE 8 MEASUREMENT AND PAYMENT

PSLE 8.2.1.1 SUPPLY AND LAY CONCRETE PIPES CULVERTS

Add the following clause:

Supply Concrete pipe culverts

The unit of measurement shall be per liner meter (m)

PSLE 8.2.1.2 INTSALL CONCRETE PIPE CULVERT S

Add the following clause:

Install Concrete pipe culverts

The unit of measurement shall be per liner meter (m)

PSLE 8.2.15 GEOFABRIC (DESCRIPTION OF TYPE, GRADE, ETC)

Add the following:

The tendered rate shall include full compensation for procuring, supplying, cutting, overlapping, jointing, placing and protecting the filter fabric as specified, as well as for

wastage.

The filter fabric will be measured in place after installation in square metres (m²)

PSLE 8.2.16 CRUSHED STONE, NO FINES CONCRETE AND SAND IN SURFACE DRAINS

Add the following clause:

The tendered rate shall include full compensation for procuring, supplying, transporting and placing the material as specified. The quantity shall be calculated from the authorised dimensions. Impermeable material will be paid under SABS 1200 DB.

The unit of measurement shall be in cubic metres (m³)

PSLE 8.2.20 BREAK INTO EXISTING MANHOLE AND INSTALL

(a)(State pipe diameter and type)

Unit: Sum

(b)Etc. for other diameters and types

The tendered rates shall include full compensation for the supply of all labour, plant and materials, for making an opening in the existing manhole, for installing the new pipe in the new opening, for sealing around the pipe, for breaking out the existing benching and channels where required and reconstructing them complete with rendering to suite the New pipe arrangement, for disposal of all debris to the dumping site and for backfilling around the manhole with selected material.

C3.3.2.2 AMENDMENTS COTO SPECIFICATIONS

INTRODUCTION

In certain clauses, the standard, standardised and particular specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains additional specifications required for this particular contract.

The number of each clause and each payment item in this part of the project specifications consists of the prefix PC followed by a number corresponding to the number of the relevant clause or payment item in the standard specifications. The number of a new clause or payment item, which does not form part of a clause or a payment item in the standard specifications, and which is included here, is also prefixed by PC, but followed by a new number which follows on from the last clause or item number used in the relevant section of the standard specifications.

CHAPTER 6: CONCRETE LAYERS

SECTION P6.2: SEGMENTAL BLOCK PAVING LAYERS

PART C: MEASUREMENT AND PAYMENT

Item	Description	Unit
PC6.2.1	Segmental block paving:	
PC6.2.1.1	Concrete block paving (Class 30, Type S-A, 60mm).....	square metre (m ²)

Amend the payment description for pay item C6.2.1.1 as follows:

The unit of measurement shall be the square metre of completed concrete block paving. The quantity shall be calculated from the dimensions shown on the drawings or authorised by the Engineer. The tendered rate shall include full compensation for procurement of the bedding sand and transportation to the site of use, furnishing all materials, constructing the sand bedding, laying and compacting the concrete pavement blocks, filling the joints with jointing sand and for all other work necessary to complete the concrete block paving using labour-intensive construction methods as specified.

CHAPTER 12: GEOTECHNICAL APPLICATIONS

SECTION P12.2: GROUND ANCHORS

PART C: MEASUREMENT AND PAYMENT

Item	Description	Unit
PC12.2.15	Install, grout and protect soil nails or rock bolts (6m).....	number (No.)

Add the following to the payment description for pay item C12.2.15 as follows:

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to install 30MPa grout (including wastage) to soil nails as per engineering drawing 60591/043_Rev 0.

PC12.2.20	Subsoil Drainage.....	metre (m)

Add the following payment description for pay item C12.2.20 as follows:

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to install 100mm wide Fin Drain with netlon core or similar approved drainage medium behind soil nail wall as per engineering drawing 60591/043_Rev 0.

