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TENDER NO. 30/23

CONTRACT DOCUMENT

FOR THE

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

VOLUME 3

(RETURNABLE DOCUMENT)

Name of Tenderer: .....

NOTE:

- The Form of Offer and Acceptance (C1.1) is on **page 112** of this document
- The Preferencing Schedule (B-BBEE Contributor Level) is on **page** Error! Bookmark not defined. of this document.

PREPARED FOR:

STELLENBOSCH MUNICIPALITY
PO BOX 17
STELLENBOSCH
7599
Tel: (021) 808 8224
Fax: (021) 883 9874

PREPARED BY:

JG AFRIKA (PTY) LTD
P.O. Box 38561
PINELANDS
7430
Tel: (021) 532 0940
Fax: (021) 532 0950

February 2023

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CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

GENERAL TENDER INFORMATION

TENDERS INVITED	:	Friday, 17 February 2023
ESTIMATED CIDB CONTRACTOR GRADING	:	7CE or higher
CLARIFICATION MEETING	:	A compulsory clarification meeting to be held on 02 March 2023 at 10H00
VENUE FOR SITE VISIT/CLARIFICATION MEETING	:	Stellenbosch WWTW, Vredenburg Rd, Stellenbosch
CLOSING DATE	:	Monday 20 March 2023
CLOSING TIME	:	12h00
CLOSING VENUE	:	Tender Box at the Municipal Office, Plein Street, Stellenbosch
VALIDITY PERIOD OF TENDER	:	180 days
TENDER BOX	:	The Tender Documents (which includes the Form of Offer and Acceptance) completed in all respects, plus any additional supporting documentation required, must be submitted in a sealed envelope with the name and address of the tenderer, the tender No. and title and the closing date indicated on the envelope. The sealed envelope must be inserted into the appropriate official tender box before closing time. The onus remains with the tenderer to ensure that the tender is placed in the correct tender box.

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CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

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Part T1: Tendering procedures

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TENDER NOTICE & INVITATION TO TENDER

BID NOTICE

STELLENBOSCH MUNICIPALITY HEREBY INVITES YOU TO TENDER FOR B/SM 30/23: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

TENDER NUMBER: **B/SM 30/23**
DESCRIPTION: **JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE**
CLOSING DATE: **Monday 20 March 2023**
CLOSING TIME: **12h00**: Bids will be opened in the **Council Chambers** or **SCM Boardroom**.

CIDB: The following CIDB class of construction works will be applicable to the Tender, in accordance with the sum tendered or value determined in accordance with regulation 25(7A) of the Construction Industry Development Regulations, 2004 (as amended) – As at 23 May 2019 - Class of Construction Works: 7CE or higher.

INFORMATION:
Tender Specifications: **Wade van der Merwe at 021 808 8747: e-mail:** Wade.vanderMerwe@stellenbosch.gov.za
SCM Requirements: **Jeanette Williams at 021 808 8524: e-mail:** Jeanette.Williams@stellenbosch.gov.za
Office hours for collection; 08h00-15h30

A **Compulsory Clarification Meeting** will be held on **2 March 2023 at 10H00** at **the Stellenbosch Wastewater Treatment Works, Vredenburg Road Stellenbosch. Tenderers who fail to attend the compulsory information session will be regarded as non-compliant.** In the event of a Joint Venture, one of each company must attend the site meeting.

Tenders may only be submitted on the Tender document issued by Stellenbosch Municipality and must be valid for **180 days** after tender closing. Late, electronic format, telephonic or faxed Tenders will not be considered and Stellenbosch Municipality does not bind itself to accept the lowest bid or any of the tenders that has been submitted.

Sealed Tenders, with "**JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE"** clearly endorsed on the envelope, must be deposited in the Tender box at the offices of the Stellenbosch Municipality, Plein Street, Stellenbosch. The Tender box is accessible 24 hours a day and Tenders must be accompanied by the completed Tender documents. Tenders not accompanied by a complete Tender document, will not be considered

NOTE: This tender will be evaluated in terms of the General Conditions of Contract**,** Supply Chain Management Policy and relevant specification as depicted in the document and also the Stellenbosch Preferential Procurement Policy effective from 16 January 2023 in accordance with the Preferential Procurement Regulations that was promulgated by the Minister of Finance on 04 November 2022 in Government Gazette No 47452.

The preferential points system applied is as follows:80/20 in terms of the approved policy.

Price	**80**
B-BBEE status level of contribution	**20**
Total points for Price and B-BBEE	**100**

The following conditions to Tender exist (failure to comply may result in your Tender being disqualified):

1. This Tender is subject to the general conditions of contract (GCC) and special conditions for Tendering.
2. Relevant terms of reference.
3. Tenderers must be registered on the Central supplier database (CSD) if they wish to conduct business with the municipality.

4. No award will be made to tenderers whose tax status is non-compliant.
5. Tenders submitted must be in a sealed envelope clearly marked with the Tender number, placed in the tender box before closing time. Failure will result in the tender being invalid.

*Tender documents, in English, are available free of charge on the website: www.stellenbosch.gov.za. Alternatively, hard copies of the document are obtainable from the offices of the Supply Chain Management Unit, Stellenbosch Municipality ,Town House Complex, 1st Floor, Plein Street, Stellenbosch, upon payment of a non-refundable fe**e of R 1 256.50 per document.***

G Mettler (Ms)
MUNICIPAL MANAGER

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TENDER KENNISGEWING

STELLENBOSCH MUNISIPALITEIT NOOI U VIR DIE VOLGENDE TENDER: B/SM 30/23: JAMESTOWN 5ML STOORDAM : KONSTRUKSIE VAN GROOTMAAT WATER EN GEASSOSIEERDE INFRASTRUKTUUR

TENDER NOMMER: **B/SM 30/23**
BESKRYWING: **JAMESTOWN 5ML STOORDAM :KONSTRUKSIE VAN GROOTMAAT WATER EN GEASSOSIEERDE INFRASTRUKTUUR**

SLUITINGSDATUM: **Maandag 20 Maart 2023**
TYD VAN SLUITING: **12h00.** Tenders sal oopgemaak word in die **Raadsaal** of in die **Voorsieningskanaalbestuurs Raadsaal.**

KIOR: Die volgende KIOR klas vir konstruksiewerk, in ooreenstemming met die totale bedrag getender of waarde bepaal in ooreenstemming met regulasie 25 (7A) van die Konstruksie-industrie Ontwikkelingsraad, Regulasies, 2004 (soos gewysig) op 23 Mei 2019, sal op die bod van toepassing wees. Tenderaars moet 'n **geskatte KIOR kontrakteurgradering** van ten minste **7CE of hoër** hê.

NAVRAE:
Tender spesifikasies: Wade van der Merwe at 021 808 8747: e-pos: Wade.vanderMerwe@stellenbosch.gov.za
Vkb vereistes: Jeanette Williams at 021 808 8524: e-pos: Jeanette.Williams@stellenbosch.gov.za
Kantoor Ure: 08h00-15h30

'n **Verpligte inligtingsessie** sal gehou word op **2 Maart 2023 om 10H00 te Stellenbosch Wastewater Treatment Works, Vredenburg Pad Stellenbosch.** Tenderaars wat nie die verpligte inligtingsessie bywoon nie, sal nie in ag geneem word nie.

Tenders mag slegs ingedien word op die tenderdokumentasie verskaf deur Stellenbosch Munisipaliteit en moet geldig wees vir 180.dae na die sluitingsdatum. Laat, elektroniese formaat of gefakse tenders sal nie aanvaar word nie en Stellenbosch Munisipaliteit is nie verplig om die laagste of enige tender wat ingedien word te aanvaar nie.

Verseëlde tenders duidelik gemerk: ": **B/SM 30/23: JAMESTOWN 5ML STOORDAM: KONSTRUKSIE VAN GROOTMAAT WATER EN GEASSOSIEERDE INFRASTRUKTUUR,** op die koevert, moet geplaas word in tenderbus buite die kantore van Stellenbosch Munisipaliteit ,Meenthuis Kompleks, Stellenbosch. Die tenderbus is 24 uur per dag beskikbaar en tenders moet vergesel word met die voltooide stel tenderdokumente. Tenderaanbiedinge wat nie deur die volledige tenderdokument vergesel word nie, sal nie oorweeg word nie.

LET WEL: Hierdie tender sal geëvalueer word ingevolge die Algemene Kontrakvoorwaardes, Voorsieningskanaal Bestuursbeleid en relevante spesifikasies, soos vervat in die tender dokument asook die Stellenbosch **Voorkeurverkrygingsbeleid effektief vanaf 16 Januarie 2023 in samewerking met die Voorkeurverkrygingsregulasies wat op 04 November 2022 deur die Minister van Finansies in Staatskoerant No 47452 afgekondig is.**

Die voorkeurpunte stelsel is soos volg gebaseer: 80/20 in terme van die goedgekeurde beleid:

Prys	**80**
BBSEB status	**20**
Totale punte vir prys en B-BSEB	**100**

Die volgende voorwaardes vir Tender soos volg: (versuim om te voldoen, kan veroorsaak dat u Tender gediskwalifiseer word):

1. Hierdie tender is onderworpe aan die algemene kontrakvoorwaardes (GCC) en spesiale voorwaardes vir die tender;
2. Toepaslike opdrag
3. Tenderaars moet geregistreer wees op Sentrale verskaffersdatabasis (SVD) as hulle met die munisipaliteit sake wil doen
4. Geen toekenning sal gemaak word aan diensverskaffers wie se Belasting status ongeldig is.
5. Die tender wat ingedien moet word, moet in 'n verseëlde koevert wees wat duidelik gemerk is met die Tendernommer, wat in die tenderbus voor sluitingstyd geplaas word. Versuim sal tot gevolg hê dat die tender ongeldig is.

Tenderdokumente, in Engels, is verkrygbaar by die kantoor van die Voorsieningskanaalbestuurseenheid, Stellenbosch Munisipaliteit, Meenthuis Kompleks, *1ste Vloer, Pleinstraat, Stellenbosch na betaling van 'n nie-terugbetaalde tenderdeelnamefooi van* ***R 1 256.50 per dokument.*** *Alternatiewelik mag die dokument gratis afgelaai word vanaf die webblad www.stellenbosch.gov.za.*

G Mettler (Me)
MUNISIPALE BESTUURDER

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PART A
INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE (*NAME OF MUNICIPALITY/ MUNICIPAL ENTITY*)					
BID NUMBER:	**B/SM 30/23**	CLOSING DATE:	**20 March 2023**	CLOSING TIME:	**12h00**
DESCRIPTION	**JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE**				
THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (MBD7).					

BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX
SITUATED AT *(STREET ADDRESS*

STELLENBOSCH MUNICIPALITY, PLEIN STREET, STELLENBOSCH

SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
TAX COMPLIANCE STATUS	TCS PIN:		**OR**	CSD No:	
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE [TICK APPLICABLE BOX]	☐ Yes ☐ No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT	☐ Yes ☐ No	

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]

1. ARE YOU THE ACCREDITED REPRESENTATIVE **IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?**	☐Yes ☐No [IF YES ENCLOSE PROOF]	**2.** ARE YOU A FOREIGN BASED SUPPLIER FOR **THE GOODS /SERVICES /WORKS OFFERED?**	☐Yes ☐No [IF YES, ANSWER PART B:3]
3. TOTAL NUMBER OF ITEMS OFFERED		**4. TOTAL BID PRICE**	**R**
5. SIGNATURE OF BIDDER	……	**6. DATE**	
7. CAPACITY UNDER WHICH THIS BID IS SIGNED			

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:		**TECHNICAL INFORMATION MAY BE DIRECTED TO:**	
DEPARTMENT	SUPPLY CHAIN MANAGEMENT	CONTACT PERSON	Wade van der Merwe
CONTACT PERSON	Jeanette Williams	TELEPHONE NUMBER	021 808 8747
TELEPHONE NUMBER	021 808 8524	FACSIMILE NUMBER	N/a
FACSIMILE NUMBER	N/A	E-MAIL ADDRESS	Wade.vanderMerwe@stellenbosch.gov.za
E-MAIL ADDRESS	Jeanette.Williams@stellenbosch.gov.za		

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PART B
TERMS AND CONDITIONS FOR BIDDING

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

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

SIGNATURE OF BIDDER: ……
CAPACITY UNDER WHICH THIS BID IS SIGNED: ……
DATE: ……...

CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

T1.2 Tender Data

The conditions of tender are the Standard Conditions of Tender as contained in Annex F of the CIDB Standard for Uniformity in Construction Procurement (July 2015) as published in Government Gazette No. 38960, Board Notice 136 of 2015 of 10 July 2015. (see www.cidb.org.za).

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.

"Bid" should read "tender", and vice versa, throughout the document – implying both words have the same meaning.

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

Clause Number	Tender Data

F.1 General

F.1.1 Actions

The Employer is STELLENBOSCH MUNICIPALITY.

F.1.2 Tender Documents

Add the following:

The following documents form part of this tender:

VOLUME 1 : The General Conditions of Contract for Construction Works (Third Edition) 2015 as published by the South African Institution of Civil Engineering. This publication is available and tenderers must obtain copies at their own cost from the South African Institution of Civil Engineering (SAICE), Private Bag X200, Halfway House 1685, Tel: (011) 805 5947, Fax: (011) 805 5971, e-mail: civilinfo@saice.org.za.

VOLUME 2: The SANS Standard Specifications for Civil Engineering Construction prepared by Standards South Africa (SANS 1200). These publications are obtainable, and tenderers must obtain copies at their own cost from Standards South Africa, Private Bag X191, PRETORIA, 0001.

Volumes 1 and 2 may also be inspected, by appointment, at the offices of the Employer during normal office hours.

The Tender Documents issued by the Employer comprise:

VOLUME 3: The Tender Document (this document), in which are bound:

THE TENDER
Part T1: Tendering Procedures
T1.1 Tender Notice and Invitation to Tender

T1.2 Tender Data
Part T2: Returnable documents
T2.1 List of Returnable Documents
T2.2 Returnable Schedules

THE CONTRACT
Part C1: Agreements and Contract Data
C1.1 Form of Offer and Acceptance
C1.2 Contract Data
C1.3 Form of Performance Guarantee
C1.4 Form of Advance Payment Guarantee
C1.5 Occupational Health and Safety Agreement
C1.6 Protection of the Environmental Declaration
C1.7 Insurance Broker's Warranty
C1.8 Contract of Temporary Employment as Community Liaison Officer
Part C2: Pricing data
C2.1 Pricing Instructions
C2.2 Bill of Quantities
Part C3: Scope of Work
C3.1 Description of the Works
C3.2 Engineering
C3.3 Procurement
C3.4 Construction
C3.5 Management
C3.6 Works Specifications
C3.7 Health and Safety Specifications
C3.8 Environmental Management Plan
C3.9 Annexures
Part C4: Site Information
C4.1 Site Information

VOLUME 4: The following drawings issued with this tender:

	LOCALITY PLAN DRAWINGS
5473-0-C001	Locality Plan
	SITE LAYOUT DRAWINGS
5473-0-C100	Site Layout - Bulk Water Infrastructure
5473-0-C101	Site Layout - Jamestown Reservoir
5473-0-C102	Site Layout - Decommission existing Reservoir
	PLAN AND PROFILE DRAWINGS
5473-0-C200	Proposed 355mm Ø HDPE Inflow Rising Main LS (Sheet 1 of 2)
5473-0-C201	Proposed 355mm Ø HDPE Inflow Rising Main LS (Sheet 2 of 2)
5473-0-C202	Proposed 355mm Ø HDPE Outflow Pipeline LS (Sheet 1 of 2)
5473-0-C203	Proposed 355mm Ø HDPE Outflow Pipeline LS (Sheet 2 of 2)
5473-0-C204	Proposed 250mm Ø Scour Pipeline LS (Sheet 1 of 2)
5473-0-C205	Proposed 250mm Ø Scour Pipeline LS (Sheet 2 of 2)
	JAMESTOWN 5ML RESERVOIR DRAWINGS
5473-0-C300	Outlet and Scour Details (sheet 1 of 2)
5473-0-C301	Outlet and Scour Details (sheet 2 of 2)
5473-0-C302	Inlet and overflow details
5473-0-C303	Reservoir plan and long section
	SITE WORKS DETAILS

5473-0-C400	Site Works Details (Sheet 1 of 6)
5473-0-C401	Site Works Details (Sheet 2 of 6)
5473-0-C402	Site Works Details (Sheet 3 of 6)
5473-0-C403	Site Works Details (Sheet 4 of 6)
5473-0-C404	Site Works Details (Sheet 5 of 6)
5473-0-C405	Site Works Details (Sheet 6 of 6)
5473-0-C600	Typical Details
5473-0-C601	Thrust Block Details

F.1.3 Interpretation

F.1.3.2 *Delete the clause and replace with the following:*
These conditions of tender, the tender data and tender schedules which are required for tender evaluation purposes, shall form part of any contract arising from the invitation to tender.

F.1.4 Communication and Employer's Agent

Delete the first sentence of the clause and replace with the following:
Verbal or any other form of communication, from the Employer, its employees, agents or advisors during site visits/clarification meetings or at any other time prior to the award of the Contract, will not be regarded as binding on the Employer, unless communicated by the Employer in writing to suppliers by its Director: Supply Chain Management or his nominee.

The Employer's Agent, for the purposes of any communication between the Employer and Tenderer is:

Name	:	JG AFRIKA (Pty) Ltd
Represented By	:	Mr Charl du Preez or any director or shareholder of the company
Address	:	14 Central Square Pinelands, 7405
Telephone :		(021) 532 0940
Fax	:	(021) 532 0950
E-mail	:	duPreezC@jgafrika.com

F.1.5 Cancellation and Re-Invitation of Tenders
Delete the fulstop at the end of F.1.5.1 c) and replace with , or
Add the following after F.1.5.1 c):
d) there is a material irregularity in the tender process.

F.1.6.2 Competitive negotiation procedure
Add the following to F.1.6.2.1:
A competitive negotiation procedure will not be followed.

F.1.6.3 Proposal procedure using the two-stage system
Add the following between F.1.6.3 and F.1.6.3.1:
A two-stage system will not be followed.

Add the following after F.1.6.3.2.2

F.1.6.4 Objections, complaints, queries and disputes/ Appeals in terms of Section 62 of the Systems Act/ Access to court

F.1.6.4.1 Disputes, objections, complaints and queries
In terms of Regulations 49 and 50 of the Local Government: Municipal Finance Management Act, 56 of 2003 – Municipal Supply Chain Management Regulations (Board Notice 868 of 2005):

a) Persons aggrieved by decisions or actions taken by the Stellenbosch Municipality in the implementation of its supply chain management system, may lodge within 14 days of the decision or action, a written objection or complaint or query or dispute against the decision or action.

F.1.6.4.2 Appeals

a) In terms of Section 62 of the Local Government: Municipal Systems Act, 32 of 2000 a person whose rights are affected by a decision taken by the Municipality, may appeal against that decision by giving written notice of the appeal and reasons to the Municipal Manager within 21 days of the date of the notification of the decision.
b) An appeal must contain the following:
   i) Must be in writing
   ii) It must set out the reasons for the appeal
   iii) It must state in which way the Appellant's rights were affected by the decision;
   iv) It must state the remedy sought; and
   v) It must be accompanied with a copy of the notification advising the person of the decision

F.1.6.4.3 Right to approach the courts and rights in terms of Promotion of Administrative Justice Act, 3 of 2000 and Promotion of Access to Information Act, 2 of 2000

The sub- clauses above do not influence any affected person's rights to approach the High Court at any time or its rights in terms of the Promotion of Administrative Justice Act and Promotion of Access to Information Act.

F.1.6.4.4 All requests referring to sub clauses F.1.6.4.1 and F.1.6.4.2 must be submitted in writing to:

The Municipal Manager, Stellenbosch Municipality, PO Box 17, Stellenbosch.

F.1.6.4.5 All requests referring to clause F.1.6.4.2 3 regarding access to information or reasons must be submitted in writing to:

The Municipal Manager, Stellenbosch Municipality, PO Box 17, Stellenbosch.

F.1.7 **National Treasury Web Based Central Supplier Database (CSD) Registration**

Tenderers are required to be registered on the National Treasury Web Based Central Supplier Database (CSD) as a service provider. Tenderers must register as such upon being requested to do so in writing and within the period contained in such a request, failing which no orders can be raised or payments processed from the resulting contract. In the case of Joint Venture partnerships this requirement will apply individually to each party of the Joint Venture.

Tenderers who wish to register on the National Treasury Web Based Central Supplier Database (CSD) may do so via the web address **https://secure.csd.gov.za**.

It is each tenderer's responsibility to keep all the information on the National Treasury Web Based Central Supplier Database (CSD) updated.

F.2 Tenderer's obligations

F.2.1 **Eligibility**
Delete the heading ***Eligibility*** *and Replace with* ***Responsiveness Criteria***

F.2.1.1 *Delete the clause and replace with the following:*
Tenderers must submit a tender offer that complies in all aspects to the conditions as detailed in this document. Only those tenders that comply in all aspects with the tender conditions, specifications, pricing instructions and contract conditions will be declared responsive.

Add the following after F.2.1.2:
F.2.1.3 Only those tender submissions from which it can be established that a clear and unambiguous offer has been made to Employer, by whom the offer has been made and what the offer constitutes, will be declared responsive.

F.2.1.4 Only those tenders that satisfy the following criteria will be declared responsive:

F.2.1.4.1 **Construction Industry Development Board (CIDB) Registration**
Only those tenders submitted by tenderers who are registered, or capable of being registered, with an active status with the CIDB, 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, will be declared responsive. Tenderers must obtain such active status upon being requested to do so in writing and within the period contained in such a request, failing which their tenders will be declared non-responsive.

Joint Ventures are eligible to submit tenders provided that:
a) every member of the joint venture is registered with an active status with the CIDB;
b) the lead partner has a contractor grading designation of not lower than one level below the required grading designation in the CE class of construction work; and
c) the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 8CE class of construction work or a value determined in accordance with Regulation 25 (1B) or 25 (7A) of the Construction Industry Development Regulations.

For alpha-numerics associated with the contractor Grading Designations see Annex G attached.