PC12.2.21	Shotcrete.....	square metre (m²)

Add the following payment description for pay item C12.2.21 as follows:

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to install 75mm thick shotcrete of minimum 25 MPa strength at 28 days, reinforced with reinforcement mesh Ref 245.

SECTION P12.6: MECHANICALLY STABILISED EARTH WALLS AND GABIONS

PART C: MEASUREMENT AND PAYMENT

Item	Description	Unit
PC12.6.13	Drainage medium (MacDrainW105M, or similar).....square metre (m ²)	

Replace the payment description for pay item C12.6.13 as follows:

The unit of measurement shall be the square metre of drains installed either on excavation face, behind selected backfill or through facing panels.

The tendered rate shall include full compensation for the supplying of all the material, labour, plant and equipment required for the operation.

CHAPTER 14: REPAIR AND REHABILITATION OF STRUCTURES

SECTION P14.5: ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION

PART C: MEASUREMENT AND PAYMENT

Item	Description	Unit
PC14.5.7	Crack Filling	
PC14.5.7.1	Repair system to cracked brickwork on chamber walls.....metre (m)	

Amend the payment description for pay item C14.5.7.1 as follows:

The unit of measurement shall be linear metre of completed brick stitching where specified by the engineer.

The tendered rate shall include full compensation for all labour, materials, equipment and plant as well as for all work and incidentals required to prepare, clean and prime all surfaces, repair and cure the designated cracks (including rebar and wastage), and finish the repaired surface all in accordance with crack stitching detail on engineering drawing no. 60591/032_Rev 0.

SECTION P14.7: PROTECTIVE COATINGS AND TREATMENT FOR CONCRETE

PART C: MEASUREMENT AND PAYMENT

Item	Description	Unit
	<i>Amend the description for pay item C14.7.2 as follows:</i>	
PC14.7.2	Application of torch-applied waterproofing membrane on chamber brick walls(m ²)	

The unit of measurement shall be the square metre of surface area to be protected or treated as specified. For payment purposes, the surface area shall be measured once only irrespective of the number of layers of protective coatings or applications of surface treatment is required to achieve the specified application rate.

The tendered rate shall include full compensation for all surface preparations, labour, materials, equipment, additional safety measures, storage, mixing and applications of the protective coatings and treatments, cleaning and disposal of unused or rejected material and all incidentals necessary to execute the work, including wastage, as specified, all to the

satisfaction of the Engineer.

SECTION P14.9: REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS

PART C: MEASUREMENT AND PAYMENT

Item	Description	Unit

Amend the payment and description for pay item C14.9.1 as follows:

PC14.9.1	Removal of plant growth and debris.....(m²)	

The unit of measurement shall be the square metre of the plant growth.

The tendered rate shall include full compensation for all labour, material, plant and equipment required to execute the work, including remediation of any damaged brickwork and mortar and any additional protective measures and disposal of plant growth and debris from chamber walls and floors.

Item	Description	Unit

Amend the payment and description for pay item C14.9.7 as follows:

PC14.9.7	Removal of brickwork and reinstatement with concrete)(m²)	

The unit of measurement shall be the square metre of brickwork removed and disposed of and subsequently replaced with concrete.

The tendered rate shall include full compensation for all labour, material, plant and equipment required for the removal of brickwork, transport to a registered landfill site, and subsequent replacement with concrete, inclusive of all drill and dowel bars, shutters, and reinforcement required as in accordance with details on engineering drawing no. 60591/032_Rev 0.

Item	Description	Unit

Add the following payment and description being pay item C14.9.18 as follows:

PC14.9.18	Ream and replace mortar on brick chamber walls.....(m²)	

The unit of measurement shall be the square metre.

The tendered rate shall include full compensation for all labour, material, plant and equipment required for the reaming out of mortar to a depth of 15mm between brickwork on chamber walls and replacing it with new mortar, complying with the requirements per PSX 2.6, on all positions indicated by the Engineer as per detail on engineering drawing no. 60591/032_Rev 0.