F.2.1.4.2 **Compliance with requirements of Stellenbosch Municipality's SCM Policy and procedures**
Only those tenders that are compliant with the requirements below will be declared responsive:
a) Full name of entity submitting tender to be provided;
b) Identification number or company or other registration number to be provided;
c) Tax reference number to be provided;
d) VAT registration number (if any) to be provided;
e) A completed **Certificate of Authority for Partnerships/ Joint Ventures/ Consortiums** to be provided authorising the tender to be made and the signatory to sign the tender on the partnership /joint venture/consortium's behalf (applicable schedule to be completed);
f) A copy of the partnership / joint venture / consortium agreement to be provided;
g) A completed **Declaration of Interest – State Employees** to be provided and which does not indicate any non-compliance with the legal requirements relating to state employees (applicable schedule to be completed);
h) A completed **Declaration – Conflict of Interest** and **Declaration of Bidder's past Supply Chain Management Practices** to be provided and which does not indicate any conflict or past practises that renders the tender non-responsive (applicable schedules to be completed);
i) A completed **Certificate of Independent Bid Determination** to be provided and which does not indicate any non-compliance with the requirements of the schedule (applicable schedule to be completed);
j) The tenderer (including any of its directors or members), has not been restricted in terms of abuse of the Supply Chain Management Policy;
k) The tenderer's tax matters with SARS are in order;
l) The tenderer is not an advisor or consultant contracted with the Employer;

m) The tenderer is not a person, advisor, corporate entity or a director of such corporate entity, involved with the bid specification committee.

F.2.1.4.3 **Functionality/ Pre-Qualification**

In order to be considered for a contract in terms of this tender, tenderers must confirm Pre-Qualifications functionality as stated below.

The description of the functionality criteria and the maximum possible score for each is shown in the table below. The score achieved for functionality will be the sum of the scores achieved, in the evaluation process, for the individual criteria.

CRITERIA	APPLICATION OF THE CRITERIA	CONFIRM
Company Experience	Demonstrated experience of the tendering entity with respect to comparable projects by completing each row in the Returnable Schedule of work experience in full. **CRITERIA Company Experience HDPE pipes: (minimum requirements):** 2 x Completed projects - The Construction of large diameter HDPE pressure pipes with welded joints (315mm nominal diameter or larger) by means of open trench construction at trench depths exceeding 3m for at least 300m. Or: 3 x Completed projects - The Construction of large diameter HDPE pressure pipes with welded joints (250mm nominal diameter or larger) by means of open trench construction at trench depths exceeding 3m for at least 200m. Or: 3 x Completed projects - The Construction of large diameter HDPE pressure pipes with welded joints (250mm nominal diameter or larger) by means of open trench construction at trench depths exceeding 2.2m for at least 100m. **AND** **CRITERIA Company Experience reinforced concrete reservoirs. (minimum requirements):** 3 x Completed projects – Construction of reinforced concrete water retaining structure with concrete roof structure. Minimum capacity of structure 4ML or larger. Or: 2 x Completed projects – Construction of reinforced concrete water retaining structure with concrete roof structure. Minimum capacity of structure 5ML or larger. Or: 2 x Completed projects - Construction of reinforced concrete water retaining structure with minimum capacity of 6ML.	

Resources and Capacity	Only those tenderers who have in their **full-time** employment, management and supervisory staff **available** for this Contract, and satisfying the requirements for EPWP Labour Intensive Construction (LIC), are eligible to submit tenders. **Resources and Capacity: (Minimum requirements)** Contracts Managers – NQF level 7, with min 8 years Construction Management experience for grade 7CE (or higher) Full-Time Site Agents – NQF level 5, with min 10 years work scope related experience or NQF level 6 with min 5 years relevant experience. **CV's and proof of LIC qualifications for individuals must be attached to the Tender, in order to submit a responsive tender.** In addition to the above, only those tenderers that satisfy the following criteria are eligible to submit tenders: • Proof of availability of resources; • Proof of capacity to mobilize own and subcontracting resources; • Proof of availability of skills to manage and perform the contract (assigned personnel) – **attach Project Organogram**	
Methodology	**The Methodology to be used:** Minimum requirements: - Proposes a step by step process; - Innovative and creative in bringing new ideas; - Proposes additional value-adding features; - Demonstrates cost minimisation mechanisms; - Includes a costed project plan with clear milestones - Organogram displaying Key personnel.	
Local Company Office	The bidders must provide a utility bill/lease agreement as proof that the company has a permanent office in the Western Cape, or if they do not have an office in the Western Cape, they must provide an undertaking to establish an office within the Western Cape within two calendar months after successful Bid award date. The service provider must submit their undertaking as part of their returnable documents in their tender submission.	

Tenderers must indicate in the confirm column whether they comply to these criteria.

Where the entity tendering is a Joint Venture the tender must be accompanied by a statement describing exactly what aspects of the work will be undertaken by each party to the joint venture (appended to Schedule 10, Part T2.2: Returnable Schedules).

Where the tenderer intends to sub-contract any of the work components listed above, full details of the intended sub-contractor and portions of work to be undertaken by them shall be provided with the tender. The verifiable experience of the sub-contractor relevant to the component of work to be performed by them will be taken into consideration when allocating scores.

Tenderers shall ensure that all relevant information has been submitted with the tender offer in the prescribed format to ensure optimal scoring of functionality points for each Evaluation Criteria. Failure to provide all information **IN THIS TENDER SUBMISSION** could result in the tenderer not being able to achieve the specified minimum scoring.

F.2.1.4.5 **Compulsory clarification meeting**

Tenderers are required to attend a compulsory clarification meeting and site visit at which they may familiarise themselves with aspects of the proposed work, services or supply and pose questions.

Details of the meeting(s) are stated in the General Tender Information.

Only those tenders submitted by tenderers who have signed the attendance register will be declared responsive.

F.2.1.4.6 **Good standing with Bargaining Council**

Only those tenders submitted by tenderers who are in good standing with the **Bargaining Council for the Civil Engineering Industry (BCCEI)** at the time of the tender award will be declared responsive. Tenderers must attach such proof to the schedule titled **Declaration in Respect of Compliance with Labour Legislation** or obtain such upon being requested to do so in writing and within the period contained in such a request, failing which their tenders will be declared non-responsive

F.2.3 **Check documents**

F.2.3 *Delete the clause and replace with the following:*

The Tenderer should check the tender documents on receipt for completeness, missing or duplicated pages, indistinct figures or writing and any obvious errors. The Tenderer must notify the Employer's agent at once of any such problems identified

F.2.7 **Clarification meeting**

Add the following after the second sentence:

The arrangements for the compulsory site visit/clarification meeting are as stated on the General Tender Information page and in the Responsiveness Criteria (if applicable) .

Tenderers should be represented at the site visit/clarification meeting by a person who is suitably qualified and experienced to comprehend the implications of the work involved.

F.2.8 **Seek Clarification**

Add the following after the first sentence:

The tenderer warrants that it has:

a) inspected the Specifications and read and fully understood the Conditions of Contract.
b) read and fully understood the whole text of the Specifications and Price Schedule and thoroughly acquainted itself with the nature of the goods proposed and generally of all matters which may influence the Contract.
c) visited the site(s) where delivery of the proposed works will take place, carefully examined existing conditions, the means of access to the site(s), the conditions under which the delivery is to be made, and acquainted itself with any limitations or restrictions that may be imposed by the Municipal or other Authorities in regard to access and transport of materials, plant and equipment to and from the site(s) and made the necessary provisions for any additional costs involved thereby.
d) requested the Employer to clarify the requirements contained in the Specifications and Price Schedule, the exact meaning or interpretation of which is not clearly intelligible to the tenderer.
e) received any notices to the tender documents which have been issued in accordance with the Employer's SCM Policy.

The Employer will therefore not be liable for the payment of any extra costs resulting from any claim submitted by the tenderer arising from any alleged ambiguity or uncertainty contained in the tender document.

F.2.12 **Alternative tender offers**

F.2.12.1 *Add the following to F.2.12.1 at the end of the first sentence:*
If a tenderer wishes to submit an alternative tender offer, he shall do so as a separate offer on a separate set of tender documents. The alternative tender offer shall be submitted in a separate sealed envelope on a separate Form of Offer, both clearly marked "Alternative Tender" in order to distinguish it from the main tender offer.

While it is not necessary to duplicate all parts of the main tender offer, the alternative tender offer shall be supported by the following documents as applicable:

a) the schedule that compares the alternative(s) offered with the requirements of the issued tender documents
b) preliminary designs, calculations, drawings and all other pertinent technical information and characteristics must be submitted with the alternative tender offer, in order to enable the Employer to evaluate the efficacy of the alternatives proposed
c) revised Bills of Quantities, or parts thereof, highlighting the changes made, together with a revised Summary, the total of which has been carried to the Form of Offer
d) details of any proposed amendments to the Pricing Assumptions

F.2.12.3 *Add the following to F.2.12.1 at the end of the first sentence:*
An alternative of the highest ranked acceptable main tender offer that is priced higher than the main tender offer may be recommended for award, provided that the ranking of the alternative tender -offer is higher than the ranking of the next ranked acceptable main tender offer.

The Employer's costs in confirming the acceptability of the alternative offer will be, *inter alia*, taken into account in considering the alternative offer.

The Employer will not be bound to consider alternative tenders and shall have sole discretion in this regard.

In the event that the alternative is accepted, the Contractor shall accept full responsibility that the alternative offer complies in all respects with the Employer's standards and requirements.

F.2.13 **Submitting a tender offer**

Add the following to F.2.13.1 at the end of the first sentence:
F.2.13.1 Where the tendering entity is a joint venture it is recommended that the standard CIDB Joint Venture Agreement be used.

Add the following to F.2.13.3 at the end of the first sentence:
F.2.13.3 Parts of each tender offer communicated on paper shall be submitted as an original, plus 0 (naught) copies.

Add the following to F.2.13.5 at the end of the first sentence:
F.2.13.5 The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are:

Employer:	Stellenbosh Municipality
Physical address:	Plein Street, Stellenbosch
Identification details:	Tender Number: B/SM 30/23 Title of Contract: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

Sealed tenders with the Tenderer's name and address and the endorsement "**TENDER NO. B/SM 30/23: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE**" on the envelope, must be placed in the appropriate official tender box at the abovementioned address.

Add the following to F.2.13.6:
F.2.13.6 A two-envelope procedure will **not** be followed (F.3.5).

Add the following after F.2.13.9:

F.2.13.10 By signing the offer part of C1.1 Form of Offer and Acceptance the tenderer declares that all information provided in the tender submission is true and correct.

F.2.13.11 The Employer shall not formally issue tender documents in electronic format and shall only issue tender documents in hardcopy. An electronic version of the issued tender documents may be made available to the tenderer, upon written request in terms of this clause, subject to the following:

a) Electronic copies of the issued tender documents, or parts thereof, will only be provided to tenderers who have been issued with the tender documents as contemplated in F.1.2 in hardcopy.
b) The electronic version shall not be regarded as a substitute for the issued tender documents.
c) The Employer shall not accept tenders submitted in electronic format. Only those tenders that have been completed on the issued hard copy tender document shall be considered, provided that printed Bills of Quantities, in the same format (that is, layout, billed items and quantities) as those issued electronically by the Employer, may be submitted with the tender as stated in F.2.13.2.
d) Where Addenda have been issued which amend the Bills of Quantities, then the printed Bills of Quantities shall take these into account. The pages of the issued Bills of Quantities should not be removed from the tender document.
e) The Employer accepts no responsibility or liability arising from any reliance on or use of the electronic version provided in terms of this clause. Tenderers are alerted to the fact that electronic versions of the tender documents may not reflect any notices or addenda that amend the tender document.
f) Any non-compliance with these provisions, including effecting any unauthorised alterations to the tender documents as contemplated in F.2.11, shall render the tender non-responsive. The Employer reserves the right to take any action against such tenderer allowed in law including, in circumstances where the tender had already been awarded, the right to cancel the contract.
g) In requesting the electronic version of the tender documents or parts thereof, the tenderer is deemed to have read, understood and accepted all of the above conditions.

F.2.15 **Closing time**

Add the following to F.2.15.1 after the first sentence:

F.2.15.1 The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.

F.2.16 **Tender offer validity**

Add the following to F.2.16.1 after the first sentence:

F.2.16.1 The tender offer validity period is **(180 calendar days)**.

F.2.16.2 *Delete the clause and replace with the following:*

Tender offers shall be deemed to remain valid until formal acceptance by the Employer of an offer at any time after the expiry date of the original tender offer validity period, unless the Employer is notified in writing of anything to the contrary, including any further conditions, by the tenderer.

Any further conditions introduced by the tenderer will be considered at the sole discretion of the Employer.

F.2.17 **Clarification of tender offer after submission**

Add the following to F.2.17 at the end of the third sentence:

A tender will be rejected as non-responsive if the tenderer fails to provide any clarification or supporting documents requested by the Employer within the time for submission stated in the Employer's written request for such clarification or documents.

F.2.18 **Provide other material**

Delete the following word in F.2.18.1:

F.2.18.1 notarized

Add the following to F.2.18.1 at the end of the first paragraph:

Provide, on written request by the Employer, where the transaction value (tendered amount) inclusive of VAT **exceeds R 10 million**:

a) audited annual financial statement for the past 3 years, or for the period since establishment if established during the past 3 years, if required by law to prepare annual financial statements for auditing;

b) a certificate signed by the tenderer certifying that the tenderer has no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days;
c) particulars of any contracts awarded to the tenderer 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;
d) a statement indicating whether any portion of the goods or services are expected to be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality or municipal entity is expected to be transferred out of the Republic.

Each party to a Consortium/Joint Venture shall submit separate certificates/statements in the above regard.

Add the following after F.2.18.2:

F.2.18.3 Tenderers shall fully cooperate with the Employer's external service provider appointed to perform a due diligence review and risk assessment upon receipt of such written instruction from the Employer.

Failure to fully cooperate could result in a tender being declared as non-responsive.

F.2.18.4 **Compliance with Occupational Health and Safety Act, 85 of 1993**

Tenderers are to note the requirements of the Occupational Health and Safety Act, 85 of 1993 and the Construction Regulations, 2014 issued in terms of Section 43 of the Act. The Tenderer shall be deemed to have read and fully understood the requirements of the above Act and Regulations and to have allowed for all costs in compliance therewith.

In this regard the Tenderer shall submit with his tender or upon request, appended to Schedule 16: Health and Safety Plan in T2.2 : Returnable Schedules, a draft Health and Safety Plan in respect of the Works in sufficient detail to demonstrate the necessary competencies and resources to perform the construction work all in accordance with the Act, Regulations and Health and Safety Specification in Part C3.7 Health and Safety Specifications for the works detailed in Part C3 Scope of works.

F.2.23 **Certificates**

Add the following after the first sentence:

The tenderer is required to submit the following:

F.2.23.1 **Evidence of tax compliance**

Tenderers shall be registered with the South African Revenue Service (SARS) and their tax affairs must be in order and they must be tax compliant. The tenderer must also provide its Tax Compliance Status PIN number on the **Compulsory Enterprise Questionnaire**

Tenderers are to note that the Employer will not award a contract to a Tenderer whose tax matters are not in order.

F.2.23.2 **Broad-Based Black Economic Empowerment Status Level Documentation**

In order to qualify for preference points, it is the responsibility of the tenderer to submit documentary proof, either as certificates, sworn affidavits or any other requirement prescribed in terms of the B-BBEE Act, of its B-BBEE status level of contribution in accordance with the applicable Codes of good practise as issued by the Department of Trade and Industry, to the Stellenbosch Municipality at the Supplier Management Unit located within the Supplier Management / Registration Office, *1st Floor, Room no.121, Plein Street, Stellenbosch* or included with the tender submission.

Consortiums/Joint Ventures will qualify for preference points, provided that the **entity** submits the relevant certificate/scorecard in accordance with the applicable codes of good practise. Note that, in the case of unincorporated entities, a verified consolidated B-BBEE scorecard must be submitted in the form of a certificate with the tender.

Tenderers are further referred to the content of the **Preference Schedule** for the full terms and conditions applicable to the awarding of preference points.

The applicable code for this tender is the **Amended Codes for Measuring Broad-Based Black Economic Empowerment in the Construction Sector) unless in possession of a valid certificate in terms of the transitional arrangements contained in these Codes.**

The tenderer shall indicate in Section 4 of the **Preference Schedule** the Level of Contribution in respect of the enterprise status or structure of the tendering entity (the supplier).

Add the follow new clause after F.2.23.2

F.2.24 **Proposed Deviations and Qualifications**

Where the tenderer cannot tender in all respects in accordance with the provisions contained in the tender documents, all deviations therefrom shall be clearly and separately listed in the schedule titled **Proposed Deviations and Qualifications by Tenderer** in T2.2 Returnable Schedules, or in a tenderer's covering letter expressly referenced in this schedule.

The tenderer accepts that the Employer will examine such deviations in terms of clause F.3.8.2 and shall not be bound to accept any such deviations or qualifications.

It must be clearly stated by the tenderer whether the sum tendered in the Tender Offer includes for all such deviations or qualifications listed or referred to in the schedule titled **Proposed Deviations and Qualifications by Tenderer** or not.

F.3 The Employer's undertakings

F.3.2 **Issue Addenda**

Delete the words "three days" from the first sentence and replace with:

"five working days where possible"

Add the following to F.3.2 at the end of the paragraph:
Notwithstanding any requests for confirmation of receipt of` Addenda issued, the tenderer shall be deemed to have received such addenda if the employer can show proof of transmission thereof (or a notice in respect thereof) via electronic mail, facsimile or registered post.

F3.4 **Opening of tender submissions**

Add the following to F.3.4.2 at the end of the paragraph:
The location for opening of the tender offers is the Tender Submission Office at the address as stated on the General Tender Information page.

F.3.8 **Test for responsiveness**

F.3.8.2 *Delete par F.3.8.2 (c)*

Replace the final sentence of F.3.8.2 with the following:
Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of the material deviation.

Add the following after clause F.3.8.2

F.3.8.3 The Employer reserves the right to accept a tender offer which does not, in the Employer's opinion, materially and/or substantially deviate from the terms, conditions, and specifications of the tender documents.

F.3.9 **Arithmetical errors, omissions and discrepancies**

Add the following after clause F.3.9.2

F.3.9.3 In the event of tendered rates or lump sums being declared by the Employer to be unacceptable to it because they are not priced, either excessively low or high, or not in proper balance with other rates or lump sums, the Tenderer may be required to produce evidence and advance arguments in support of the tendered rates or lump sums objected to. If, after submission of such evidence and any further evidence requested, the Employer is still not satisfied with the tendered rates or lump sums objected to, it may request the tenderer to amend these rates and lump sums along the lines indicated by it.

The Tenderer will then have the option to alter and/or amend the rates and lump sums objected to and such other related amounts as are agreed on by the Employer, but this shall be done without altering the tender offer in accordance with this clause.

Should the Tenderer fail to amend his tender in a manner acceptable to and within the time stated by the Employer, the Employer may declare the tender as non-responsive.

F.3.10 **Clarification of a tender offer**

Delete the clause and replace with the following:

F3.10 The Employer may, after the closing date, request additional information or clarification from tenderer, in writing on any matter affecting the evaluation of the tender offer or that could give rise to ambiguity in a contract arising from the tender offer.

F.3.11 **Evaluation of tender offers**

Add the following paragraph below the heading:

The preference point system applicable to this tender is either the 80/20 or 90/10 preference point system and the lowest responsive tender will be used to determine the applicable preference point system.

F.3.11.3(3) *Add the following after par F.3.11.3(3):*
In addition, the various deemed B-BBEE Status Level of Contributor in accordance with the relevant Codes can be attained and such tenderers must be awarded the appropriate number of points.

It should be noted that such Deemed B-BBEE Status Level of Contribution can be enhanced or discounted in accordance with the relevant clauses in the applicable Codes.

F.3.11.3(4) *Delete the heading and replace with the following:*
The 80/20 preference point system for acquisition of services, works or goods up to Rand value of R50 million

F.3.11.3(4)(a)(i) *Delete the first sentence of par F.3.11.3(4)(a)(i) and replace with the following:*

(4) (a)(i) The following formula must be used to calculate the points for price in respect of tenders (including price tender) with a rand value equal to, or above R 30'000 and up to Rand value of R50'000'000 (all applicable taxes included):

Delete the text under the formula and replace with the following:
Where
Ps = Points scored for price of tender or offer under consideration;
Pt = Price of tender or offer under consideration; and
Pmin = Price of lowest acceptable tender or offer.

F.3.11.3(4)(a) *Amend the number of points for status level 3 as follows:*

B-BBEE status level of contributor	Number of points
3	16

F.3.11.3(5) *Delete the heading and replace with the following:*
The 90/10 preference point system for acquisition of services, works or goods with a Rand value above R50 million

F.3.11.3(5)(a)(i) *Delete the first sentence of par F.3.11.3(5)(a)(i) and replace with the following:*

(5) (a)(i) The following formula must be used to calculate the points for price in respect of tenders (including price tender) with a rand value above R50'000'000 (all applicable taxes included):

Delete the text under the formula and replace with the following:
Where
Ps = Points scored for price of tender or offer under consideration;
Pt = Price of tender or offer under consideration; and
Pmin = Price of lowest acceptable tender or offer.

F.3.11.3(5)(a) *Amend the number of points for status level 3 as follows:*

B-BBEE status level of contributor	Number of points
3	8

F.3.11.7 *Delete the text in the final row of the table and replace with the following:*

a	P_m is the offer of the most favourable offer. P is the offer of the tender offer under consideration.

F.3.11.7 **Scoring Financial Offers**
Add the following:
The financial offer will be scored using **Formula 2 (Option 1)**.

F.3.11.8 **Scoring Preferences**

Add the following:

Points will be awarded to tenderers who are eligible for preferences in terms of the **Preference Schedule** (where preferences are granted in respect of B-BBEE contribution) which is included in T2.2 Returnable Schedules.

The terms and conditions of the **Preference Schedule** shall apply in all respects to the tender evaluation process and any subsequent contract.

Add the following after F.3.11.9:

F.3.11.10 **Risk Analysis**

Notwithstanding compliance with regard to CIDB registration or any other requirements of the tender, the employer will perform a risk analysis in respect of the following:

a) reasonableness of the financial offer
b) reasonableness of unit rates and prices

The conclusions drawn from this risk analysis will be used by the Employer in determining the acceptability of the tender offer in terms of F.3.13 b).

F3.13 **Acceptance of tender offer**

Delete F.3.13 and replace with the following):

Accept the tender offer, if in the opinion of the employer, it does not present any material risk and only if the tenderer:

Delete F.3.13 a) and replace with the following):

a) is not under restrictions, has any principals who are under restrictions, or is not currently a supplier to whom notice has been served for abuse of the supply chain management system, preventing participation in the employer's procurement,

If an award cannot be made in terms of anything contained herein, the Employer reserves the right to consider the next ranked tenderer(s).

F.3.16 **Notice to unsuccessful tenderers**

Replace the heading above with:

Notice to successful and unsuccessful tenderers

F.3.16.1 *Delete the clause and replace with the following:*

Before accepting the tender of the successful tenderer the Employer shall notify the successful tenderer in writing of the decision of the Employer's Bid Adjudication Committee to award the tender to the successful tenderer. No rights shall accrue to the successful tenderer in terms of this notice.

F.3.16.2 *Delete clause F.3.16.2 and replace with the following:*

The Employer shall, at the same time as notifying the successful tenderer of the Bid Adjudication Committee's decision to award the tender to the successful tenderer, also give written notice to the other tenderers informing them that they have been unsuccessful.

F.3.17 **Provide copies of the contract**

Add the following after the first sentence:

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

F.3.19 *Add the following after F.3.19*

F.3.20 **Negotiations with preferred tenderers**

The Employer may negotiate the final terms of a contract with tenderers identified through a competitive tendering process as preferred tenderers provided that such negotiation:

a) does not allow any preferred tenderer a second or unfair opportunity;
b) is not to the detriment of any other tenderer; and
c) does not lead to a higher price than the tender as submitted.

If negotiations fail to result in acceptable contract terms, the Municipal Manager (or his delegated authority) may terminate the negotiations and cancel the tender, or invite the next ranked tenderer for

negotiations. The original preferred tenderer should be informed of the reasons for termination of the negotiations. If the decision is to invite the next highest ranked tenderer for negotiations, the failed earlier negotiations may not be reopened by the Stellenbosch Municipality.

Minutes of any such negotiations shall be kept for record purposes.

The provisions of this clause will be equally applicable to any invitation to negotiate with any other tenderers.

Annex F
(normative)
Standard Conditions of Tender

As published in Annexure F of the cidb Standard for Uniformity for construction Procurement, Board Notice 136 Government Gazette No 38960 of 10 July 2015

F.1 General

F.1.1 Actions

F.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 F.2 and F.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.

F.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.

Note: 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.

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.

F.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.

F.1.2 Tender Documents

The documents issued by the employer for the purpose of a tender offer are listed in the tender data.

F.1.3 Interpretation

F.1.3.1 The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these conditions of tender.

F.1.3.2 These conditions of tender, the tender data and tender schedules which are only required for tender evaluation purposes, shall not form part of any contract arising from the invitation to tender.

F.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 organisation 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 organisation which 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;

e) **organization** means a company, firm, enterprise, association or other legal entity, whether incorporated or not, or a public body;

f) **functionality** means the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.

F.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.

F.1.5 Cancellation and Re-Invitation of Tenders

F1.5.1 An organ of state 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 services, works or goods requested; or

(b) funds are no longer available to cover the total envisaged expenditure; or

(c) no acceptable tenders are received.

F1.5.2 The decision to cancel a tender must be published in the cidb website and in the government Tender Bulletin for the media in which the original tender invitation was advertised.

F.1.6 Procurement procedures

F.1.6.1 General

Unless otherwise stated in the tender data, a contract will, subject to F.3.13, be concluded with the tenderer who in terms of F.3.11 is the highest ranked or the tenderer scoring the highest number of tender evaluation points, as relevant, based on the tender submissions that are received at the closing time for tenders.

F.1.6.2 Competitive negotiation procedure

F.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 F.3.4, the employer shall announce only the names of the tenderers who make a submission. The requirements of F.3.8 relating to the material deviations or qualifications which affect the competitive position of tenderers shall not apply.

F.1.6.2.2 All responsive tenderers, or not less than three responsive tenderers that are highest ranked in terms of the evaluation method and evaluation criteria stated in the tender data, shall be invited in each round to enter into competitive negotiations, based on the principle of equal treatment and keeping confidential the proposed solutions and associated information. Notwithstanding the provisions of F.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.

F.1.6.2.3 At the conclusion of each round of negotiations, tenderers shall be invited by the employer to make a fresh 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.

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

F.1.6.3 Proposal procedure using the two stage-system

F.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.

F.1.6.3.2 Option 2

F.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.

F.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.

F.2 Tenderer's obligations

F.2.1 Eligibility

F.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.

F.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.

F.2.2 Cost of tendering

F2.2.1 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.

F2.2.2 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.

F.2.3 Check documents

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

F.2.4 Confidentiality and copyright 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.

F.2.5 Reference documents

Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, conditions of contract and other publications, which are not attached but which are incorporated into the tender documents by reference.

F.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.

F.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 tender data.

F.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the employer at least five working days before the closing time stated in the tender data.

F.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 contract data. The tenderer is advised to seek qualified advice regarding insurance.

F.2.10 Pricing the tender offer

F.2.10.1 Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the tender data.

F2.10.2 Show VAT payable by the employer separately as an addition to the tendered total of the prices.

F.2.10.3 Provide rates and prices that are fixed for the duration of the contract and not subject to adjustment except as provided for in the conditions of contract identified in the contract data.

F.2.10.4 State the rates and prices in Rand unless instructed otherwise in the tender data. The conditions of contract identified in the contract data may provide for part payment in other currencies.

F.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.

F.2.12 Alternative tender offers

F.2.12.1 Unless otherwise stated in the tender data, 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.

F.2.12.2 Accept that an alternative tender offer may be based only on the criteria stated in the tender data or criteria otherwise acceptable to the employer.

F.2.12.3 An alternative tender offer may only be considered in the event that the main tender offer is the winning tender.

F.2.13 Submitting a tender offer

F.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, services or supply identified in the contract data and described in the scope of works, unless stated otherwise in the tender data.

F.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.

F.2.13.3 Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, 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.

F.2.13.4 Sign the original and all copies of the tender offer where required in terms of the tender data. 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.

F.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 tender data, as well as the tenderer's name and contact address.

F.2.13.6 Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data in an envelope marked —financial proposalǁ and place the remaining returnable documents in an envelope marked —technical proposalǁ. Each envelope shall state on the outside the employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.

F.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 tender data.

F.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.

F.2.13.9 Accept that tender offers submitted by facsimile or e-mail will be rejected by the employer, unless stated otherwise in the tender data.

F.2.14 Information and data to be completed in all respects

Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the employer as non-responsive.

F.2.15 Closing time

F.2.15.1 Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Accept that proof of posting shall not be accepted as proof of delivery.

F.2.15.2 Accept that, if the employer extends the closing time stated in the tender data for any reason, the requirements of these conditions of tender apply equally to the extended deadline.

F.2.16 Tender offer validity

F.2.16.1 Hold the tender offer(s) valid for acceptance by the employer at any time during the validity period stated in the tender data after the closing time stated in the tender data.

F.2.16.2 If requested by the employer, consider extending the validity period stated in the tender data for an agreed additional period with or without any conditions attached to such extension.

F.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.

F.2.16.4 Where a tender submission is to be substituted, submit a substitute tender in accordance with the requirements of F.2.13 with the packages clearly marked as "SUBSTITUTE".

F.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.

Note: *Sub-clause F.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.*

F.2.18 Provide other material

F.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. 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.

F.2.18.2 Dispose of samples of materials provided for evaluation by the employer, where required.

F.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.

F.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.

F.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.

F.2.22 Return of other tender documents

If so instructed by the employer, return all retained tender documents within 28 days after the expiry of the validity period stated in the tender data.

F.2.23 Certificates

Include in the tender submission or provide the employer with any certificates as stated in the tender data.

F.3 The employer's undertakings

F.3.1 Respond to requests from the tenderer

F.3.1.1 Unless otherwise stated in the tender Data, respond to a request for clarification received up to five working days before the tender closing time stated in the Tender Data and notify all tenderers who drew procurement documents.

F.3.1.2 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.

F.3.2 Issue Addenda

If necessary, issue addenda that may amend or amplify the tender documents to each tenderer during the period from the date that tender documents are available until three days before the tender closing time stated in the Tender Data. If, as a result a tenderer applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, shall then notify all tenderers who drew documents.

F.3.3 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.

F.3.4 Opening of tender submissions

F.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.

F.3.4.2 Announce at the meeting held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened and, where applicable, the total of his prices, number of points claimed for its BBBEE status level and time for completion for the main tender offer only.

F.3.4.3 Make available the record outlined in F.3.4.2 to all interested persons upon request.

F.3.5 Two-envelope system

F.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.

F.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.

F.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.

F.3.7 Grounds for rejection and disqualification

Determine whether there has been any effort by a tenderer to influence the processing of tender offers and instantly disqualify a tenderer (and his tender offer) if it is established that he engaged in corrupt or fraudulent practices.

F.3.8 Test for responsiveness

F.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.

F.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.

F.3.9 Arithmetical errors, omissions and discrepancies

F.3.9.1 Check the highest ranked tender or tenderer with the highest number of tender evaluation points after the evaluation of tender offers in accordance with F.3.11 for:

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

F3.9.2 The employer must correct the arithmetical errors in the following manner:

a) Where there is a discrepancy between the amounts in words and amounts in figures, the amount in words shall govern.
b) 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.
c) 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.

Consider the rejection of a tender offer if the tenderer does not correct or accept the correction of the arithmetical error in the manner described above.

F.3.10 Clarification of a tender offer

Obtain clarification from a tenderer on any matter that could give rise to ambiguity in a contract arising from the tender offer.

F.3.11 Evaluation of tender offers

F.3.11.1 General

Appoint an evaluation panel of not less than three persons. Reduce each responsive tender offer to a comparative offer and evaluate them using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender data.

F.3.11.2 Method 1: Price and Preference

In the case of a price and preference:

1) Score tender evaluation points for price
2) Score points for BBBEE contribution
3) Add the points scored for price and BBBEE.

F.3.11.3 Method 2: Functionality, Price and Preference

In the case of a functionality, price and preference:

1) Score functionality, rejecting all tender offers that fail to achieve the minimum number of points for functionality as stated in the Tender Data.
2) No tender must be regarded as an acceptable tender if it fails to achieve the minimum qualifying score for functionality as indicated in the tender invitation.
3) Tenders that have achieved the minimum qualification score for functionality must be evaluated further in terms of the preference points system.

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

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

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

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

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmin = Price of lowest acceptable bid

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

1.3 POINTS AWARDED FOR PRICE

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

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

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

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmax = Price of highest acceptable bid

2. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

2.1 In terms of Regulation 4 (2) and 5 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining a specific goal specified for the tender

2.2 The tendering conditions will stipulate the specific goals, as contemplated in section 2(1)(d)(ii) of the Preferential Procurement Act, be attained.

5.3 A maximum of 20 points (80/20 preference points system) or 10 (90/10) preference points system), must be allocated for specific goals. These goals are :

(a) contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender or disability;

(b) Promotion of enterprises located in the municipal area (WCO24)

5.4 Regarding par 5.3 (a) at least 50% of the 20/10 points must be allocated to promote this goal and points will be allocated in terms of the BBBEE scorecard as follows.

B-BBEE Status Level of Contributor	Number of Points for 80/20 Preference Points System	Number of Points for 90/10 Preference Points System
1	20	10
2	18	9
3	16	8
4	12	5
5	8	4
6	6	3
7	4	2
8	2	1
Non-compliant contributor	0	0

5.5 A tenderer must submit proof of its BBBEE status level contributor.

5.6 A tenderer failing to submit proof of BBBEE status level of contributor –

5.6.1 may only score in terms of the 80/90-point formula for price; and

5.6.2 scores 0 points out of 10/5 BBBEE status level of contributor, which is in line with section 2 (1) (d) (i) of the Act, where the supplier or service provider did not provide proof thereof.

5.7 Regarding par 5.3 (b) a maximum of 50% of the 20/10 points must be allocated to promote this goal. Maximum points will be allocated as follows.

Locality of supplier	Number of Points for 80/20 Preference Points System	Number of Points for 90/10 Preference Points System
Within the boundaries of the municipality	10	5
Outside of the boundaries of the municipality	0	0

The maximum will be proportionately adjusted depending on the number of points allocated for this goal. E.G., 40% will equate to 8/4 points.

5) (c) A maximum of 10 points may be allocated in accordance with subparagraph (5)(b).

5) (d) The points scored by tender in respect of B-BBEE contribution must be added to the points scored for price as calculated

5) (e) Subject to paragraph 4.3.8 of "Standard for Uniformity in Procurement, April 2017", the contract must be awarded to the tender who scores the highest total number of points.

F.3.11.4 Decimal places

Score price, preference and functionality, as relevant, to two decimal places.

F.3.11.5 Scoring Price

Score price of remaining responsive tender offers using the following formula:

$$N_{FO} = W_1 \times A$$

Where:

N_{FO} = *the number of tender evaluation points awarded for price.*

W_1 = *the maximum possible number of tender evaluation pints awarded for price as stated in the Tender Data.*

A = *a number calculated using the formula and option described in Table F.1 as stated in the Tender Data.*

Table F.1: Formulae for calculating the value of A

Formula	Comparison aimed at achieving	Option 1[a]	Option 2[a]
1	Highest price or discount	$A = \left(1 + \frac{P - Pm}{Pm}\right)$	A = P / Pm
2	Lowest price or percentage commission / fee	$A = \left(1 - \frac{P - Pm}{Pm}\right)$	A = Pm / P
	[a] P_m = is the comparative offer of the most favourable comparative offer. P = is the comparative offer of the tender offer under consideration.		

F.3.11.6 Scoring preferences

Confirm that tenderers are eligible for the preferences claimed in accordance with the provisions of the tender data and reject all claims for preferences where tenderers are not eligible for such preferences.
Calculate the total number of tender evaluation points for preferences claimed in accordance with the provisions of the tender data.

F.3.11.7 Scoring functionality

Score each of the criteria and sub criteria for quality in accordance with the provisions of the Tender Data.

Calculate the total number of tender evaluation points for quality using the following formula:

$N_Q = W_2 \times S_O / M_S$

where: S_O *is the score for quality allocated to the submission under consideration;* M_S *is the maximum possible score for quality in respect of a submission; and*
W_2 *is the maximum possible number of tender evaluation points awarded for the quality as stated in the tender data*

F.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 contract data, require the employer to provide.

F.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, 2008, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of any of the foregoing,
e) complies with the legal requirements, if any, stated in the tender data, and
f) is able, in the opinion of the employer, to perform the contract free of conflicts of interest.

F.3.14 Prepare contract documents

F.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.

F.3.14.2 Complete the schedule of deviations attached to the form of offer and acceptance, if any.

F.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.

F.3.16 Notice to unsuccessful tenderers

F.3.16.1 Notify the successful tenderer of the employer's acceptance of his tender offer by completing and returning one copy of the form of offer and acceptance before the expiry of the validity period stated in the tender data, or agreed additional period.

F.3.16.2 After the successful tenderer has been notified of the employer's acceptance of the tender, notify other tenderers that their tender offers have not been accepted.

F.3.17 Provide copies of the contracts

Provide to the successful tenderer the number of copies stated in the Tender Data of the signed copy of the contract as soon as possible after completion and signing of the form of offer and acceptance.

F.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.

F3.19 Transparency in the procurement process

F3.19.1 The cidb prescripts require that tenders must be advertised and be registered on the cidb i.Tender system.

F3.19.2 The employer must adopt a transparency model that incorporates the disclosure and accountability as transparency requirements in the procurement process.

F3.19.3 The transparency model must identify the criteria for selection of projects, project information template and the threshold value of the projects to be disclosed in the public domain at various intervals of delivery of infrastructure projects.

F3.19.4 The client must publish the information on a quarterly basis which contains the following information:

- Procurement planning process
- Procurement method and evaluation process
- Contract type
- Contract status
- Number of firms tendering
- Cost estimate
- Contract title
- Contract firm(s)
- Contract price
- Contract scope of work
- Contract start date and duration
- Contract evaluation reports

F3.19.5 The employer must establish a Consultative Forum which will conduct a random audit in the implementation of the transparency requirements in the procurement process.

F3.19.6 Consultative Forum must be an independent structure from the bid committees.

F3.19.7 The information must be published on the employer's website.

F 3.19.8 Records of such disclosed information must be retained for audit purposes.

Annex G
(normative)

Alpha-numerics associated with the Contractor Grading Designations

Table: CIDB- Contractor grading designations and associated parameters

Grading Designation	New Tender Value Limit (effective 07 October 2019)	Best Annual Turnover	Largest Contract	Available Capital
1	R 500 000	R -	R -	R -
2	R 1 000 000	R -	R 130 000,00	R -
3	R 3 000 000	R 1 000 000	R 450 000,00	R 100 000
4	R 6 000 000	R 2 000 000	R 900 000,00	R 200 000
5	R 10 000 000	R 3 250 000	R 1 500 000,00	R 650 000
6	R 20 000 000	R 6 500 000	R 3 000 000,00	R 1 300 000
7	R 60 000 000	R 20 000 000	R 9 000 000,00	R 4 000 000
8	R 200 000 000	R 65 000 000	R 30 000 000,00	R 13 000 000
9	No Limit	R 200 000 000	R 90 000 000,00	R 40 000 000

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GENERAL CONDITIONS OF TENDER

1. Sealed tenders, with the **"Tender Number and Title"** clearly endorsed on the envelope, must be deposited in the **tender box** at the offices of the Stellenbosch Municipality, Plein Street, Stellenbosch.

2. The tender must be lodged by the Tenderer in the tender box in the Main Hall Entrance, Stellenbosch Municipal Offices, Plein Street, Stellenbosch

PLEASE NOTE:

2.1. Tenders that are deposited in the incorrect box will not be considered.

2.2. Mailed, telegraphic or faxed tenders will not be accepted.

2.3. Documents may only be completed in non-erasable ink.

2.4. The use of correction fluid/tape is not allowed.

2.4.1. In the event of a mistake having been made, it shall be crossed out in ink and be accompanied by an initial at each and every alteration.

2.4.2. Alterations or deletions not signed by the Tenderer may render the tender invalid.

2.5. All bids must be submitted in writing on the official forms supplied (not to be re-typed)

2.6. All prices shall be quoted in South African currency and be **INCLUSIVE of VAT.**

3. Where the value of an intended contract will exceed R1 000 000, 00 (R1 million) it is the bidder's responsibility to be registered with the South African Revenue Service (SARS) for VAT purposes in order to be able to issue tax invoices. The municipality will deem the price above R 1 000 000,00 (R1 million) to be VAT inclusive even if it is indicated that no VAT is charged. Please ensure that provision is made for VAT in these instances.

3.1 It is a requirement of this contract that the amount of value-added tax (VAT) must be shown clearly on each invoice.

3.2 The amended Value-Added Tax Act requires that a Tax Invoice for supplies in excess of R3 000 should, in addition to the other required information, also disclose the VAT registration number of the recipient, with effect from 1 March 2005. The VAT registration number of the Stellenbosch Municipality is **4700102181.**

3 Any Tender received after the appointed time for the closing of Tenders shall not be considered but shall be filed unopened with the other Tenders received or may be returned to the Tenderer at his request.

4 Tenders may not be telefaxed to the Municipality and therefore any tenders received by fax will **not** be considered.

5 Tenders shall be opened in public at the Stellenbosch Municipal Offices as soon as possible after the closing time for the receipt of tenders.

6 The Municipality shall have the right to summarily disqualify any Tenderer who, either at the date of submission of this tender or at the date of its award, is indebted to the Municipality in respect of any rental, levies, rates and/or service charges; ALTERNATIVELY;

6.1 That an agreement be signed whereby the Tenderer agrees that a percentage or fixed amount at the discretion of the Municipality, be deducted from payments due to him for this tender, until the debt is paid in full.

6.2 The tenderer shall declare **all** the Municipal account numbers in the Stellenbosch Area for which the enterprise or the proprietors or directors in their personal capacity is/ are responsible or co-responsible.

7 This bid will be evaluated and adjudicated according to the following criteria:

7.1 Relevant specifications
7.2 Value for money
7.3 Capability to execute the contract
7.4 PPPFA & associated regulations

8 Service Level Agreement

The award of the tender is subject to the signing of a Service Level Agreement (SLA) between the successful bidder and Stellenbosch Municipality.

9 Centralised Supplier Database

No Bids will be awarded to a bidder who is not registered on the Centralised Supplier Database (CSD)

The CSD supplier number starting with (MAAA) number is automatically generated by the Central Database System after successful registration and validation of a prospective service provider. This number is now a mandatory requirement, as referred to in regulation 14(1) *(b)* of the Municipal Supply Chain Management Regulations, as part of the listing criteria for accrediting a prospective service provider. Prospective suppliers should self – register on the CSD website at www.csd.gov.za Registration on the CSD will be compulsory in order to conduct business with the STELLENBOSCH MUNICIPALITY. Registration on SMSD can be done by contacting 021 808 8594 or Nicolene.Hamilton@stellenbosch.gov.za

Centralised Supplier Database No. MAAA……

10. Unbundling of Assets

Where a tender runs over more than one financial year (therefore not concluded by 30 June of a year) the following provision must be included in the consultant's project management agreement – it therefore forms part of the consultant's responsibilities:

If construction is still in progress over the year-end period of the Stellenbosch Municipality, being 30 June of each year, the Municipality should be furnished with a report / certificate at year-end (30 June), which details

(a) The cumulative expenditure incurred up to 30 June for the project.

(b) any details if the project is taking a significant longer period of time to complete than expected, including reasons for any delays.

(c) details where construction or development has been halted either during the current or previous reporting period(s), including reasons for halting the construction or development of the asset/project.

11. Settlement of Disputes:

Should the parties fail to resolve any dispute by way of mutual consultation, either party shall be entitled to refer the matter for mediation. Such referral shall be done by either party giving written notice to the other of its intention to commence with mediation. No mediation may be commenced unless such notice is given to the other party.

Irrespective whether the mediation resolves the dispute, the parties shall bear their own costs concerning the mediation and share the costs of the mediator and related costs equally.

Where the parties reach settlement of the dispute or any part thereof, the mediator shall record such agreement and on signing thereof by the parties the agreement shall be final and binding.

Save for reference to any portion of any settlement or decision which has been agreed to be final and binding on the parties, no reference shall be made by or on behalf of either party in any subsequent court proceedings, to any outcome of an amicable settlement by mutual consultation, or the fact that any particular evidence was given, or to any submission, statement or admission made in the course of amicable settlement by mutual consultation or mediation.

If the parties cannot reach an agreement, the Mediator must refer the matter to Arbitration.

Arbitration:

Arbitrator will be appointed by mutual agreement as per the provisions of the Arbitration Act of 1965 as amended, nominated from the Association of Arbitrators (Southern Africa).

The Arbitrator must be a legal practitioner with more than 10 years legal experience. Must have a good knowledge of the Municipal Finance Management Act and other relevant Municipal Legislation, and may in addition be qualified in respect of the main nature of the Contract (Engineer, Quantity Surveyor, Accountant, etc.).