C3.4: PARTICULAR SPECIFICATIONS

In addition to the Standardised and Project Specifications, the Particular Specifications / Policies that apply to this contract can be found in Annexure C3.6.1.

C3.5: CONTRACT AND STANDARD DRAWINGS

C3.5.1 CONTRACT DRAWINGS / DETAILS

Dwg No	Description
60591/001	General Site Layout
60591/002	Earthworks Layout Drawing
60591/003	Earthworks Sections
60591/004	Earthworks Sections
60591/005	New Steel Pipelines
60591/006	Reservoir 1 Chambers
60591/007	Reservoir 2 Chambers
60591/008	DN350 Meter Chamber Details
60591/009	DN400 Meter Chamber Details
60591/010	DN300 Meter Chamber Details
60591/011	Cross Connection Chamber Details
60591/012	DN300 Inlet Chamber Reservoir 2
60591/013	Air Valve Chamber Details
60591/014	Typical Valve Chamber Details
60591/015	Stormwater Layout
60591/016	Stormwater Details
60591/017	Stormwater Long Sections
60591/018	Gate & Fence Details
60591/019	Manhole Cover Details
60591/020	GRP Access Ladder Details
60591/021	Access Road Layerworks
60591/022	Trench Details
60591/023	Steel Door & Air Vent Details
60591/024	Electrical, Lighting & Instrumentation Layout
60591/025	Reservoir Plan Lightning Protection & Earthing Layout
60591/026	Telemetry Room - Electrical, Instrumentation & Earthing Layout
60591/027	P&ID Diagram
60591/040	Site Plan & Sections Showing 1:2 Slope & Fill to New Platform
60591/041	Plan & Elevation of Mechanically Stabilised Gabion Wall
60591/042	1m To 8m Gabion Wall Details
60591/043	Temporary Soil Nails, Plans & Details
60591/044	Section D : Site Plan & Details of Low Level Retaining Wall
60591/030	Reservoir Demolition Plan
60591/031	Reservoir 2 Details : Piling Layout
60591/031	Reservoir 2 Details : Floor Plan & Column Details
60591/031	Reservoir 2 Details : Roof Plan & Telemetry Room Details
60591/031	Reservoir 2 Details : Sections & Details
60591/032	Defects & Rehabilitation Details

C3.5.2 STANDARD DRAWINGS

The Standard Drawings to which these Standard Engineering Specifications refer are listed below.

Dwg No	Description
38577	Kerbing Details
006	Precast Spacer Ring
027	Valve Marker
028	No 5B Valve Cover
45005/02	GRP Access Ladder & Safety Cage: Plan, Section & Details
68308	1200 x 1200 GI Manhole Cover and Frame Rev D

C3.6: ANNEXURES

- C3.6.1 Particular Specifications**
- C3.6.2 Compulsory Returnable Data Sheets**
- C3.6.3 Health and Safety Specifications and Baseline Risk Assessment**