The Arbitrator shall hear arguments both in writing and oral representations and parties shall have the right to contend the position of the other party and shall have the right to defend its own position.

The ruling of the Arbitrator shall be executed, but the matter may thereafter be defended in court if parties still do not agree.

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T2.1 List of Returnable Documents

The tenderer must complete the following Returnable Documents:

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2. OTHER DOCUMENTS REQUIRED FOR TENDER EVALUATION PURPOSES

- A Certificate of Contractor Registration issued by the CIDB
- Joint Venture Agreement (if applicable)
- B-BBEE Certificate
- Copies of latest Municipal Accounts for accounts listed in Schedule 4
- Functionality Criteria, append to Schedule 11, 12 and 14

3. C1.1 THE OFFER PORTION OF C1.1: FORM OF OFFER AND ACCEPTANCE

4. C1.2 CONTRACT DATA (PART 2)

5. C2.2 BILLS OF QUANTITIES

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SCHEDULE 1: COMPULSORY ENTERPRISE QUESTIONNAIRE

The following particulars must be furnished. In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted.
Section 1: Name of enterprise: . . . . . .
Section 2: VAT registration number, if any: . . . . . .
Section 2a: National Treasury Central Supplier Database registration number : . . . . . .
Section 2b: SARS Tax Compliance Status PIN : . . . . . .
Section 3: cidb registration number, if any: . . . . . .
Section 4: Particulars of sole proprietors and partners in partnerships ***** *Complete only if sole proprietor or partnership and attach separate page if more than 3 partners*
Section 5: Particulars of companies and close corporations Company registration number . . . . . . Close corporation number . . . . . . Tax reference number . . . . .
The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise: i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order; ii) confirms that 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 or Database of Restricted Suppliers; 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; and iv) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER:

…… ……
Signature Date

…… ……
Position Name of Bidder

……
Enterprise name

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SCHEDULE 3: DECLARATION OF INTEREST

MBD 4

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

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

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

3.1 Full Name of bidder or his or her representative:

……..

3.2 Identity Number: ……..….

3.3 Position occupied in the Company: ……
(Director, shareholder* etc.)

3.4 Company Registration Number: ……

3.5 Tax Reference Number: ……

3.6 VAT Registration Number: ……

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

3.7.1 If so, furnish particulars:

……

……

……

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

3.8.1 If so, furnish particulars.

……

……

……

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

(a) a member of –
  (i) any municipal council.
  (ii) any provincial legislature; or
  (iii) the national Assembly or the national Council of provinces;
(b) a member of the board of directors of any municipal entity;
(c) an official of nay municipality or municipal entity;
(d) an employee of any national or provincial department, national or provincial public entity or constitutional institutional within the meaning of the Public Finance Management Act,1999 (Act No.1 of 19999);
(e) A member of the accounting authority of any national or provincial entity ; or
(f) An employee of Parliament or a provincial legislature.
(g) "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.

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

3.9.1 If so, furnish particulars.

……

……

……

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

3.10.1 If so, furnish particulars

……

……

……

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

3.11.1 If so, furnish particulars.

……

……

……

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

3.12.1 If so, furnish particulars.

……

……

……

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

3.13.1 If so, furnish particulars.

……

……

……

3.14 Please provide the following information on ALL directors/shareholders/trustees/members below:

Full Name and Surname	Identity Number	Personal Income Tax Number	Provide State* Employee Number

NB:

a) PLEASE ATTACH CERTIEFIED COPY(IES) OF ID DOCUMENT(S)
b) PLEASE PROVIDE PERSONAL INCOME TAX NUMBERS FOR ALL DIRECTORS / SHAREHOLDERS/ TRUSTEES/ MEMBERS, ETC.

DECLARATION

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

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

…….. ……..
Signature **Date**

…….. ……..
Position **Name of Bidder**

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SCHEDULE 4 : CERTIFICIATE FOR PAYMENT OF MUNICIPAL SERVICES (MBD 10)

DECLARATION IN TERMS OF CLAUSE 112(1) OF THE MUNICIPAL FINANCE MANAGEMENT ACT (NO.56 OF 2003)

I, _____, _____ (full name and ID no.), hereby acknowledge that according to SCM Regulation 38(1)(d)(i), the Municipality may reject the tender of the tenderer if any municipal rates and taxes or municipal service charges owed by the Tenderer or any of its directors/members/partners to the Stellenbosch Municipality, or to any other municipality or municipal entity, are in arrears for more than 3 (three) months.

I declare that I am duly authorised to act on behalf of _____ (name of the firm) and hereby declare, that to the best of my personal knowledge, neither the firm nor any director/member/partner of said firm is in arrears on any of its municipal accounts with any municipality in the Republic of South Africa, for a period longer than 3 (three) months.

I further hereby certify that the information set out in this schedule and/or attachment(s) hereto is true and correct. The Tenderer acknowledges that failure to properly and truthfully complete this schedule may result in the tender being disqualified, and/or in the event that the tenderer is successful, the cancellation of the contract.

PHYSICAL BUSINESS ADDRESS(ES) OF THE TENDERER	MUNICIPAL ACCOUNT NUMBER

FURTHER DETAILS OF THE BIDDER'S Director / Shareholder / Partners, etc.:

Director / Shareholder / partner	Physical address of the Business	Municipal Account number(s)	Physical residential address of the Director / shareholder / partner	Municipal Account number(s)

NB: Please attach certified copy (ies) of ID document(s) and Municipal Accounts

If the entity or any of its Directors/Shareholders/Partners, etc. rents/leases premises, a copy of the rental/lease agreement must or sworn affidavit must be submitted with this tender.

- **PLEASE SUBMIT MUNICIPAL ACCOUNTS FOR THE FOLLOWING TWO MONTHS AFTER BID CLOSURE TO THE RELEVANT SCM PRACTITIONER SHOULD THE BID NOT BE AWARDED YET.**

Signature	**Position**	**Date**

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SCHEDULE 5: DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

MBD 8

1. This Municipal Bidding Document must form part of all bids invited.
2. It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
3. The bid of any bidder may be rejected if that bidder, or any of its directors have:
   3.1. abused the municipality's / municipal entity's supply chain management system or committed any improper conduct in relation to such system;
   3.2. been convicted for fraud or corruption during the past five years;
   3.3. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
   3.4. been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).
4. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

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

4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.5.1	If so, furnish particulars:		

CERTIFICATION

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

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

……..	……..
Signature	**Date**
……..	……..
Position	**Name of Bidder**

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SCHEDULE 6: CERTIFICATE OF INDEPENDENT BID DETERMINATION

MBD 9

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

2. Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).* Collusive bidding is a *per se* prohibition meaning that it cannot be justified under any grounds.

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

   3.1 take all reasonable steps to prevent such abuse;

   3.2 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

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

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

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

CERTIFICATE OF INDEPENDENT BID DETERMINATION:

I, the undersigned, in submitting the accompanying bid:

B/SM 30/23: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

(Bid Number and Description)

in response to the invitation for the bid made by:

STELLENBOSCH MUNICIPALITY

(Name of Municipality / Municipal Entity)

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

I certify, on behalf of: _____ that:

(Name of Bidder)

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

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

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

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

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

   5.1 has been requested to submit a bid in response to this bid invitation;

   5.2 could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and

   5.3 provides the same goods and services as the bidder and/or is in the same line of business as the bidder

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium* 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:

   7.1 Prices;

   7.2 geographical area where product or service will be rendered (market allocation);

   7.3 methods, factors or formulas used to calculate prices;

   7.4 the intention or decision to submit or not to submit, a bid;

   7.5 the submission of a bid which does not meet the specifications and conditions of the bid; or

   7.6 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.

* 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.

* 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.

.....	.....
Signature	Date
.....	.....
Position	Name of Bidder

STELLENBOSCH MUNICIPALITY

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SCHEDULE 7: CONFIRMATION OF CIDB REGISTRATION

I/We confirm my/our registration with the Construction Industry Development Board (CIDB) details of which are as follows:

COMPANY NAME	CIDB REGISTRATION NO.	CONTRACTOR GRADING DESIGNATION

Where a tenderer satisfies CIDB Contractor grading designation requirements through the formation of a joint venture, details of each party to the joint venture shall be submitted

The information provided above shall be verified by the Employer.

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER:

…… ……
Signature Date

…… ……
Position Name of Bidder

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SCHEDULE 8: AUTHORITY OF SIGNATORY

1. SOLE PROPRIETOR (SINGLE OWNER BUSINESS) AND NATURAL PERSON

1.1. I, _____, the undersigned, hereby confirm that I am the sole owner of the business trading as _____.

OR

1.2. I, _____, the undersigned, hereby confirm that I am submitting this tender in my capacity as natural person.

SIGNATURE:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

2. COMPANIES AND CLOSE CORPORATIONS

2.1. **If a Bidder is a COMPANY**, **a certified copy of the resolution by the board of directors**, duly signed, authorising the person who signs this bid to do so, as well as to sign any contract resulting from this bid and any other documents and correspondence in connection with this bid and/or contract on behalf of the company **must be submitted with this bid,** that is, before the closing time and date of the bid

2.2. In the case of a **CLOSE CORPORATION (CC**) submitting a bid**, a resolution by its members**, authorizing a member or other official of the corporation to sign the documents on their behalf, **shall be included with the bid.**

PARTICULARS OF RESOLUTION BY BOARD OF DIRECTORS OF THE COMPANY/MEMBERS OF THE CC

Date Resolution was taken	
Resolution signed by (name and surname)	
Capacity	
Name and surname of delegated Authorised Signatory	
Capacity	
Specimen Signature	

Full name and surname of ALL Director(s) / Member (s)			
1.		2.	
3.		4.	
5.		6.	
7.		8.	
9.		10.	

Is a CERTIFIED COPY of the resolution attached?	**YES**		**NO**	

SIGNED ON BEHALF OF COMPANY / CC:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

3. PARTNERSHIP

We, the undersigned partners in the business trading as _____ hereby authorize Mr/Ms _____ to sign this bid as well as any contract resulting from the bid and any other documents and correspondence in connection with this bid and /or contract for and on behalf of the abovementioned partnership.

The following particulars in respect of every partner must be furnished and signed by every partner:

Full name of partner			Signature
SIGNED ON BEHALF OF PARTNERSHIP:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

4. CONSORTIUM

We, the undersigned consortium partners, hereby authorize_____ _____ (Name of entity) to act as lead consortium partner and further authorize Mr./Ms. _____ To sign this offer as well as any contract resulting from this tender and any other documents and correspondence in connection with this tender and / or contract for and on behalf of the consortium.

The following particulars in respect of each consortium member must be provided and signed by each member:

Full Name of Consortium Member	Role of Consortium Member	% Participation	Signature
SIGNED ON BEHALF OF PARTNERSHIP:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

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SCHEDULE 9: SITE VISIT/CLARIFICATION MEETING CERTIFICATE

This is to certify that I/we .....

of (Tenderer) .....

.....

.....

on (date) .....

have examined the Site of the Works and its surroundings for which I/we am/are submitting this tender and have, so far as is practicable, familiarized myself/ourselves with all the information, risks, contingencies and other circumstances which may influence or affect my/our Tender.

NAME & SURNAME: .....

CAPACITY: .....

NAME OF FIRM: .....

ADDRESS: .....

.....

.....

TELEPHONE NO: .....

FAX NO: .....

EMAIL: .....

SIGNED ON BEHALF OF TENDERER: . . . . . .

NB: Please note that no latecomers will be allowed.

For all compulsory briefing sessions/site meetings/clarification meetings, bids received from interested bidders that did not attend the meeting or arrived later than predetermined date and time, will be **disqualified**

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SCHEDULE 10: CERTIFICATE OF AUTHORITY FOR JOINT VENTURES

This returnable schedule is to be completed by JOINT VENTURES

We, the undersigned, are submitting this tender offer in joint venture and hereby authorize Mr./Ms. _____

_____

authorized signatory of the Company/Close Corporation/Partnership (name) _____

_____, acting in the capacity of lead partner, to sign all documents in connection with the tender offer and any contract resulting from it on our behalf.

(i) Name of firm (Lead partner)			
Address			
		Tel. No.	
Signature		Designation	

(ii) Name of firm			
Address			
		Tel. No.	
Signature		Designation	

(iii) Name of firm			
Address:			
		Tel. No.	
Signature		Designation	

(iv) Name of firm			
Address			
		Tel. No.	
Signature		Designation	

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

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SCHEDULE 11: SCHEDULE OF WORK EXPERIENCE

The tenderer shall insert in the spaces provided below a list of similar completed contracts awarded to him/her and those that are currently completed to 80% of work scope or greater.

The tenderer is reminded that the information provided with this Schedule shall be used in terms of Clauses F.2.1.4.3 in Part T1.2 Tender Data to confirm the tendering entity's eligibility to tender, and the responsiveness of the Tender Submitted. The tenderer is therefore required to supply detailed information relating to previous projects, and projects to date which are completed to 80% of work scope or greater, to clearly illustrate and prove that the tendering entity meets the work experience requirements stipulated in Clause F.2.1.4.3. Such proof may consist of, but not be limited to, photographic records, reports and completion certificates.

Specific space has been allocated in the schedules below in which the tenderer shall detail in short how the listed project satisfied the relevant requirement. A separate schedule has been created for each listed requirement as detailed in Clause F.2.1.4.3 in Part T1.2 – Tender Data. Should more than one page be required for a particular requirement, the tenderer shall append the additional pages (copies of the original page) to this schedule.

The tenderer's attention is also directed to the involvement and substitution of sub-contractors during the Contract, whose experience contribute to the fulfilment of the experience criteria requirements under Clause F.2.1.4.3 in Part T1.2 – Tender Data, being subject to the Employer's Approval.

Note: Only the information provided on this Schedule, or attached hereto, will be considered. Failure to complete this Schedule may result in the tender being non-responsive in terms of Clause F.2.1.4.3.

COMPLETED CONTRACTS IN THE LAST 12 YEARS					
REQUIREMENT 1.1:	**CONTRACTS WHERE THERE WAS CONSTRUCTION OF LARGE DIAMETER HDPE PRESSURE SEWERS (315MM NOMINAL DIAMETER OR LARGER, MINIMUM 400m IN LENGTH) BY MEANS OF OPEN TRENCH CONSTRUCTION AT TRENCH DEPTHS EXCEEDING 3M:**				
ENTITY RESPONSIBLE FOR WORK	EMPLOYER (NAME, TEL No. AND FAX No.)	CONSULTING ENGINEER (NAME, TEL No. AND FAX No.)	NATURE OF WORK DETAIL FULLFILLMENT OF REQUIREMENT	VALUE OF WORK R(m)	DATE COMPLETED
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Pipe Size: ND……mm Trench depth: ……m		
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Pipe Size: ND……mm Trench depth: ……m		
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Pipe Size: ND……mm Trench depth: ……m		

COMPLETED CONTRACTS IN THE LAST 12 YEARS					
REQUIREMENT 1.2:	**CONTRACTS WHERE THERE WAS INSTALLATION OF WATER UNDER HIGH WATER TABLE CONDITIONS WHICH REQUIRED FORMAL DEWATERING:**				
ENTITY RESPONSIBLE FOR WORK	EMPLOYER (NAME, TEL No. AND FAX No.)	CONSULTING ENGINEER (NAME, TEL No. AND FAX No.)	NATURE OF WORK DETAIL FULLFILLMENT OF REQUIREMENT	VALUE OF WORK R(m)	DATE COMPLETED
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Describe de-watering system:		
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Describe de-watering system:		
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Describe de-watering system:		

COMPLETED CONTRACTS IN THE LAST 12 YEARS					
REQUIREMENT 1.3:	**CONTRACTS WHERE THERE WAS CONSTRUCTION OF FOUNDATIONS WITH DEPTHS EXCEEDING 5M WHICH REQUIRED A SHORING SYSTEM FOR THE FULL DEPTH OF THE EXCAVATION AND ON ALL SIDES OF THE EXCAVATION:**				
ENTITY RESPONSIBLE FOR WORK	EMPLOYER (NAME, TEL No. AND FAX No.)	CONSULTING ENGINEER (NAME, TEL No. AND FAX No.)	NATURE OF WORK DETAIL FULLFILLMENT OF REQUIREMENT	VALUE OF WORK R(m)	DATE COMPLETED
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Shoring on all sides of excavation? (circle applicable) YES/NO Excavation depth: ……m		
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Shoring on all sides of excavation? (circle applicable) YES/NO Excavation depth: ……m		
Name					
Circle entity type if not main tenderer: JV part/ Sub-contr			Shoring on all sides of excavation? (circle applicable) YES/NO Excavation depth: ……m		

COMPLETED CONTRACTS IN THE LAST 12 YEARS					
REQUIREMENT 1.4:	**CONSTRUCTION OF WATER RETAINING STRUCTURES (RESERVOIRS):**				
ENTITY RESPONSIBLE FOR WORK	EMPLOYER (NAME, TEL No. AND FAX No.)	CONSULTING ENGINEER (NAME, TEL No. AND FAX No.)	NATURE OF WORK DETAIL FULLFILLMENT OF REQUIREMENT	VALUE OF WORK R(m)	DATE COMPLETED
Name Circle entity type if not main tenderer: JV part/ Sub-contr					
Name Circle entity type if not main tenderer: JV part/ Sub-contr					
Name Circle entity type if not main tenderer: JV part/ Sub-contr					

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNATURE (Bidder)		**FOR OFFICE USE ONLY:**	
CAPACITY		Evaluated by	
NAME OF FIRM		Signature:	
NAME (PRINT)		Designation:	
DATE		Date:	

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SCHEDULE 12: DETAILS OF CONSTRUCTION MANAGER'S AND SITE AGENT'S EXPERIENCE

Tenderers shall set out in the Schedule hereunder details of the Contract Manager's and Site Agent's Experience in work of a similar nature to that for which their Tender is submitted.

The tenderer is reminder that the information provided with this Schedule shall be used in terms of Clauses F.2.1.4.3 in Part T.1.2 Tender Data to confirm the tendering entity's eligibility to tender, and the responsiveness of the Tender submitted. The tenderer is therefore required to supply detailed information relating to previous projects, and projects to date, to clearly illustrate that the tendering entity meets key staff experience requirements stipulated in Clause F.2.1.4.3.

Note: Only the information provided on this Schedule, or attached hereto, will be considered. Failure to complete this Schedule may result in the tender being non-responsive in terms of Clause F.2.1.4.3.

CONSTRUCTION MANAGER	NAME: …… YEARS ACCRUED EXPERIENCE AS CONSTRUCTION MANAGER IN MANAGIN GRADE 7CE (OR HIGHER) CONTRACTS: ……				
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING ENGINEER (NAME, TEL No. AND FAX No.)

SITE AGENT	NAME: …… YEARS EXPERIENCE AS SITE AGENT: ……

CONTRACTS WHERE THERE WAS CONSTRUCTION OF LARGE DIAMETER HDPE PRESSURE SEWERS (315MM NOMINAL DIAMETER OR LARGER, MINIMUM 400m IN LENGTH) BY MEANS OF OPEN TRENCH CONSTRUCTION AT TRENCH DEPTHS EXCEEDING 3M:

CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING ENGINEER (NAME, TEL No. AND FAX No.)

SITE AGENT	NAME: …… YEARS EXPERIENCE AS SITE AGENT: ……				
CONTRACTS WHERE THERE WAS INSTALLATION OF WATER MAINS UNDER HIGH WATER TABLE CONDITIONS WHICH REQUIRED FORMAL DEWATERING:					
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING ENGINEER (NAME, TEL No. AND FAX No.)

SITE AGENT	NAME: …… YEARS EXPERIENCE AS SITE AGENT: ……				
CONTRACTS WHERE THERE WAS CONSTRUCTION OF WATER RETAINING STRUCTURES (RESERVOIRS):					
CONTRACT & CLIENT	NATURE OF WORK	POSITION HELD	VALUE OF WORK R(m)	DATE COMPLETED	EMPLOYER AND CONSULTING ENGINEER (NAME, TEL No. AND FAX No.)

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNATURE (Bidder)		**FOR OFFICE USE ONLY:**	
CAPACITY		Evaluated by	
NAME OF FIRM		Signature:	
NAME (PRINT)		Designation:	
DATE		Date:	

SCHEDULE 13: SCHEDULE OF CONSTRUCTION PLANT

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

13.1 DETAILS OF MAJOR EQUIPMENT THAT IS OWNED BY AND IMMEDIATELY AVAILABLE FOR THIS CONTRACT.			
QUANTITY	**DESCRIPTION (Incl. Type of plant; make & model; Year of Manufacture)**	**SIZE**	**CAPACITY**

Attach additional pages if mores space is required.

13.2 DETAIL OF MAJOR EQUIPMENT THAT WILL BE HIRED, ORE ACQUIRED FOR THIS CONTRACT IF MY / OUR TENDER IS ACCEPTED.			
QUANTITY	**DESCRIPTION (Incl. Type of plant; make & model; Year of Manufacture)**	**SIZE**	**CAPACITY**

Attach additional pages if mores space is required.

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER:

……. …….
Signature Date

……. …….
Position Name of Bidder

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SCHEDULE 14: PRELIMINARY WORK PLAN AND PROGRAMME (FOR INFORMATION PURPOSES ONLY)

The tenderer shall append their proposed work plan and programme to this Schedule.

It should be noted that while a programme may form part of the required work plan, more than a programme is expected in response to this requirement. The work plan must indicate the approach and methodology that the tenderer intends following in order to reach the required outcomes. The work plan must show that the tenderer has appreciated the Scope of Work, and has good insight as to what actions or activities are required in order to comply with the Employer's objectives and be in line with the requirements set out in the minimum requirements set out in F.2.1.4.3 (Methodology) of the Standard Conditions of Tender in Part T1.2.

The programme shall be in the form of a bar chart (Gantt chart) or similar acceptable time/activity form reflecting the proposed sequence and tempo of the various activities and the quantities that will be carried out every week under each of the elements, comprising the work for this contract. The programme shall also indicate the point where the tenderer intends to commence work operations and the direction in which the work will proceed. The working hours shall be indicated.

The tenderer shall also take into account the additional requirements stated in the Project Specifications when drawing up the programme.

Details of the preliminary work plan and programme shall be appended to this Schedule.

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER:

…….	…….
Signature	Date
…….	…….
Position	Name of Bidder

SCHEDULE 15: SCHEDULE OF ESTIMATED MONTHLY EXPENDITURE

The tenderer shall state his estimated expenditure indicating the value of work done and materials not yet built into the Permanent Works for each month of the Contract period which he estimates will arise based on his preliminary programme and tendered rates, as set out in the table below. The total of the monthly amounts shall be equal to the tender sum. **The times for achieving Practical Completion for the portions as set out in the Scope of Works is 12 calendar months inclusive of the 14-day period to achieve commencement of works.**

MONTH	VALUE
1.	R
2.	R
3.	R
4.	R
5.	R
6.	R
7.	R
8.	R
9.	R
10.	R
11.	R
12.	R
SUBTOTAL	R
CONTINGENCIES (10%)	R
SUBTOTAL	R
VAT (15%)	R
TOTAL	R (INCLUDING VAT @ 15%)

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER:

…….. ……
Signature Date

…….. ……
Position Name of Bidder

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SCHEDULE 16: SCHEDULE OF SUBCONTRACTORS

Tenderers shall set out below the details of sub-contractors, other than plant hire firms, they propose to use on the Works.

Acceptance of this tender shall not be construed as approval of all or any of the listed subcontractors. Should any of the subcontractors not be approved subsequent to acceptance of the tender, this shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed below being approved by the Employer's Agent.

NAME OF PROPOSED SUB-CONTRACTORS (Incl. Contact Person & Details)	REGISTERED ADDRESS	NATURE OF WORK TO BE UNDERTAKEN	APPROXIMATE VALUE OF WORK (Excluding VAT)	B-BBEE STATUS (1)

(1) Indicate whether the sub-contractor is an EME or QSE

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER:

……. …….
Signature Date

……. …….
Position Name of Bidder

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SCHEDULE 17: HEALTH AND SAFETY PLAN

Tenderers are to note the requirements of the Occupational Health and Safety Act No. 85 of 1993 and the Construction Regulations 2014 issued in terms of Section 43 of the Act. The tenderer shall be deemed to have read and fully understood the requirements of the above Act and Regulations and to have allowed for all costs in compliance therewith. Tenders are to note that the above regulations form part of the contract and with reference to the requirements of Clause F.2.18.4 in Part T1.2 Tender Data.

In this regard the tenderer shall prepare and attach a Health and Safety Plan in respect of the Works in order to demonstrate the necessary competencies and resources to perform the construction work all in accordance with the Act and Regulations. Such Health and Safety Plan shall cover inter-alia the following details:

(1) Management Structure, Site Supervision and Responsible Persons including a succession plan.
(2) Contractor's induction training programme for employees, sub-contractors and visitors to the Site.
(3) Health and safety precautions and procedures to be adhered to in order to ensure compliance with the Act, Regulations and Safety Specifications.
(4) Regular monitoring procedures to be performed.
(5) Regular liaison, consultation and review meetings with all parties.
(6) Site security, welfare facilities and first aid.
(7) Site rules and fire and emergency procedures.

Tenderers are to note that the Contractor is required to ensure that all sub-contractors or others engaged in the performance of the contract also comply with the above requirements.

The tenderer shall also take into account the additional requirements stated in the Scope of Work when drawing up the Health and Safety Plan for the contract.

Details of the Health and Safety Plan shall be appended to this Schedule.

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER: ……

……..	……
Signature	Date
……..	……
Position	Name of Bidder

STELLENBOSCH MUNICIPALITY

CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

SCHEDULE 18: ALTERATIONS/AMENDMENTS BY TENDERER

The Tenderer should record any **proposed** deviations or qualifications he may wish to make to the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such proposed deviations and qualifications in a covering letter attached to his tender and reference such letter in this schedule. Any proposed deviations or qualifications contained in a covering letter which is not referenced in this schedule will not be considered.

The Tenderer's attention is drawn to clause F.3.8 of the Standard Conditions of Tender referenced in the Tender Data regarding the Employer's handling of material deviations and qualifications.

If no deviations or qualifications are proposed, the schedule hereunder is to be marked NIL and signed by the Tenderer.

PAGE	CLAUSE OR ITEM	PROPOSED DEVIATION OR QUALIFICATION

Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER: . . . . . .

…….. ……..
Signature Date

…….. ……..
Position Name of Bidder

STELLENBOSCH MUNICIPALITY

CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

SCHEDULE 19: RECORD OF ADDENDA TO TENDER DOCUMENTS

We confirm that the following communications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

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

Attach additional pages if more space is required.
Number of sheets, appended by the tenderer to this Schedule ..... (If nil, enter NIL).

SIGNED ON BEHALF OF TENDERER: . . . . . .

…….. ……
Signature Date

…….. ……
Position Name of Bidder

STELLENBOSCH MUNICIPALITY

CONTRACT NO. B/SM 30/23

Schedule 20: MBD6.1 – PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022 – PURCHASES/SERVICES 80/20 or 90/10

NB:
Before completing this form, bidders must study the general conditions, definitions and directives applicable in respect of B-BBEE, as prescribed in the Preferential Procurement Regulations, 2022 and the Stellenbosch Preferential Procurement Policy 2022/23

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution and any other applicable preference

1.GENERAL CONDITIONS

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

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

1.2

a) The value of this bid is estimated to not exceed R50 000 000 (all applicable taxes included) and therefore the 80/20 preference point system shall be applicable; or

1.3 Points for this bid shall be awarded for:

(a) Price;

(b) B-BBEE Status Level of Contributor.

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

	POINTS
PRICE	80
B-BBEE STATUS LEVEL OF CONTRIBUTOR	20
Total points for Price and Preferences must not exceed	**100**

1.5 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.6 Failure on the part of a bidder to submit proof of Locality together with the bid, will be interpreted to mean that preference points for Locality are not claimed.**(N/A)**

1.7 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 DEFINITIONS

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

(b) "**B-BBEE status level of contributor"** means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;

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

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

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

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

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

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

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

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

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

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

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

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

4.POINTS AWARDED FOR PRICE

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

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

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

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

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmin = Price of lowest acceptable bid

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

4.3 POINTS AWARDED FOR PRICE

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

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

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

Where

Ps = Points scored for price of bid under consideration

Pt = Price of bid under consideration

Pmax = Price of highest acceptable bid

5.POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

5.1 In terms of Regulation 4 (2) and 5 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining a specific goal specified for the tender

5.2 The tendering conditions will stipulate the specific goals, as contemplated in section 2(1)(d)(ii) of the Preferential Procurement Act, be attained.

5.3 A maximum of 20 points (80/20 preference points system) or 10 (90/10) preference points system), must be allocated for specific goals. These goals are :

(c) contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender or disability;

(d) Promotion of enterprises located in the municipal area (WCO24) **(N/A)**

5.4 Regarding par 5.3 (a) at least 50% of the 20/10 points must be allocated to promote this goal and points will be allocated in terms of the BBBEE scorecard as follows.

B-BBEE Status Level of Contributor	Number of Points for 80/20 Preference Points System	Number of Points for 90/10 Preference Points System
1	20	10
2	18	9
3	16	8
4	12	5
5	8	4
6	6	3
7	4	2
8	2	1
Non-compliant contributor	0	0

5.5 A tenderer must submit proof of its BBBEE status level contributor.

5.6 A tenderer failing to submit proof of BBBEE status level of contributor –

5.6.1 may only score in terms of the 80/90-point formula for price; and

5.6.2 scores 0 points out of 10/5 BBBEE status level of contributor, which is in line with section 2 (1) (d) (i) of the Act, where the supplier or service provider did not provide proof thereof.

5.7 Regarding par 5.3 (b) a maximum of 50% of the 20/10 points must be allocated to promote this goal. Maximum points will be allocated as follows.**(N/A)**

Locality of supplier	Number of Points for 80/20 Preference Points System	Number of Points for 90/10 Preference Points System
Within the boundaries of the municipality	N/A	N/A
Outside of the boundaries of the municipality	0	0

.

6. BID DECLARATION

6.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution and/or Locality must complete the following:

7. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

7.1 B-BBEE Status Level of Contributor: . = ……(maximum of 20 points)

(Points claimed in respect of paragraph 7.1 must be substantiated by relevant proof of B-BBEE status level of contributor.)

7.2 Within the boundaries of Stellenbosch Municipality (WC024)? **(N/A)**

YES		NO	

Address - ……

……

(Points claimed in respect of paragraph 7.2 must be substantiated by relevant proof that the business premises is situated in the Municipal area of Stellenbosch (WC024). A valid municipal account or proof of valid lease agreement must be attached) **(N/A)**

8. SUB-CONTRACTING

8.1 Will any portion of the contract be sub-contracted?

(***Tick applicable box***)

YES		NO	

8.1.1 If yes, indicate:

i) What percentage of the contract will be subcontracted.....……%
ii) The name of the sub-contractor……..
iii) The B-BBEE status level of the sub-contractor.....……..
iv) Whether the sub-contractor is an EME or QSE

(Tick applicable box)

YES		NO	

v) Specify, by ticking the appropriate box, if subcontracting with an enterprise

Designated Group: An EME or QSE which is at last 51% owned by:	**EME** √	**QSE** √
Black people		
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		
Black people who are military veterans		
OR		
Any EME		
Any QSE		

9. **DECLARATION WITH REGARD TO COMPANY/FIRM**

9.1 Name of company/firm:…….

9.2 VAT registration number:…….……

9.3 Company registration number:…….……

9.4 TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

……
……
……
……

9.6 COMPANY CLASSIFICATION

- Manufacturer
- Supplier
- Professional service provider
- Other service providers, e.g. transporter, etc.

[*TICK APPLICABLE BOX*]

9.7 MUNICIPAL INFORMATION

Municipality where business is situated: …….

Registered Account Number: …….

Stand Number:…….

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

9.9 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

i) The information furnished is true and correct;

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

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;

iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the

purchaser may, in addition to any other remedy it may have –

(a) disqualify the person from the bidding process;

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

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

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

(e) forward the matter for criminal prosecution.

SIGNATURE OF BIDDER(S):			
WITNESS 1:		WITNESS 2:	
DATE:			
ADDRESS:			

SWORN AFFIDAVIT – B-BBEE EXEMPTED MICRO ENTERPRISE – GENERAL (If Applicable)

I, the undersigned,

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.

2. I am a Member / Director / Owner (**Select one**) of the following enterprise and am duly authorised to act on its behalf:

NB!

Enterprise Name:	
Trading Name (If Applicable):	
Registration Number:	
Vat Number (If applicable)	
Enterprise Physical Address:	
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):	
Nature of Business:	
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – (a) who are citizens of the Republic of South Africa by birth or descent; or (b) who became citizens of the Republic of South Africa by naturalisation- i. before 27 April 1994; or ii. on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"
Definition of "Black Designated Groups"	"Black Designated Groups means: (a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; (b) Black people who are youth as defined in the National Youth Commission Act of 1996; (c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; (d) Black people living in rural and under developed areas; (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;"

3. I hereby declare under Oath that:

- The Enterprise is_____% Black Owned using the flow-through principle as per Amended Code Series 100 of the Amended Codes of Good

Practice issued under section 9
(1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,

- The Enterprise is_____% Black Female Owned as per Amended Code Series 100of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is_____% Black Designated Group Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- Black Designated Group Owned % Breakdown as per the definition stated above:
    - Black Youth % =_____%
    - Black Disabled % =_____%
    - Black Unemployed % =_____%
    - Black People living in Rural areas % =_____%
    - Black Military Veterans % =_____%

- Based on the Audited Financial Statements/Financial Statements and other information available on the latest financial year-end of_____(DD/MM/YYYY), the annual TotalRevenue was R10,000,000.00 (Ten Million Rands) or less
- Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box.**

NB!

100% Black Owned	**Level One** (135% B-BBEE procurement recognition level)	
At least 51% Black Owned	**Level Two** (125% B-BBEE procurement recognition level)	
Less than 51% Black Owned	**Level Four** (100% B-BBEE procurement recognition level)	

4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the Owners of the Enterprise which I represent in this matter.

5. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature:_____

Date :_____

NB! ORIGINALLY CERTIFIED/ NOT COPY

_____

Commissioner of Oaths
Signature & stamp
Date:

EXAMPLE OF POINT SCORING AND ALLOCATION OF PREFERENCE POINTS (80/20) WHERE LOCALITY AS A GOAL IS INCLUDED. STELLENBOSCH PREFERENTIAL PROCUREMENT POLICY.

BIDDER	PRICE	BBBEE LEVEL (VALID)	BUSINESS PREMISES (IN WC024)
TENDERER A	R 80 000	1	NO
TENDERER B	R 75 000	1	YES
TENDERER C	R 70 000	2	NO

BIDDER	PRICE POINTS (Out of 80)	BBBEE POINTS (Out of 10)	LOCALITY POINTS (Out of 10)	TOTAL POINTS (Out of 100)
TENDERER A	68.57	10	0	78.57
TENDERER B	74.29	10	10	94.29
TENDERER C	80	9	0	89

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JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

SCHEDULE 21: COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 1993 (ACT 130 OF 1993)

COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 1993 (ACT 130 OF 1993)	
Stellenbosch Municipality has legal duty in terms of Section 89 of the said Act to ensure that all contractors with whom agreements are entered into for the execution of work are registered as employers in accordance with the provisions of this Act and that all the necessary assessments have been paid by the contractor. In order to enter into this agreement, the following information is needed regarding the above-mentioned:	
Contractor's registration number with the office of the Compensation Commissioner:	
NOTE: **A copy of the latest receipt together with a copy of the relevant assessment OR a copy of a valid Letter of Good Standing must be handed in, in this regard.**	

PRINT NAME:			
CAPACITY:		NAME OF FIRM	
SIGNATURE:		DATE:	

STELLENBOSCH MUNICIPALITY

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JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

SCHEDULE 22: PREQUALIFICATION SCORE SHEET

*** Proof of Contactable References is required, as per F2.1 in Part T1.2, and must accompany each proposal.**

The bidder must confirm prequalification in the table below to be evaluated further.

CRITERIA	APPLICATION OF THE CRITERIA	CONFIRMATION
Company Experience	Demonstrated experience of the tendering entity with respect to comparable projects by completing each row in the Returnable Schedule of work experience in full. **CRITERIA Company Experience HDPE pipes: (minimum requirements):** 2 x Completed projects - The Construction of large diameter HDPE pressure pipes with welded joints (315mm nominal diameter or larger) by means of open trench construction at trench depths exceeding 3m for at least 300m. Or: 3 x Completed projects - The Construction of large diameter HDPE pressure pipes with welded joints (250mm nominal diameter or larger) by means of open trench construction at trench depths exceeding 3m for at least 200m. Or: 3 x Completed projects - The Construction of large diameter HDPE pressure pipes with welded joints (250mm nominal diameter or larger) by means of open trench construction at trench depths exceeding 2.2m for at least 100m. **AND** **CRITERIA Company Experience reinforced concrete reservoirs. (minimum requirements):** 3 x Completed projects – Construction of reinforced concrete water retaining structure with concrete roof structure. Minimum capacity of structure 4ML or larger. Or: 2 x Completed projects – Construction of reinforced concrete water retaining structure with concrete roof structure. Minimum capacity of structure 5ML or larger. Or: 2 x Completed projects - Construction of reinforced concrete water retaining structure with minimum capacity of 6ML.	
Resources	Only those tenderers who have in their **full-time** employment,	

and Capacity	management and supervisory staff **available** for this Contract, and satisfying the requirements for EPWP Labour Intensive Construction (LIC), are eligible to submit tenders. **Resources and Capacity: (Minimum requirements)** Contracts Managers – NQF level 7, with min 8 years Construction Management experience for grade 7CE (or higher) Full-Time Site Agents – NQF level 5, with min 10 years work scope related experience or NQF level 6 with min 5 years relevant experience. **CV's and proof of LIC qualifications for individuals must be attached to the Tender, in order to submit a responsive tender.** In addition to the above, only those tenderers that satisfy the following criteria are eligible to submit tenders: • Proof of availability of resources; • Proof of capacity to mobilize own and subcontracting resources; • Proof of availability of skills to manage and perform the contract (assigned personnel) – **attach Project Organogram**	
Methodology	**The Methodology to be used:** Minimum requirements: - Proposes a step by step process; - Innovative and creative in bringing new ideas; - Proposes additional value-adding features; - Demonstrates cost minimisation mechanisms; - Includes a costed project plan with clear milestones - Organogram displaying Key personnel.	
Local Company Office	The bidders must provide a utility bill/lease agreement as proof that the company has a permanent office in the Western Cape, or if they do not have an office in the Western Cape, they must provide an undertaking to establish an office within the Western Cape within two calendar months after successful Bid award date. The service provider must submit their undertaking as part of their returnable documents in their tender submission.	

SIGNATURE (Bidder)		**FOR OFFICE USE ONLY:**	
CAPACITY		Evaluated by	
NAME OF FIRM		Signature:	
NAME (PRINT)		Designation:	
DATE		Date:	

STELLENBOSCH MUNICIPALITY

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JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

SCHEDULE 23: FORM OF INDEMNITY

INDEMNITY

Given by (Name of Company) _____ of

(registered address of Company) _____a

company incorporated with limited liability according to the Company Laws of the Republic of South Africa (hereinafter called the Contractor), represented herein by (Name of Representative) _____in

his capacity as (Designation) _____ of the

Contractor, is duly authorised hereto by a resolution dated _____ /20____, to

sign on behalf of the Contractor.

WHEREAS the Contractor has entered into a Contract dated _____ / 20____,
with the Municipality who require this indemnity from the Contractor.

NOW THEREFORE THIS DEED WITNESSES that the Contractor does hereby indemnify and hold harmless the Municipality in respect of all loss or damage that may be incurred or sustained by the Municipality by reason of or in any way arising out of or caused by operations that may be carried out by the Contractor in connection with the aforementioned contract; and also in respect of all claims that may be made against the Municipality in consequence of such operations, by reason of or in any way arising out of any accidents or damage to life or property or any other cause whatsoever; and also in respect of all legal or other expenses that may be incurred by the Municipality in examining, resisting or settling any such claims; for the due performance of which the Contractor binds itself according to law.

SIGNATURE OF CONTRACTOR:	
DATE:	
SIGNATURE OF WITNESS 1:	
DATE:	
SIGNATURE OF WITNESS 2:	
DATE:	

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JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

SCHEDULE 24: DECLARATION BY TENDERER

I / We acknowledge that I / we am / are fully acquainted with the contents of the conditions of tender of this tender document and that I / we accept the conditions in all respects.

I / We agree that the laws of the Republic of South Africa shall be applicable to the contract resulting from the acceptance of *my / our tender and that I / we elect *domicillium citandi et executandi* (physical address at which legal proceedings may be instituted) in the Republic at:

_____

_____

_____

I / We accept full responsibility for the proper execution and fulfillment of all obligations and conditions devolving in me / us under this agreement as the principal liable for the due fulfillment of this contract.

I / We furthermore confirm I / we satisfied myself / ourselves as to the corrections and validity of my / our tender; that the price quoted cover all the work / items specified in the tender documents and that the price(s) cover all my / our obligations under a resulting contract and that I / we accept that any mistake(s) regarding price and calculations will be at my / our risk.

I / We furthermore confirm that my / our offer remains binding upon me / us and open for acceptance by the Purchases / Employer during the validity period indicated and calculated from the closing date of the bid.

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			
WITNESS 1		WITNESS 2	

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STELLENBOSCH MUNICIPALITY

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SCHEDULE 25: DECLRATION FOR PROCUREMENT ABOVE R10 MILLION (VAT INCLUDED) –(MBD 5)

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

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

CERTIFICATION

I, the undersigned (name) _____, certify that the information furnished on this declaration form is correct.

I accept that the state may act against me should this declaration prove to be false.

SIGNATURE		DATE	
NAME (PRINT)			
CAPACITY			
NAME OF FIRM			

STELLENBOSCH MUNICIPALITY

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Part C1: Agreements and Contract Data

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JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C1.1 Form of Offer and Acceptance

NOTE:

1. **This form must be completed in duplicate by both the successful bidder (Part 1) and the purchaser (Part 2). Both forms must be signed in the original so that the successful bidder and the purchaser will be in possession of originally signed contracts for their respective records.**
2. **NO correction fluid/tape may be used.**
   a. **In the event of a mistake having been made, it shall be crossed out in ink and be accompanied by an initial at each and every alteration.**
3. **The Bidder MUST indicate whether he/she/the entity is a registered VAT Vendor or not.**
   a. **In the case of the Bidder not being a registered VAT Vendor, both columns (amount/rate excluding AND including VAT) must reflect the same amount.**

	INDICATE WITH AN 'X'									
Are you/is the firm a registered VAT Vendor	**YES**					**NO**				
If "YES", please provide VAT number										

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. B/SM 30/23: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

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 VAT IS:	
In figures:	**R**
In words:	

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

Signature(s)			
Name(s)			
Capacity			
Name of tenderer:			
Name of witness:	*(Insert name and address of organisation)*	Date	
Signature of witness:			

Acceptance

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

The terms of the contract are contained in:

Part C1: Agreements and Contract Data (which includes this Agreement)
Part C2: Pricing Data
Part C3: Scope of Work
Part C4: Site Information

and 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 representative(s) of both parties.

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

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Tenderer receives one fully completed original copy of this document, including the Schedule of deviations (if any). Unless the Tenderer (now Contractor) within five working 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.

ONLY TO BE COMPLETED AT ACCEPTANCE STAGE

Signature(s):			
Name(s):			
Capacity:			
For the Employer:	**Stellenbosch Municipality, Plein Street, Stellenbosch**		
Name of witness:		Date:	
Signature of witness:			

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Schedule of Deviations

Notes:

1. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender,

2. A Tenderer's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here,

3. Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here,

4. Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the final draft of the Contract,

1 Subject . . . . . .
Details . . . . . .
. . . . . .
. . . . . .
. . . . . .

2 Subject . . . . . .
Details . . . . . .
. . . . . .
. . . . . .
. . . . . .

3 Subject . . . . . .
Details . . . . . .
. . . . . .
. . . . . .
. . . . . .

4 Subject . . . . . .
Details . . . . . .
. . . . . .
. . . . . .
. . . . . .

ONLY TO BE COMPLETED AT ACCEPTANCE STAGE

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.

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For the Tenderer:

Signature(s) . . . . . .

Name(s) . . . . . .

Capacity . . . . . .

(Name and address of organization) . . . . . .

. . . . . .

. . . . . .

Name and signature of witness . . . . . Date . . . . . .

For the Employer:

Signature(s) . . . . . .

Name(s) . . . . . .

Capacity . . . . . .

(Name and address of organization) STELLENBOSCH MUNICIPALITY. . . . . .
Plein Street
Stellenbosch

Name and signature of witness . . . . . Date . . . . . .