ANNEXURE C3.6.1: PARTICULAR SPECIFICATIONS

ANNEXURE C3.6.2: COMPULSORY RETURNABLE DATA SHEETS

ANNEXURE C3.6.3: HEALTH & SAFETY SPECIFICATIONS AND BASELINE RISK ASSESSMENT

PART C4: SITE INFORMATION

C4.1 LOCALITY PLAN

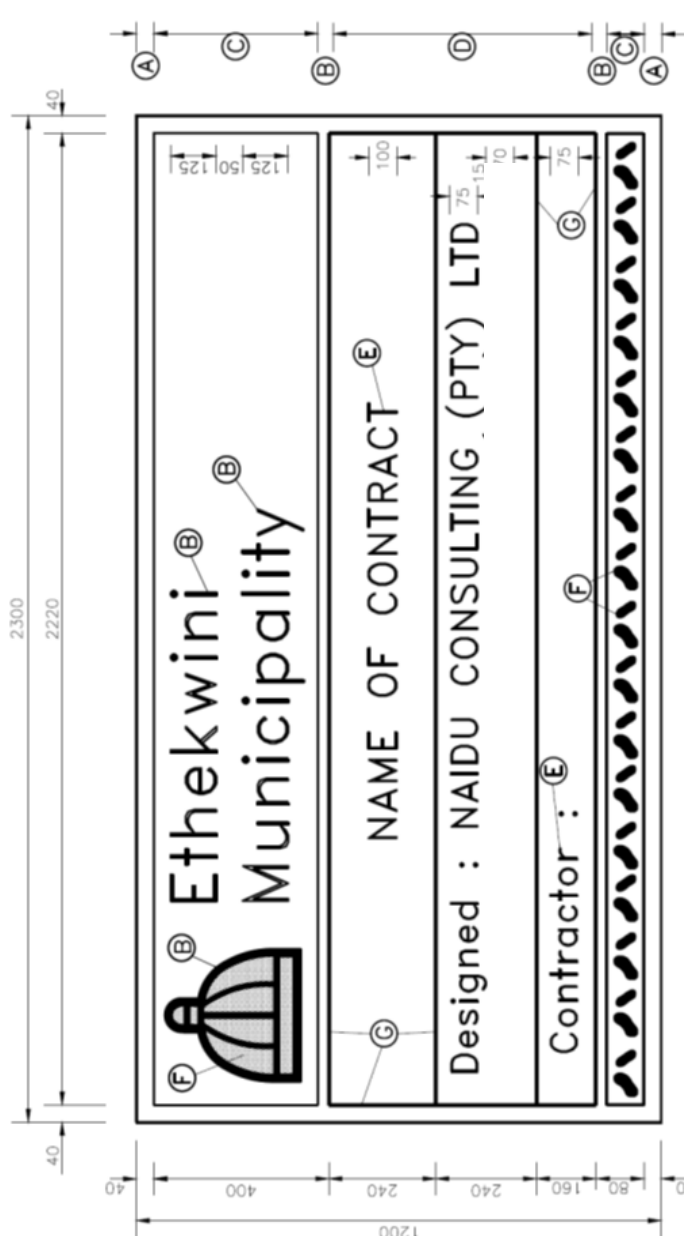
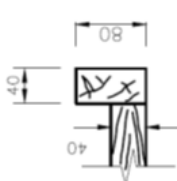
C4.2 CONDITIONS ON SITE

C4.3 CONSTRUCTION NOTICEBOARD

C4.1 LOCALITY PLAN

Please note the following disclaimer:

The accuracy of the data provided in this site is not guaranteed nor is it implied. The eThekweni Municipality accepts no liability for any claims brought against it or its employees as a result of the use of supplied data

		DETAIL OF SURROUND 
LEGEND : A : RAISED SURROUND PAINTED WHITE B : WHITE C : BLUE BACKGROUND – F04 NATIONAL FLAG BLUE D : WHITE BACKGROUND E : BLUE LETTERS – F04 NATIONAL FLAG BLUE F : F29 CORNFLOWER BLUE G : BLUE BORDER AND DIVIDING LINE – F04 NATIONAL FLAG BLUE		
NOTE : 1) THE FACE TO BE TEMPERED HARDBOARD IN ONE PIECE. 2) THE COLOUR NUMBERS REFERRED TO ARE THOSE ON THE COLOUR SPECIFICATION OF S.A.B.S. 1091–1975 (AMENDED 1988) 3) ALL DIMENSIONS ARE IN MILLIMETRES. 4) ALL TEXT TO BE ROMAN DUPLEX FONT.		
ETHEKWINI MUNICIPALITY		WATER DESIGN BRANCH
Drawn by : <i>S.J.M.</i> Checked by : Date : <i>MAR 2002</i> _____ Manager: Water Design	<i>NOTICE BOARD</i>	_____ Executive Director: Ethekwini Water Services Plan No: <i>9</i>