ONLY TO BE COMPLETED AT ACCEPTANCE STAGE

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Confirmation of Receipt

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

the.....(day)

of .....(month)

20.....(year)

at .....(place)

For the Contractor:

.....
Signature

.....
Name

.....
Capacity

Signature and name of witness:

.....
Signature

.....
Name

ONLY TO BE COMPLETED AT ACCEPTANCE STAGE

STELLENBOSCH MUNICIPALITY

CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C1.2 Contract Data

Part 1: Data Provided by the Employer

GENERAL CONDITIONS OF CONTRACT

The following standardised General Conditions of Contract:

General Conditions of Contract for Construction Works, Third Edition, 2015

prepared by the South African Institution of Civil Engineering (SAICE) shall apply to and form the General Conditions of Contract for this contract. Copies of these conditions of contract are obtainable from the South African Institution of Civil Engineering (SAICE), Private Bag X200, Halfway House 1685, Tel: (011) 805 5947, Fax: (011) 805 5971, e-mail: civilinfo@saice.org.za.

Copies of the General Conditions of Contract are available for inspection and scrutiny at the offices of the Employer.

The Pro-formas bound with the General Conditions of Contract 2015, on pages 96 to 113 shall not apply to this Contract and shall be replaced with the documents bound into this Contract Document.

The General Conditions of Contract make several references to the Contract Data for specific data, which together with these conditions collectively describe the risks, liabilities and obligations of the contracting parties and the procedures for the administration of the Contract. The Contract Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the general conditions of contract.

The General Conditions of Contract shall be read in conjunction with the variations, amendments and additions set out in the Contract Specific Data below. Each item of data given below is cross-referenced to the clause in the General Conditions of Contract to which it mainly applies.

The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence:

a) the Form of Offer and Acceptance,
b) the Contract Specific Data within the Contract Data,
c) the General Conditions of Contract for Construction Works, Third Edition, 2015,
d) the Drawings,
e) the Scope of Work,
f) the Pricing Data, and
g) the conditions of tender, the tender data and tender schedules

If an ambiguity or discrepancy is found in the documents, the Employer's Agent shall issue any necessary clarification or instruction.

CONTRACT SPECIFIC DATA

The following contract specific data are applicable to this Contract:

Clause 1.1.1.13:

The Defects Liability Period is **12** months.

Clause 1.1.1.14:

The time for achieving Practical Completion is stated in the Schedule of Contract Specific Data. The time for achieving Practical Completion is inclusive of the 14 day period referred to in Clause 5.3.2 below, and inclusive of non-working days and special non-working days (Clause 5.8.1).

The times for achieving Practical Completion for the portions as set out in the Scope of Works is 12 calendar months inclusive of the 14-day period referred to in clause 5.3.2.

The time for achieving Practical Completion of the Whole of the Works is 83 (eighty-three) weeks, exclusive of special non-working days referred to in Clause 5.8.1 and exclusive of any delay between completion of Portion 1 and the abovementioned instruction to proceed with Portion 2.

The Employer reserves the right, at its discretion, to instruct Portion 2 to commence immediately after completion of Portion 1, or to delay the start of Portion 2 as necessary to accommodate budgetary constraints.

The time for completion of Portion 2 shall be calculated from the date of issue of the instruction to proceed with Phase 2 and shall include the time required to mobilise and re-establish on site.

Clause 1.1.1.15:

The **Employer** is the **Stellenbosch Municipality**, represented by the Director: **Technical Services** and/or such other person or persons duly authorised thereto by the Employer in writing.

The name of the Employer is: STELLENBOSCH MUNICIPALITY

and is referred to in this Contract Document by the terms “Employer”, “Municipality” or “Council” as the context provides.

The **Employer’s Agent**, referred to in the Contract documents:

Name	:	JG AFRIKA (Pty) Ltd
Represented By	:	Mr Charl du Preez or any director or shareholder of the company
Address	:	14 Central Square Pinelands, 7405
Telephone	:	(021) 532 0940
Fax	:	(021) 532 0950
E-mail	:	duPreezC@jgafrika.com

Clause 1.1.1.26:

The Pricing Strategy is a Re-measurement Contract.

Add the following clauses after Clause 1.1.1.34:

1.1.1.35 “**Drawings**” means all drawings, calculations and technical information forming part of the Contract Documents and any modifications thereof or additions thereto from time to time approved in writing by the Employer’s Agent or delivered to the Contractor by the Employer’s Agent.

1.1.1.36 “**Letter of Notification**” means the letter of formal notification, signed by the Employer, of the decision of the Supply Chain Management Bid Adjudication Committee sent to all tenderers. The notification of the decision does not form part of the Employer’s Acceptance of the successful tenderer’s Form of Offer and no rights shall accrue

Clause 1.2.1.2:

The address of the Employer is:

Physical address:	Directorate: Technical Services Stellenbosch Municipality Plein Street Stellenbosch 7599

Clause 1.1.1.16:

The **Employer's Agent**, referred to in the documents, is the firm of JG AFRIKA (Pty) Ltd acting through a director, executive associate, associate or an official authorised thereto in writing.

Clause 1.2.1.2:

The address of the Employer's Agent is:

Physical address:	14 Central Square Pinelands Cape Town
Postal address:	P O Box 38561 Pinelands 7430

Clause 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:

1. Clause 3.3.1 Nomination of Employer's Agent's Representative;
2. Clause 3.3.4 Employer's Agent's authority to delegate;
3. Clause 4.7 The issuing of instructions for dealing with fossils and the like;
4. Clause 5.11.2 Suspension of the Works;
5. Clause 5.12.4 Acceleration instead of extension of time;
6. Clause 6.3.1 Ordering of any variation that causes the contract price to exceed the contract sum;
7. Clause 6.10.10 Advance payment, for items not listed I the Advance Payment Schedule;
8. Clause 8.2.2.2 Authorizing the Contractor to repair and make good excepted risks.

Clause 4.1:

Add the following Clause after Clause 4.1.2:

4.1.3 Where the Contract is based on an alternative tender offer submitted by the Tenderer/Contractor, he shall, notwithstanding acceptance of the offer by the Employer, be liable for any deficiency in the alternatives proposed, for any costs in ensuring that the alternatives meet the Employer's standards and requirements, and for any loss or damage arising out of such error or deficiency.

Clause 4.3:

Add the following clause after Clause 4.3.2.:

4.3.3 The Employer and the Contractor shall enter into an agreement to complete the work required for the construction of the works in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act (Act 85 of 1993) and the Construction Regulations promulgated thereunder.

An agreement is included in the Contract Document (C1.4 of Contract Data) and shall be completed and submitted to the Employer together with a letter of good standing from the Compensation Commissioner (if not insured with a Licenced Compensation Insurer) within fourteen (14) days after the Commencement Date. The Contractor shall ensure that any letter of good standing shall be timeously renewed in order that it remains in full force for the duration of the Contract.

Clause 5.3.1:

The documentation required before commencement with Works execution is:

(1) Approved Health and Safety Plan (Refer to Clause 4.3)
(2) Initial programme (Refer to Clause 5.6)
(3) Security (Refer to Clause 6.2)
(4) Insurance (Refer to Clause 8.6)
(5) Occupational Health and Safety Agreement (C1.5 of the Contract Document)
(6) Letter of Good Standing from the Compensation Commissioner (if not insured with a Licensed Compensation Insurer)
(7) Protection of the Environment Declaration (Part C1.6 in Agreements and Contract Data)
(8) Proof of Registration / Letter of Good Standing with the Bargaining Council for the Civil Engineering Industry (BCCEI)
(9) Insurance Broker's Warranty (C1.7 of the Contract Document)
(10) Contract of Temporary Employment as Community Liaison Officer (C1.8 of the Contract Document)

Add the following to Clause 5.3.1:

Such instruction shall, where the Contract Sum exceeds one hundred and thirty million Rand (R130 000 000), also be subject to the issuing, by the Provincial Director of the Department of Labour, of a construction work permit to perform the intended construction work in terms of Clause 5.3.4 below. The application can only be completed once the Contractor is appointed and the approval process is estimated to take 4weeks. The Contractor is to allow for this time in his programme.

Clause 5.3.2:

The time to submit the documentation required before commencement with Works execution is 14 days.

Clause 5.3.3:

Add the following to Clause 5.3.3:

Notwithstanding the above, where the Contract Sum exceeds one hundred and thirty million Rand (R130 000 000), and a construction work permit from the Provincial Director of the Department of Labour is required, commencement of the Works shall not be deemed to take place until such construction work permit has been issued by the Provincial Director.

Add the following Clause after Clause 5.3.3:

5.3.4 Application for Construction Work Permit

Where the Contract Sum exceeds one hundred and thirty million Rand (R130 000 000), the Employer shall, in compliance with Regulation 3 of the Construction Regulations, read together with the exemptions published in Government Notice dated 26 July 2018, apply to the Provincial Director of the Department of Labour for a construction work permit to perform the intended construction work. The employer will apply for the construction work permit as soon as possible after its Bid Adjudication Committee has awarded the contract, and the period that the Department of labour requires to issue the permit will run concurrently with the appeal period.

Should the issuing of a construction work permit delay the Employer's Agent's instruction to commence executing the Works and this in turn causes a delay to Practical Completion, then the Contractor shall be entitled to make a claim in accordance with Clause 10.1. Should, however, the issuing of a construction work permit be delayed by the submission of an unacceptable draft Health and Safety Plan, in the opinion of either the Employer's Health and Safety Agent, or the Provincial Director of the Department of Labour, no claim for an extension of time will be entertained.

Clause 5.4.2:

Access to and possession of the site shall not be exclusive to the Contractor, but as set out in the Scope of Work and Site Information.

Add the following clause after Clause 5.4.3:

5.4.4 The Contractor shall bear all costs and charges for special and temporary rights of way required by him in connection with access to the Site.

Clause 5.6.2.3:

Insert the following after "…approvals,":

… permits,

Clause 5.8.1:

The non-working days are Sundays.

The special non-working days are:

(1) All gazetted public holidays falling outside the year end break.
(2) The year end break commencing on 14 December and ending on 5 January, inclusive.

Clause 5.12.2.2:

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

The number of days quoted below shall be regarded as a fair estimate of the delays to be anticipated and allowed for under normal climatic conditions where inclement weather prevents or disrupts critical work.

January	2 days
February	2 days
March	2 days
April	2 days
May	2 days
June	4 days
July	4 days
August	4 days
September	4 days
October	2 days
November	2 days
December	2 days

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

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

Clause 5.13.1:

The penalty for failing to complete the Works is **R5 000** per calendar day.

Clause 5.16.3:

The latent defects period is **10** years

Clause 6.2.1:

The security to be provided by the Contractor shall be a performance guarantee. The Guaranteed Sum shall be calculated as follows:

CONTRACT SUM	PERCENTAGE OF CONTRACT SUM
Up to R300 000	Nil
R300 001-R1 000 000	2.5%
R1 000 001-R3 000 000	5%
R3 000 001-R5 000 000	7.5%
R5 000 001- and above	10%

The performance guarantee shall contain the wording of the document included in C1.3.

Clause 6.2.2:

Delete Clause 6.2.2 in its entirety.

Clause 6.2.3:

Delete Clause 6.2.3 in its entirety and replace with the following:

The Contractor shall ensure that the performance guarantee remains valid and enforceable until the Certificate of Completion of the Works is issued.

Clause 6.4.1.5

In respect of additional work carried out by any subcontractor, the work shall be valued in accordance with the provision of Clause 6.6.

Clause 6.5.1.2.3:

The percentage allowance to cover profit and overhead charges shall be the percentage tendered under Item No.1:1.45 of Schedule 1 of the Schedules of Quantities.

Clause 6.6.1.2.1

The percentage commission on the sums paid to Subcontractors shall be as tendered under Item No.1:1.39. of Schedule 1 of the Schedules of Quantities.

Clause 6.8.2:

Add the following to Clause 6.8.2:

The Contract Price shall be subject to Contract Price Adjustment in accordance with Clause 6.8 of the General Conditions of Contract.

If special materials are specified in Part 2 of the Contract Data then the provisions of Clause 6.8.3 of the General Conditions of Contract shall apply to such special materials.

The base month is one month prior to the month in which the tender closed.
Furthermore, the Contract Price Adjustment Schedule shall be amended as follows:

“L” is the “Labour Index” and shall be the Consumer Price Index (CPI) for “All items (CPI Headline)”, as published in the Statistical News Release, P0141: Table A – Consumer Price Index: Main Indices of Statistics South Africa.

“P” is the “Plant Index” and shall be the Construction Materials Price Index for “Plant and Equipment” as published in the Statistical News Release P0151.1, Table 4 – Mining and construction plant and equipment price index of Statistics South Africa.

“M” is the “Materials Index” and shall be the Construction Materials Price Index for selected materials, Materials for “Civil Engineering material – structures **(excluding bitumen)**,” as published in the Statistical News Release P0151.1, Table 6 – Civil engineering material price indices of Statistics South Africa

“F” is the “Fuel Index” and shall be the Producer Price Index (PPI) for “Coal and Petroleum Products - Diesel”, as published in the Statistical News Release P0142.1: Table 1 –PPI for final manufactured goods of Statistics South Africa.

Where applicable, in terms of the foregoing, the value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule with the following values for "Water and Sewer Reticulation":

The value of "x" is 0,10.

The values of the coefficients for "Water and Sewer Reticulation" are:

a = 0,15 b = 0,20 c = 0,55 d = 0,10

Clause 6.8.3: Variation in the cost of special materials

Price adjustment for variations in the cost of special materials is provided for in the Special Materials Schedule at the end of this Part 1: Contract Data provided by the Employer.

Clause 4.2 of the Contract Price Adjustment Schedule

Delete the words "by the Contractor" that appear after "…. entered in the Contract Data"

Clause 6.8.4:

Add the following to Clause 6.8.4:

Notwithstanding the above, in the event that a public holiday is proclaimed after 28 days before the closing date for tenders, no costs other than those that can be claimed under Clause 5.12.3 shall be added to the contract price.

Add the following after Clause 6.8.4:

6.8.5. If price adjustment for variations in the cost of plant and materials imported from outside of South Africa is provided for in the contract data, such adjustment shall be based on the information contained on the schedule titled "**Price Basis for Imported Resources"** and as below. For the purposes of this clause the Rand value of imported Plant and Materials inserted on the schedule titled "**Price Basis for Imported Resources"** (column (F)) shall be the value in foreign currency (column (A)) converted to South African Rand (column (C)) by using the closing spot selling rate quoted by **Employer's** main banker, ABSA, on the Base Date (seven calendar days before tender closing date) rounded to the second decimal place (column(B)), to which shall be added any Customs Surcharge and Customs Duty applicable at that date (columns (D) and (E)).

6.8.5.1 Adjustment for variations in rates of exchange:

(a) The value in foreign currency inserted in column (A) shall be subject to clause (h) below when recalculating the Rand value.

(b) The rate of exchange inserted in column (B) shall be the closing spot selling rate quoted by **Employer's** main banker, ABSA, on the Base Date, rounded to the second decimal place, subject to sub-paragraph (c) below.

(c) If the rate of exchange inserted by the Tenderer differs from the ABSA rate referred to above, then the ABSA rate shall apply and the Rand value in columns (C) and (F) shall be recalculated accordingly, without altering the price in the Schedules of Quantities for the relevant items.

(d) If a tender from a supplier or sub-contractor provides for variations in rates of exchange, the Contractor may **only** claim for variations in rates of exchange if he binds the supplier or sub-contractor to the same provision to take out forward cover as described in sub-paragraph (e) below.

(e) The Contractor (or supplier or sub-contractor) shall within five working days from the date of placing a firm order on an overseas supplier, cover or recover forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the schedule titled "**Price Basis for Imported Resources"**.

(f) When the Contractor (or supplier or sub-contractor) so obtains forward cover, the Contractor shall immediately notify the Employer of the rate obtained and furnish the Employer with a copy of the foreign exchange contract note.

(g) Based on the evidence provided in sub-paragraph (f) above, the value in Rand inserted in column (C) on the schedule titled "**Price Basis for Imported Resources"**shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to sub-paragraph (h) below. Failure to provide such evidence shall result in no such recalculation shall be considered by the Employer.

(h) The adjustments shall be calculated upon the value in foreign currency in the Contractor's (or supplier's or sub-contractor's) **forward cover contract**, provided that, should this value exceed the value in foreign currency inserted in column (A) of the schedule titled "**Price Basis for Imported Resources"**, then the value in column (A) shall be used.

6.8.5.2 Adjustment for variations in customs surcharge and customs duty

(a) Any increase or decrease in the Rand value between the amounts of Customs Surcharge and Customs Duty inserted on the schedule titled "**Price Basis for Imported Resources"**and those amounts actually paid to the Customs and Excise Authorities, which are due to changes in the percentage rates applicable or to the foreign exchange rate used by the authorities, shall be adjusted accordingly.

(b) The Tenderer shall state the Customs Duty Tariff Reference applicable to each item and the Contractor shall advise the Employer's Agent of any changes which occur.

6.8.5.3 Adjustment for variation in labour and material Costs

If the prices for imported Plant and Materials are not fixed, the Contractor shall in his Tender specify the formula for calculating Contract Price Adjustments normally used in the country of manufacture and the indices and relative proportions of labour and material on which his Tender prices are based. Evidence of the indices applicable shall be provided with each claim. The indices applicable 42 days before contractual dispatch date from the factory will be used for the purposes of Contract Price Adjustment.

Failure to specify a formula in the Tender shall mean that the prices are fixed or shall be deemed to be fixed.

Clause 6.10.1.5:

Delete Clause 6.10.1.5 in its entirety and replace with the following:

6.10.1.5 The value of Plant and materials:

6.10.1.5.1 up to a percentage limit of **80%** for the Plant and materials referred to in Clause 6.9.1.1 brought on to the Site but not yet built into the Permanent Works;

Provided that the Contractor has produced documentary evidence of ownership of such Plant and/or materials and has delivered to the Employer an indemnity, approved in writing by the Employer, against any claim to or in respect of such Plant and/or materials by reason of the Contractor's sequestration or liquidation, or of any defect in the Contractor's title to the Plant and/or materials;

6.10.1.5.2 which have been manufactured and are stored at places other than the Site, in respect of which the Employer has indicated, on the Advance Payment Schedule, that advance payment will be permitted;

6.10.1.5.3 for which a deposit with order is required from the Contractor by a manufacturer/supplier, only in respect of which the Employer has indicated, on the Advance Payment Schedule, that advance payment will be permitted;

The terms and conditions for advance payment are set out in Clause 6.10.10 and in the Advance Payment Schedule at the end of this Part 1: Contract Data provided by the Employer.

Clause 6.10.1.7:

Add the following after the words "Clause 5.13":

or any other fines or penalties that become due under the Contract.

Clause 6.10.3:

Add the following to Clause 6.10.3:

Notwithstanding the provision of a performance guarantee in terms of Clause 6.2.1, interim payments to the Contractors shall be subject to a retention by the Employer of an amount of **10%** of the said amounts due to the Contractor, up to a limit of 5% of the Contract Sum. A guarantee in lieu of retention is not permitted.

Clause 6.10.4:

Add the following to the last sentence of Clause 6.10.4:

…, dated as at the date of delivery of the Contractor's statement to the Employer's Agent.

Add the following to Clause 6.10.4:

Notwithstanding the above, the Employer's Agent shall be empowered to withhold the delivery of the payment certificate until the Contractor has complied with his obligations to report in terms of Clause 4.10.2 and as described in the Scope of Work.

The Contractor may submit a fully motivated application regarding more frequent payment to the Employer's Agent to be submitted to the Employer for consideration. Requests for more frequent payments will be considered at the sole discretion of the Employer and is not a right in terms of this contract.

Clause 6.10.10:

Add the following Clause after Clause 6.10.9:

6.10.10 Advance payment

Subject to Clauses 6.10.1.5.2 and 6.10.1.5.3, and the Advance Payment Schedule, the Employer shall make an advance payment for Plant and materials stored at places other than the Site, or in respect of which a deposit with order is required, only once the Contractor has submitted an advance payment guarantee in accordance with this Clause.

Unless and until the Employer receives this guarantee, the following paragraphs shall not apply.

The Employer's Agent shall issue an Interim Payment Certificate for, or including, advance payment after receiving a statement under Clause 6.10.1 and after the Employer has received a guarantee in an amount equal to the advance payment requested. This guarantee shall be issued by a financial institution approved by the Employer, as listed in the Annexure in Part C1.3 of the Contract Data, and shall be in the form of and shall contain the precise wording of the document included in Part C1.4: **Form of Advance Payment Guarantee** and shall come into force, be administered and expire in terms thereof**.**

The Employer shall return the guarantee to the Contractor within 14 days after the expiry date.

The provision of the Advanced Payment Guarantee shall be at the Contractor's cost.

The term "deposit" or "deposit with order" used in the context of this Clause and elsewhere by reference to this Clause, means a sum payable by the Contractor to a manufacturer/supplier prior to the manufacture of an item of Plant or material, required at the time of placing an order, the balance of the value of the item being payable later.

Clause 8.6.1.1.2:

The value of Plant and materials supplied by the Employer to be included in the insurance sum is **R 0.00 (Nil)**.

Clause 8.6.1.1.3:

The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is **R0.00 (Nil).**

Clause 8.6.1.3:

The limit of indemnity for liability insurance is **R10 000 000.00** for any single claim – the number of claims to be unlimited during the construction and defects liability periods.

Clause 8.6.1.5:

In addition to the insurances required in terms of General Conditions of Contract Clauses 8.6.1.1 to 8.6.1.4 the following insurance is also required:

(a) Insurance of Construction Plant and Equipment (including tools, offices and other temporary structures and contents) and other things (except those intended for incorporation into the Works) brought onto the site for a sum sufficient to provide for their replacement.

(b) Insurance in terms of the provisions of the Compensation for Occupational injuries and Diseases Act No. 130 of 1993.

(c) Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger Liability Indemnity.

(d) Where the contract involves manufacturing and/or fabrication of the works or part thereof at premises other than the Site, the Contractor shall satisfy the Employer that all materials and equipment for incorporation in the works are adequately insured during manufacture and/or fabrication. In the event of the Employer having an insurable interest in such works during manufacture or fabrication then such interest shall be noted by endorsement to the Contractor's Policies of Insurance.

Clause 8.6.5:

Delete the following from Clause 8.6.5:

"and the terms thereof shall be subject to the approval of the Employer's Agent, which approval shall not be unreasonably withheld."

Clause 8.6.6:

Replace clause 8.6.6 with the following:

The Contractor shall provide evidence in the form stated in the contract data to the Employer's Agent that the required insurances are affected and that all premiums thereunder have been paid.

Clause 9.1:

In Clause 9.1.6 replace "and 9.1.3" with:

, 9.1.3 and 9.1.7

Add the following Clause after Clause 9.1.6:

9.1.7 Death of Sole Proprietor/Member

Upon the death of the Contractor who was a Sole Proprietor, or a sole member of a Close Corporation, the Contract will terminate forthwith. The Employer shall pay to the Contractor's estate any money which it considers due under the Contract in terms of Clause 9.1.5, in full and final settlement thereof.

Clause 9.2.1:

Add the following to Clauses after Clause 9.2.1.3.8:

9.2.1.3.9 The Contractor committed a corrupt or fraudulent act during the procurement process or the execution of the contract.

9.2.1.3.10 An official or other role player committed any corrupt or fraudulent act during the procurement process or in the execution of the contract that benefited the Contractor.

Clause 9.2.1.3.9 (Additional clause)

The Contract would be terminated by the Employer should the tenderer not comply with the following:

- Register on Stellenbosch Municipality's Supplier Database by completing and submitting the relevant form as well as submitting and completing the Creditor Control Form within 14 days of being requested to do so. These forms can be obtained from the Municipality's Supply Chain office.
- Submit to the Municipality, written confirmation that the tenderer has the ability to carry out the works:
  - Within the timeframe required by the Municipality, within 7 days of being requested to do so.
  - Utilizing the proper materials, as specified in the Contract Data, within 7 days of being requested to do so.
  - Utilizing the proper work methods, as specified in the Contract Data, within 7 days of being requested to do so.
- Submit to the Municipality, where the tenderer has undercut rates, the following, within 3 days of being requested to do so:
  - A detailed breakdown of the submitted and undercut rate.
  - Written confirmation that the tenderer is able to absorb financial losses on work assignment.

And on receipt of the information, the Municipality determines that the tenderer will incur appreciable losses.

Clause 10.5.3:

The number of ad-hoc Adjudication Board Members to be appointed is 1(one).

ADDITIONAL CONDITIONS OF CONTRACT

Add the following clause after clause 10

Clause 11: Details to be confidential

The Contractor shall treat the details of the Works comprised in this Contract as private and confidential (save in so far as may be necessary for the purposes hereof) and shall not publish or disclose the same or any particulars thereof in any trade or technical paper elsewhere without the prior written consent of the Employer's Agent.

Part 2: Data Provided by the Contractor

Clause 1.1.1.9:

The name of the Contractor is .....

Clause 1.2.1.2:

The address of the Contractor is

Physical: Address	.....	Postal: Address	.....
	.....		.....
	.....		.....
	.....		.....
Telephone:	.....	Fax:	.....
E-mail:	.....		

SIGNED ON BEHALF OF TENDERER: . . . . . .

STELLENBOSCH MUNICIPALITY

CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C1.3 Form of Guarantee

PERFORMANCE GUARANTEE

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

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

"Physical address: .....

"Employer" means: The Stellenbosch Municipality

"Contractor" means: .....

" Employer's Agent " means: JG AFRIKA (Pty) Ltd

"Works" means: **B/SM 30/23: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE**

"Site" means: The site as defined in Clause 1.1.1.29 of the General Conditions of Contract .....

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

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

Amount in words: .....

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

Amount in words: .....

"Expiry Date" means: .....

CONTRACT DETAILS

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

PERFORMANCE GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

2. The Guarantor's period of liability shall be from and including the date of issue of this Performance Guarantee and up to and including the Expiry Date or the date of issue by the Employer's Agent of the Certificate of Completion of the Works or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Employer's Agent and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of Completion of the Works has been issued.

3. The Guarantor hereby acknowledges that:

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

3.2 its obligation under this Performance Guarantee is restricted to the payment of money.

4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Employer's Agent in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.

5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

5.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or

5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and

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

6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7. Where the Guarantor has made payment in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

8. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

9. Payment by the Guarantor in terms of 5 will only be made against the return of the original Performance Guarantee by the Employer.

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

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

12. This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

13. This Performance Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

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

Signed at .....

Date .....

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

Capacity .....

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

Capacity .....

Witness signatory (1) .....

Witness signatory (2) .....

ANNEXURE

LIST OF APPROVED FINANCIAL INSTITUTIONS

The following financial institutions are currently (as at 18 October 2016) approved for issue of contract guarantees to the Municipality:

National Banks:
ABSA Bank Ltd.
FirstRand Bank Ltd.
Investec Bank Ltd.
Nedbank Ltd.
Standard Bank of SA Ltd.

International Banks (with branches in SA):
Barclays Bank plc.
Citibank n.a.
Credit Agricole Corporate and Investment Bank
HSBC Bank plc.
JP Morgan Chase Bank
Societe Generale
Standard Chartered Bank

Insurance companies:
ABSA Insurance
Coface s.a.
Compass Insurance Co.
Constantia Insurance Co.
Credit Guarantee Insurance Co.
Guardrisk Insurance Co.
Hollard Insurance Company Ltd.
Home Loan Guarantee Co.
Infiniti Insurance Limited
Lombard Insurance
Mutual & Federal Insurance Co.
New National Assurance Co.
Regent Insurance Co.
Renasa Insurance Company Ltd.
Santam Limited
Zurich Insurance Co.

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CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C1.4 Form of Advance Payment Guarantee

ADVANCE PAYMENT GUARANTEE

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

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

"Physical address: .....

"Employer" means: The Stellenbosch Municipality.

"Contractor" means: .....

" Employer's Agent " means: JG AFRIKA (Pty) Ltd

"Works" means: **B/SM 30/23: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE**

"Site" means: The site as defined in Clause 1.1.1.29 of the General Conditions of Contract.

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

"Plant and materials" means: The Plant and materials stored at places other than the Site, or in respect of which an advance payment prior to manufacture is required, which the Employer has agreed may be subject to advance payment, such Plant and materials being listed in the Schedule of Plant and materials.

"Schedule of Plant and materials" means: A list of Plant and materials which shows the value thereof to be included in the Guaranteed Advance Payment Sum.

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

Amount in words: .....

"Expiry Date" means: The date of the payment certificate wherein the Plant and materials have been certified by the Employer's Agent as having been built into the Permanent Works.

CONTRACT DETAILS

Employer's Agent issues: Interim Payment Certificates and Final Payment Certificate.

ADVANCE PAYMENT GUARANTEE

1. The Guarantor's liability shall be limited to the amount of the Guaranteed Advance Payment Sum.

2. The Guarantor's period of liability shall be from and including the date of issue of this Advance Payment Guarantee and up to and including the Expiry Date or the date of payment in full of the Guaranteed Advanced Payment Sum, whichever occurs first.

3. The Guarantor hereby acknowledges that:

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

3.2 its obligation under this Advance Payment Guarantee is restricted to the payment of money.

4. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Employer's Agent in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) calendar days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.

5. Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Advance Payment Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Advance Payment Guarantee, such demand stating that:

5.1 the Contract has been terminated due to the Contractor's default and that this Advance Payment Guarantee is called up in terms of 5; or

5.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Advance Payment Guarantee is called up in terms of 5; and

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

6. It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7. Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

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

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

11. This Advance Payment Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

12. This Advance Payment Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

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

Signed at .....

Date .....

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

Capacity .....

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

Capacity .....

Witness signatory (1) .....

Witness signatory (2) .....

.

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Schedule of Plant and materials

For use with Advance Payment Guarantees on contracts using the General Conditions of Contract for Construction Works, Third Edition, 2015.

Employer The Stellenbosch Municipality, Transport and Urban Development Authority

Contractor ……..

Works Contract No. and Title……

Payment Certificate No. ……

Advance payment is requested in respect of the following items of Plant and materials, which have been manufactured and are stored at places other than the Site, or in respect of which a deposit with order is required from the Contractor by a manufacturer/supplier:

Bill of Quantities item no.	Description of Plant and materials	Deposit with order required (Y/N)	Place of storage (or manufacture, if deposit with order is required)	Unit	Quantity	Unit price R c	Total Price R c
Total Value of Plant and materials to be included in Guaranteed Advance Payment Sum						R	

Signed at …….. on the ……..day of……..20……..

…….. for the Contractor

……. As witness

…… Approved by Employer's Agent

STELLENBOSCH MUNICIPALITY

CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C1.5 Occupational Health and Safety Agreement

AGREEMENT MADE AND ENTERED INTO BETWEEN STELLENBOSCH MUNICIPALITY (HEREINAFTER CALLED THE "EMPLOYER") AND

……..……..…… ,
(Contractor/Mandatary/Company/CC Name)

IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, ACT No. 85 OF 1993 AS AMENDED.

I, ……..……..…… , representing

……..……..…… , as an employer
in its own right, do hereby undertake to ensure, as far as is reasonably practicable, that all work will be performed, and all equipment, machinery or plant used in such a manner as to comply with the provisions of the Occupational Health and Safety Act (OHSA) and the Regulations promulgated thereunder.

I furthermore confirm that I am/we are registered with the Compensation Commissioner and that all registration and assessment monies due to the Compensation Commissioner have been fully paid or that I/We are insured with an approved licensed compensation insurer.

COID ACT Registration Number: .....

OR Compensation Insurer: .....

Policy No.: .....

I undertake to appoint, where required, suitable competent persons, in writing, in terms of the requirements of OHSA and the Regulations and to charge him/them with the duty of ensuring that the provisions of OHSA and Regulations as well as the Employer's Special Conditions of Contract, Way Leave, Lock-Out and Work Permit Procedures are adhered to as far as reasonably practicable.

I further undertake to ensure that any subcontractors employed by me will enter into an occupational health and safety agreement separately, and that such subcontractors comply with the conditions set.

I hereby declare that I have read and understand the appended Occupational Health and Safety Conditions and undertake to comply therewith at all times.

I hereby also undertake to comply with the Occupational Health and Safety Specification and Plan.

Signed at .....on the.....day of.....20….

_____ _____
Witness Mandatary

Signed at ..... on the.....day of.....20 ....

_____ _____
Witness for and on behalf of
Overberg Water

OCCUPATIONAL HEALTH AND SAFETY CONDITIONS

1. The Chief Executive Officer of the Contractor shall assume the responsibility in terms of Section 16(1) of the Occupational Health and Safety Act (as amended). Should the Contractor assign any duty in terms of Section 16(2), a copy of such assignment shall immediately be provided to the representative of the Employer as defined in the Contract.

2. All work performed on the Employer's premises shall be performed under the supervision of the construction supervisor who understand the hazards associated with any work that the Contractor performs on the site in terms of Construction Regulations 2014.

3. The Contractor shall appoint a Competent Person who shall be trained on any occupational health and safety aspect pertaining to them or to the work that is to be performed.

4. The Contractor shall ensure that he familiarises himself with the requirements of the Occupational Health and Safety Act and that he, his employees, and any sub-contractors, comply with them.

5. Discipline in the interests of occupational health and safety shall be strictly enforced.

6. Personal protective equipment shall be issued by the Contractor as required and shall be worn at all times where necessary.

7. Written safe work procedures and appropriate precautionary measures shall be available and enforced, and all employees shall be made conversant with the contents of these practices.

8. No substandard equipment/machinery/articles or substances shall be used on the site.

9. All incidents referred to in terms of Section 24 of the Occupational Health and Safety Act shall be reported by the Contractor to the Department of Labour and the Employer.

10 The Employer hereby obtains an interest in the issue of any formal inquiry conducted in terms of Section 32 of the Occupational Health and Safety Act and into any incident involving a Contractor and/or his employees and/or his sub-contractor/s.

11. No use shall be made of any of the Employer's machinery/plant/equipment/substance/personal protective equipment or any other article without prior arrangement and written approval.

12. No alcohol or any other intoxicating substance shall be allowed on the site. Any person suspected of being under the influence of alcohol or any other intoxicating substance shall not be permitted access to, or allowed to remain on the site.

13. Prior to commencement of any work, verified copies of all documents mentioned in the agreement, must be presented to the Employer.

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CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C1.6 Protection of the Environment Declaration

PROTECTION OF THE ENVIRONMENT DECLARATION

The Contractor will not be given right of access to the Site until this form has been signed

CONTRACT NO.: B/SM-NN/YY

CONTRACT TITLE: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

I/ we,.....{Contractor} record as follows:

1. I/ we, the undersigned, do hereby declare that I/ we am/ are aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.

2. In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I/ we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in-so-far as I/ we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options. In this regard, I/ we recognise and accept the need to abide by the "precautionary principle" which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.

3. I/ we declare that I/ we have read and understood the contents of the Environmental Management Programme (which is comprised of the Environmental Management Specification and its Annexures) for this Contract, and that I/ we understand my/our responsibilities in terms of enforcing and implementing the Environmental Management Programme. I/ we also declare that I/ we have made appropriate provision in my/ our pricing of the Bills of Quantities items for the Environmental Management Programme.

4. I/ we acknowledge and accept the right of the Employer to deduct, should he so wish, from any amounts due to me/ us, such amounts (hereinafter referred to as fines) as the Employer's Agent shall certify as being warranted in view of my/ our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:

4.1 The Employer's Agent, in determining the amount of such fine, shall take into account, *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he considers it necessary to impose a sanction in order to eliminate/reduce future occurrences

4.2 The Employer's Agent shall, with respect to any fine imposed, provide me/ us with a written statement giving details of the offence, the facts on which the Employer's Agent has based his assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

Signed ..... Date.....
CONTRACTOR

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CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C1.7 Insurance Broker's Warranty

Pro Forma

Logo

Letterhead of Contractor's Insurance Broker

Date _____

STELLENBOSCH MUNICIPALITY
Municipal Manager
Plein Street
Stellenbosch
7600

Dear Sir

CONTRACT NO.: **B/SM 30/23**

CONTRACT TITLE: JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

NAME OF CONTRACTOR: _____

I, the undersigned, do hereby confirm and warrant that all the insurances required in terms of the abovementioned contract have been issued and/or in the case of blanket/umbrella policies, have been endorsed to reflect the interests of the STELLENBOSCH MUNICIPALITY with regard to the abovementioned contract, and that all the insurances and endorsements, etc., are all in accordance with the requirements of the contract.

I furthermore confirm that all premiums in the above regard have been paid.

Yours faithfully

Signed: _____

For: _____

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CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C1.8 Contract of Temporary Employment as Community Liaison Officer

Construction Contract No.: ..B/SM 30/23

PROJECT: Jamestown 5ML Reservoir: Construction of Bulk Water and Associated Infrastructure

AGREEMENT made between the CONTRACTOR .....
and the Community Liaison Officer……, hereafter referred to as the CLO, for the appointment and employment of a CLO for the duration of the work in respect of the above named construction contract.

1. **THE PARTIES HAVE AGREED THAT**

The CLO will be employed by the CONTRACTOR on a temporary basis for the duration of the work from the date of signing this agreement to the date of practical completion as defined in the Contract, subject to all the conditions set out below.

2. **THE DUTIES OF THE COMMUNITY LIAISON OFFICER SHALL BE:**

1. to keep the community informed on the progress of the project;
2. to keep the Contractor informed on relevant Community affairs and possible grievances;
3. to manage the recruitment of workers from the Sub-Council Job-Seekers Database;
4. to assist the Contractor's supervisory staff in the management of the workers.

3. **THE FOLLOWING CONDITIONS OF EMPLOYMENT SHALL APPLY:**

The Conditions of Temporary Employment as applicable on this Contract for the workers recruited from the Community shall apply equally to the CLO, except that the rate of remuneration shall be R365.00 per working day. These conditions that apply are listed below as they appear in the Contract of Temporary Employment:

3.1 If required to work on a statutory public holiday or Sunday the payment will be double the amount stated in the previous paragraph.

3.2 Maximum hours of work:

(i) 9¼ hours per day
(ii) 45 hours per week;
(iii) 5 days per week;
(iv) 5 hours without an interval, whereupon there shall be an interval of at least 30 minutes;
(v) A spread-over period of 12 hours.

3.3 The CLO shall be entitled to payment where he is prevented from working by reasons which are within the control of the Contractor.

3.4 On days when it is raining the Contractor may, before 9 a.m., decide not to open the site and there will be no pay.

If the Contractor closes the site between 9 a.m. and 1 p.m., the CLO will be paid half the daily wage.

If the site works later than 1 p.m., the CLO will be paid the full daily wage.

3.5 Workers and the CLO will not be permitted to work under conditions of:

(i) undisciplined or unruly behaviour;
(ii) insubordination to Team Leader, Supervisors or Management;
(iii) abuse of intoxicating substances;
(iv) criminal actions by the employee;
(v) strike action or political stayaways.

3.6 Workers, including the CLO, may be dismissed after two official written warnings for the following behaviour:

(i) undisciplined or unruly behaviour;
(ii) insubordination to Team Leader, Supervisors or Management;
(iii) abuse of intoxicating substances;
(iv) wilful or negligent damage to or loss of machines or equipment.

The Contractor shall ensure that he has statements from at least two witnesses concerning any of the above situations.
The Contractor shall inform the CLO within 24 hours of any warning issued to workers employed from the Job-Seekers Database.

3.7 The CLO will be paid on a Friday afternoon every two weeks, one week in arrears.

3.8 The CLO shall be given a statement with each payment on which is recorded:

(i) the name of the Contractor;
(ii) the CLO's name;
(iii) the number of days worked by the CLO;
(iv) the rate per day;
(v) the details of any deductions made;
(vi) the actual amount paid to the CLO.

3.9 No deduction shall be made from the remuneration except where the CLO consents in writing or unless the Contractor is permitted or required to do so by law or the order of any competent court.

3.10 The CLO shall be supplied free of charge with all health and safety equipment required by the Occupation Health and Safety Act. The equipment shall remain the property of the Contractor.

3.11 The Contractor must give the CLO at least one week's notice of the termination of the Contract of Temporary Employment. If this is not done, the CLO must be paid earnings for five days. This condition does not apply if the CLO is dismissed.

3.12 At the end of the period of temporary employment, the Contractor shall provide a Certificate of Service recording the Contractor's name, the CLO's name and address, the period of service, the type of work on which the CLO was engaged and the rate of remuneration on termination.

4. TERMINATION OF AGREEMENT

4.1 If the CLO can no longer perform and execute his/her duties as detailed in this agreement, this agreement will be terminated without prejudice to any rights under this agreement.

5. THE CONDITIONS OF THIS AGREEMENT

5.1 The parties expressly declare that this agreement contains all the conditions negotiated between them, and no condition or stipulation not contained herein shall be binding upon the parties.

6. THUS AGREED AND SIGNED BY THE PARTIES:

Contractor: ……

Community Liaison officer: .....

Date:

.....

Part C2: Pricing Data

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C2.1 Pricing Assumptions

Pricing Assumptions mean the criteria as set out below, read together with all Parts of this contract document, which it will be assumed in the contract, that the tenderer has taken into account when developing his prices.

1. Measurement and payment shall be in accordance with the relevant provisions of clause 8 of each of the SABS 1200 Standardised Specifications for Civil Engineering Construction referred to in the Scope of Work. The Preliminary and General items shall be measured in accordance with the provision of SABS 1200-A, General.

2. Descriptions in the Bills of Quantities are abbreviated and comply generally with those in the Standardised Specifications. Clause 8 of each Standardised Specification, read together with the relevant clauses of the Scope of Work, set out what ancillary or associated activities are included in the rates for the operations specified. The short descriptions of the items of payment given in these Bills of Quantities are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.

   Should any requirements of the measurement and payment clause of the applicable Standardised Specification, or the Scope of Work, conflict with the terms of the Bills of Quantities, the requirements of the Standardised Specification or Scope of Work, as applicable, shall prevail.

3. The clauses in a specification in which further information regarding the bill item appears, are given under "Reference clause" in the Bills of Quantities. The reference clauses indicated are not necessarily the only sources of information in respect of billed items. Further information and specifications may be found elsewhere in the contract documents. Standardised Specifications are identified by the letter or letters which follow SANS in the SANS 1200 series of specifications, eg. G for SANS 1200 G.

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

5. The quantities set out in the Bills of Quantities are the estimated quantities of the Contract Works, but the Contractor will be required to undertake whatever quantities may be directed by the Employer's Agent from time to time. The Contract Price for the completed contract shall be computed from the actual quantities of work done, valued at the relevant unit rates and prices.

6. The prices and rates to be inserted in the Bills of Quantities are to be the full inclusive prices for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the tender is based, as well as overhead charges and profit. Reasonable prices shall be inserted, as these will be used as a basis for assessment of payment for additional work that may have to be carried out.

7. A price or rate is to be entered against each item in the Bills of Quantities, whether the quantities are stated or not. An item against which no price is entered will be considered to be covered by the other prices or rates in the Bills of Quantities. A single lump sum will apply should a number of items be grouped together for pricing purposes.

8. Except where rates only are required, insert all amounts to be included in the total tendered price in the "Amount" column and show the corresponding total tendered price.

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

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

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

12. The units of measurement described in the Bills of Quantities are metric units. Abbreviations which may be used in these Bills of Quantities are as follows:

mm	=	millimetre	h	=	hour
m	=	metre	kg	=	kilogram
km	=	kilometre	t	=	tonne (1000 kg)
m^2	=	square metre	No.	=	number
m^2.pass	=	square metre-pass	sum	=	lump sum
ha	=	hectare	MN	=	meganewton
m^3	=	cubic metre	MN.m	=	meganewton-metre
m^3.km	=	cubic metre-kilometre	P C sum	=	Prime Cost sum
l	=	litre	Prov sum	=	Provisional sum
kl	=	kilolitre	%	=	percent
MPa	=	megapascal	kW	=	kilowatt
Km-pass	=	kilometre-pass	R/only	=	Rate only
KPa	=	kilopascal	W/day	=	Work day

C2.2 Bills of Quantities

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SUMMARY OF SCHEDULES

SCHEDULE 1: GENERAL

SECTION A: GENERAL

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 A	SECTION A: GENERAL					
1: 1.1	8.3.1	Contractual Requirements	Sum	1.00			
1: 1.2	PSA 8.3.2	Contractor's fixed establishment cost	Sum	1.00			
1: 1.3	PSA 8.3.5	Contractor's obligation with respect to health and safety	Sum	1.00			
	PSA 8.3.6	Environmental Management					
1: 1.4		a) Compliance with Environmental Management Plan	Sum	1.00			
1: 1.5		b) Environmental Awareness training	Sum	1.00			
		Items requiring special attention (fixed charge):					
1: 1.6	PSA 8.3.7	a) Wayleaves	Sum	1.00			
1: 1.7	PSA 8.3.7	b) Survey	Sum	1.00			
		TIME RELATED ITEMS					
1: 1.9	8.4.1	Contractual Requirements	Sum	1.0			
1: 1.10	PSA 8.4.2	Contractor's time related establishment	Sum	1.0			
	PSA 8.4.5	Items requiring special attention (time related):					
1: 1.11	PSA 8.4.5	a) Dealing with Water	Sum	1.00			
1: 1.12	PSA 8.4.5	b) Search for, record and protect survey bench marks	Sum	1.00			
1: 1.13	PSA 8.4.5	c) Night watch and security facilities	Sum	1.00			
1: 1.14	PSA 8.4.5	d) Maintenance of access roads	Sum	1.00			
1: 1.15	PSA 8.4.5	e) Dust control	Sum	1.00			
1: 1.16	PSA 8.4.6	Time Related costs with respect to health and safety	Sum	1.00			
1: 1.17	PSA 8.4.7	Time Related costs with respect to environmental management	Sum	1.00			
	PSA 8.4.8	Compensation in terms of Clause 5.12.2.4 of the General Conditions of Contract, 2015 and Clause 9.1.4 of the General Conditions of Contract, for delays incurred					
1: 1.18		a) Plant	Sum/working day	1.0			
1: 1.19		b) Labour	Sum/working day	1.0			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
1: 1.20		c) Supervision	Sum/working day	1.0			
1: 1.21		d) Other services, facilities etc. not covered by a), b) and c).	Sum/working day	1.0			
	PSA 8.5	PROVISIONAL SUMS					
	PSA 8.5.1	Testing of Materials and Quality Assurance					
1: 1.22	PSA 8.5.1	a) Quality Control testing ordered by the Engineer during installation	PC Sum	1.00	50,000.00	50,000	00
1: 1.23	PSA 8.5.1	b) Contractor's overheads, charges and profit on (a) above	%	50,000.00			
	PSA 8.5.2	Survey					
1: 1.24	PSA 8.5.2	a) Survey work ordered by Engineer	PC Sum	1.00	50,000.00	50,000	00
1: 1.25	PSA 8.5.2	b) Contractor's overheads, charges and profit on (a) above	%	50,000.00			
	PSA 8.5.3	Relocation Of Services					
1: 1.26	PSA 8.5.3	a) Relocation of services by local authority	PC Sum	1.00	100,000.00	100,000	00
1: 1.27	PSA 8.5.3	b) Contractor's overheads	%	100,000.00			
	PSA 8.5.4	Community Liason Officer (CLO)					
1: 1.28	PSA 8.5.4	a) Employment of CLO	PC Sum	1.00	75,000.00	75,000	00
1: 1.29	PSA 8.5.4	b) Contractor's overheads	%	75,000.00			
	PSA 8.5.5	Geotechnical Services					
1: 1.30	PSA 8.5.5	a) Geotechnical Services	PC Sum	1.0	50,000.00	50,000	00
1: 1.31	PSA 8.5.5	b) Contractor's overheads	%	50,000.0			
	PSA 8.5.6	Additional works					
1: 1.32	PSA 8.5.6	a) Additional works under any Variation Order carried out by Subcontractors in accordance with clauses 6.6 of the General Conditions of Contract	Sum	1.0			
1: 1.33	PSA 8.5.6	b) Contractor's commission on (a) above (as per GCC clause 6.6.1.2.1)	%	0.0			
	PSA 8.7	DAYWORKS					
		Materials (Provisional):					
1: 1.34		Cement	50kg bag	10.00			
1: 1.35		Building sand	m^3	10.00			
1: 1.36		19mm crushed stone	m^3	10.00			
Total Carried Forward							

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
1: 1.37		Bricks: ROK's	1000	10.00			
1: 1.38		a) Supply other materials	PC Sum	1.00			
1: 1.39		b) Contractor's overheads, profit, etc on (a) above	%	0.00			
		Labour (Provisional)					
1: 1.40		a) Qualified Artisan	hr	40.00			
1: 1.41		b) Skilled Labourer	hr	40.00			
1: 1.42		c) Semi-skilled Labourer	hr	40.00			
1: 1.43		d) Unskilled Labourer	hr	40.00			
1: 1.44		e) Foreman	hr	40.00			
1: 1.45		f) Technician	hr	40.00			
		Plant (Provisional)					
		a) Bulldozer					
1: 1.46		(i) .....kW (small)	hr	40.00			
1: 1.47		(ii) .....kW (large)	hr	40.00			
1: 1.48		b) Grader .....kW	hr	40.00			
1: 1.49		c) Wheel Loader min 2m³ bucket	hr	40.00			
1: 1.50		d) Crawler Excavator (min).100kW	hr	40.00			
1: 1.51		e) Tractor - loader - backhoe....m³ bucket	hr	40.00			
		f) Rollers and Compactors					
1: 1.52		(i) Pneumatic self propelled ..... ton	hr	40.00			
1: 1.53		(ii) Smooth self propelled vibrating roller .....ton	hr	40.00			
1: 1.54		(iii) Plate compactor	hr	40.00			
		g) Trucks					
1: 1.55		(i) Tipper truck (10 m³ min)	hr	40.00			
1: 1.56		(ii) Tipper truck (5 m³ min)	hr	40.00			
1: 1.57		(iii) Water truck (10kl min)	hr	40.00			
1: 1.58		(iv) Dumptruck .....m³	hr	40.00			
1: 1.59		h) Compressor (min 10m³/minute), incl hammer and hose	hr	40.00			
		i) Water Pumps					
Total Carried Forward							

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
1: 1.60		(i) 75mm diameter	hr	40.00			
1: 1.61		(ii) 150mm diameter	hr	40.00			
		j) Submersible Pumps					
1: 1.62		(i) 75mm diameter	hr	40.00			
1: 1.63		(ii) 150mm diameter	hr	40.00			
	8.8	TEMPORARY WORKS					
1: 1.64	PSA 8.8.1	Site Demarcation	Sum	1.00			
1: 1.65	8.8.3	Traffic Accommodation	Sum	1.00			
1:1.66		Access roads	Sum	1.00			
Total Carried Forward To Summary							

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200AB	SECTION AB: ENGINEER'S OFFICE					
	PSAB 8.3	ENGINEERS FACILITIES ON SITE					
	PSAB 8.3.1	Fixed charge items					
1: 2.1		a) Engineer's Office	Sum	1.00			
1: 2.2		b) Cellular Phone	Sum	1.00			
1: 2.3		c) Computer	Sum	1.00			
1: 2.4		d) Survey Equipment	Sum	1.00			
1: 2.5		e) Vehicle	Sum	1.00			
1: 2.6		f) Contract name boards (2 No.)	Sum	1.00			
	PSAB 8.3.2	Time related items					
1: 2.7		a) Engineer's office	Sum	1.00			
1: 2.8		b) Cellular Phone	Sum	1.00			
1: 2.9		c) Computer	Sum	1.00			
1: 2.10		d) Survey Equipment	Sum	1.00			
1: 2.11		e) Vehicle	Sum	1.00			
1: 2.12		f) Contract name boards (2 No.)	Sum	1.00			
	PSAB 8.4	Survey and materials assistants					
1: 2.13		a) Survey assistants	man.hr	20.00			
1: 2.14		b) Materials assistants	man.hr	20.00			
		PROVISIONAL SUMS					
	PSAB 8.5	Cellular Phone Calls					
1: 2.15		a) Monthly Cellular phone charges	Prov Sum	1.00	15,000.00	15,000	00
1: 2.16		b) Overheads charges and profit on (a) above	%	7,000.00			
	PSAB 8.6	Fuel					
1: 2.17		a) Fuel for Engineer's vehicle	Prov Sum	1.00	20,000.00	20,000	00
1: 2.18		b) Overheads, charges and profit on (a) above	%	10,000.00			
Total Carried Forward To Summary							

SCHEDULE 2: JAMESTOWN RESERVOIR

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		SECTION D: EARTHWORKS					
	SANS 1200 C	SITE CLEARANCE					
	8.2.1	Clear and Grub					
2: 1.1		Clear and grub reservoir site	m²	6,550.00			
	8.2.2	Remove and grub large trees and tree stumps of girth:					
2: 1.2		a) over 1m and up to and including 2m	No	2.00			
	SANS 1200 D	EARTHWORKS					
	8.3.1	SITE PREPARATION					
2: 1.3	8.3.1.2	Remove topsoil to nominal depth 150 mm, stock-pile, and maintain	m²	6,550.00			
	8.3.2	BULK EXCAVATION					
	PSD 8.3.2(a)	Excavate in all materials and use for embankment or backfill or dispose as ordered:					
2: 1.4		Levelling of site (cut to fill)-provisional	m³	2700.00			
2: 1.5		Remove excess or unsuitable material, where so ordered, and dispose of off site	m³	1500.00			
2: 1.6		Excavate for reservoir foundation, spread and compact on site. Stockpile suitable material, maintain and use for reservoir fill embankment.	m³	2,115.0			
	8.3.3(b)	Extra over for:					
2: 1.7		Hard rock excavation	m³	150.00			
2: 1.8		Boulder excavation	m³	30.00			
2: 1.9		Dewatering for reservoir excavation	Sum	1.00			
	8.3.4	IMPORTING OF MATERIALS					
2: 1.10		Importation of approved sand fill from commercial sources and stockpile on site (provisional)	m³	45.00			
	8.3.8	EXISTING SERVICES					
2: 1.11	8.3.8.1 c)	Excavate by hand in soft material to locate existing services	m³	5.00			
		BACKFILL AGAINST STRUCTURES					
2: 1.12	8.3.9	Extra over for backfilling reservoir excavation to NGL with selected granular fill compacted in layers, from excavation stockpile.	m³	250.00			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
		FINISHINGS					
	8.3.15	Construct reservoir fill embankment, compacted in layers, as per Drawings 5473-0-C101-T and 5473-0-C303-T					
2: 1.13		a) From onsite stockpile	m^3	2,100.0			
2: 1.14		b) From commercial sources	m^3	3,000.0			
2: 1.15	8.3.10	Topsoiling from stockpile	m^2	3,105.00			
2: 1.16	8.3.11	Grassing from stockpile	m^2	3,105.00			
2:1.17		Fynbos plants	m^2	3,105.00			
2.1.18		Walkway around reservoir circumference backfill top edge – 1m wide in 25MPa concrete (12.8m^3) 130mm thick with Mesh 500 and joints at 3.5m intervals.	Sum	1			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		STEEL PIPE WORK AND FITTINGS					
	DS 11	Supply and deliver Stainless steel 304 pipework as per Drawings 5473-0-C400-T, 5473-0-C401-T and 5473-0-C402-T including all necessary brackets, bolts, nuts,washers, gaskets, etc. Complete for:					
2: 2.1		ID No 1: 350mm Ø FLANGE ADAPTOR	No	10.0			
2: 2.2		ID No 2: 250mm Ø FLANGE ADAPTOR	No	8.0			
2: 2.3		ID No 3: 200mm Ø FLANGE ADAPTOR	No	2.0			
2: 2.4		ID No 4: 350mmØ x 250mmØ FLANGED REDUCING TEE (510mm x 510mm)	No	3.0			
2: 2.5		ID No 5: 350mmØ FLANGED STRAIGHT PIPE (785mm)	No	1.0			
2: 2.6		ID No 6: 350mmØ FLANGED 90° BEND (710mm x 710mm)	No	2.0			
2: 2.7		ID No 7: 350mmØ STRAIGHT PIPE FLANGED AT ONE END, INCLUDING PUDDLE FLANGE (1915mm)	No	1.0			
2: 2.8		ID No 11: 350mmØ FLANGED STRAIGHT PIPE (1245mm)	No	1.0			
2: 2.9		ID No 15: 350mmØ FLANGED STRAIGHT PIPE (1645mm)	No	1.0			
2: 2.10		ID No 16: 350mmØ PUDDLE PIPE (1530mm)	No	2.0			
2: 2.11		ID No 17: 350mmØ STRAIGHT PIPE FLANGED AT ONE END, INCLUDING PUDDLE FLANGE (970mm)	No	1.0			
2: 2.12		ID No 18: 350mmØ FLANGED STRAIGHT PIPE (960mm)	No	1.0			
2: 2.13		ID No 19: 350mmØ FLANGED STRAIGHT PIPE (1685mm)	No	1.0			
2: 2.14		ID No 21: 250mmØ FLANGED 90° BEND (510mm x 510mm)	No	3.0			
2: 2.15		ID No 22: 250mmØ FLANGED STRAIGHT PIPE (1275mm)	No	1.0			
2: 2.16		ID No 23: 250mmØ FLANGED STRAIGHT PIPE (1025mm)	No	1.0			
2: 2.17		ID No 24: 250mmØ FLANGED EQUAL TEE (330mm x 330mm)	No	5.0			
2: 2.18		ID No 27: 250mmØ STRAIGHT PIPE FLANGED AT ONE END, INCLUDING PUDDLE FLANGE (985mm)	No	2.0			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
2: 2.19		ID No 28: 250mmØ FLANGED STRAIGHT PIPE (730mm)	No	1.0			
2: 2.20		ID No 29: 250mmØ FLANGED STRAIGHT PIPE (1025mm)	No	1.0			
2: 2.21		ID No 30: 250mmØ FLANGED STRAIGHT PIPE (525mm)	No	1.0			
2: 2.22		ID No 31: 250mmØ FLANGED REDUCING TEE (330mm x 330mm)	No	1.0			
2: 2.23		ID No 32: 200mmØ FLANGED STRAIGHT PIPE (1090mm)	No	1.0			
2: 2.24		ID No 33: 200mmØ FLANGED STRAIGHT PIPE (615mm)	No	1.0			
2: 2.25		ID No 34: 200mmØ STRAIGHT PIPE FLANGED AT ONE END, INCLUDING PUDDLE FLANGE (985mm)	No	1.0			
2: 2.26		ID No 35: 250mmØ FLANGED STRAIGHT PIPE (1985mm)	No	1.0			
2: 2.27		ID No 36: 250mmØ FLANGED STRAIGHT PIPE (1100mm)	No	1.0			
2: 2.28		ID No 37: 250mmØ FLANGED STRAIGHT PIPE (1410mm)	No	1.0			
2: 2.29		ID No 38: 250mmØ STRAIGHT PIPE FLANGED AT ONE END, INCLUDING PUDDLE FLANGE (1715mm)	No	1.0			
2: 2.30		ID No 39: 250mmØ FLANGED STRAIGHT PIPE (815mm)	No	1.0			
2: 2.31		ID No 40: 250mmØ FLANGED STRAIGHT PIPE (790mm)	No	1.0			
2: 2.32		ID No 41: 250mmØ PUDDLE PIPE (945mm)	No	1.0			
2: 2.33		ID No 42: 350mmØ FLANGED EQUAL TEE (510mm x 510mm)	No	2.0			
2: 2.34		ID No 43: 350mmØ FLANGED STRAIGHT PIPE (1000mm)	No	2.0			
2: 2.35		ID No 44: 250mmØ FLANGED STRAIGHT PIPE (1360mm)	No	1.0			
2: 2.36		ID No 45: 100mmØ FLANGED STRAIGHT PIPE - SEE DETAIL (200mm)	No	2.0			
2: 2.37		ID No 48: 80mmØ FLANGED STRAIGHT PIPE - SEE DETAIL (200mm)	No	1.0			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
		Supply and deliver Stainless steel 304 pipework as per Drawings 5473-0-C403-T, including all necessary brackets, bolts, nuts,washers, gaskets, etc. Complete for:					
2: 2.38		ID No 1: 250mm Ø FLANGE ADAPTOR	No	4.0			
2: 2.39		ID No 2: 250mmØ STRAIGHT PIPE FLANGED AT ONE END, INCLUDING PUDDLE FLANGE (1000mm)	No	2.0			
2: 2.40		ID No 5: 250mmØ FLANGED EQUAL TEE (330mm x 330mm)	No	1.0			
2: 2.41		ID No 6: 350mmØ x 250mmØ FLANGED CONCRENTRIC REDUCER (250mm)	No	1.0			
2: 2.42		ID No 7: 350mm Ø FLANGE ADAPTOR	No	2.0			
2: 2.43		ID No 8: 350mmØ STRAIGHT PIPE FLANGED AT ONE END, INCLUDING PUDDLE FLANGE (950mm)	No	1.0			
		Supply and deliver Stainless steel 304 pipework as per Drawings 5473-0-C403-T, including all necessary brackets, bolts, nuts,washers, gaskets, etc. Complete for:					
2: 2.44		ID No 1: 250mm Ø FLANGE ADAPTOR	No	4.0			
2: 2.45		ID No 2: 250mmØ STRAIGHT PIPE FLANGED AT ONE END, INCLUDING PUDDLE FLANGE (1000mm)	No	2.0			
2: 2.46		ID No 4: 250mmØ FLANGED STRAIGHT PIPE (1025mm)	No	1.0			
		Supply and deliver Stainless steel 304 pipework as per Drawings 5473-0-C300-T and 5473-0-C301-T including all necessary brackets, bolts, nuts,washers, gaskets, etc. Complete for:					
2: 2.47		ID No 1: 350mm Ø FLANGE ADAPTOR	No	4.0			
2: 2.48		ID No 2: 350mmØ x 250mmØ FLANGED CONCRENTRIC REDUCER (400mm)	No	4.0			
2: 2.49		ID No 5: 250mmØ FLANGED STRAIGHT PIPE (1025mm)	No	2.0			
2: 2.50		ID No 7: 250mmØ FLANGED STRAIGHT PIPE (525mm)	No	2.0			
2: 2.51		ID No 8: 350mmØ x 250mmØ FLANGED REDUCING TEE (510mm x 510mm)	No	2.0			
2: 2.52		ID No 10: 350mmØ FLANGED STRAIGHT PIPE, INCLUDING PUDDLE FLANGE (950mm)	No	4.0			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
2: 2.53		ID No 11: 100mmØ FLANGED STRAIGHT PIPE - SEE DETAIL (200mm)	No	2.0			
2: 2.54		ID No 15: 250mm Ø FLANGE ADAPTOR	No	2.0			
2: 2.55		ID No 16: 250mmØ FLANGED EQUAL TEE (330mm x 330mm)	No	1.0			
2: 2.56		ID No 17: 250mmØ FLANGED STRAIGHT PIPE, INCLUDING PUDDLE FLANGE (950mm)	No	1.0			
2: 2.57		ID No 18: 300mmØ x 250mmØ FLANGED ECCENTRIC REDUCER (250mm)	No	1.0			
2: 2.58		ID No 19: 300mmØ FLANGED STRAIGHT PIPE (920mm)	No	1.0			
2: 2.59		ID No 20: 300mm Ø FLANGE ADAPTOR	No	1.0			
2: 2.60		ID No 21: 350mmØ FLANGED EQUAL TEE (510mm x 510mm)	No	2.0			
		Supply and deliver Stainless steel 304 pipework as per Drawings 5473-0-C302-T including all necessary brackets, bolts, nuts,washers, gaskets, etc. Complete for:					
2: 2.61		ID No 2: 250mmØ FLANGED STRAIGHT PIPE, INCLUDING PUDDLE FLANGE (750mm)	No	1.0			
2: 2.62		ID No 3: 150mmØ FLANGED 90° BEND (475mm x 475mm)	No	1.0			
2: 2.63		ID No 4: 350mmØ x 150mmØ FLANGED CONCRENTRIC REDUCER (400mm)	No	1.0			
2: 2.64		ID No 5: 350mmØ FLANGED STRAIGHT PIPE (1730mm)	No	1.0			
2: 2.65		ID No 6: 350mmØ FLANGED 90° BEND (1065mm x 1065mm)	No	1.0			
2: 2.66		ID No 7: 350mm Ø FLANGE ADAPTOR	No	1.0			
2: 2.67	DS 11	Erection and installation of equipment supplied under item 2.2 complete as per specification	Sum	1.0			
2: 2.68	DS 11	Commission and testing of all equipment under item 2.2. Refer to Clause DS 11.0 of the specification.	Sum	1.0			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		VALVES AND METERS					
	DS 11	The following Items to be supplied and installed with reference to Drawings 5473-0-C400-T, 5473-0-C401-T and 5473-0-C402-T and the relevant project specifications:					
2: 3.1		ID No 8: 350mm Ø WAFER BUTTERFLY VALVE WITH GEARBOX AND HAND WHEEL (80mm)	No	4.0			
2: 3.2		ID No 9: 250mm Ø WAFER BUTTERFLY VALVE WITH GEARBOX AND HAND WHEEL (68mm)	No	11.0			
2: 3.3		ID No 10: 200mm Ø WAFER BUTTERFLY VALVE WITH GEARBOX AND HAND WHEEL (60mm)	No	2.0			
2: 3.4		ID No 12: 350mm Ø FLANGED ELECTROMAGNETIC FLOW METER (550mm)	No	1.0			
2: 3.5		ID No 13: 250mm Ø FLANGED ELECTROMAGNETIC FLOW METER (450mm)	No	2.0			
2: 3.6		ID No 14: 200mm Ø FLANGED ELECTROMAGNETIC FLOW METER (350mm)	No	1.0			
2: 3.7		ID No 20: 350mm Ø FLANGED BALL CHECK VALVE (800mm)	No	1.0			
2: 3.8		ID No 25: 250mm Ø FLANGED PRESSURE REDUCING VALVE (730mm)	No	3.0			
2: 3.9		ID No 26: 250mm Ø FLANGED BALL CHECK VALVE (600mm)	No	3.0			
2: 3.10		ID No 46: 100mm Ø FLANGED GATE VALVE (190mm)	No	2.0			
2: 3.11		ID No 47:100mm Ø FLANGED VENT - O - MAT SERIES RBxb AIR VALVE (OR SIMILAR APPROVED BY EA) (475mm)	No	2.0			
2: 3.12		ID No 49: 80mm Ø FLANGED GATE VALVE (180mm)	No	1.0			
2: 3.13		ID No 50: 80mm Ø FLANGED VENT - O - MAT SERIES RBxb AIR VALVE (OR SIMILAR APPROVED BY EA) (460mm)	No	1.0			
		The following Items to be supplied and installed with reference to Drawings 5473-0-C403-T and the relevant project specifications :					
2: 3.14		ID No 3: 250mm Ø FLANGED GATE VALVE (250mm)	No	3.0			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
2: 3.15		ID No 4: 250mm Ø FLANGED BALL CHECK VALVE (600mm)	No	1.0			
		The following Items to be supplied and installed with reference to Drawings 5473-0-C403-T and the relevant project specifications :					
2: 3.16		ID No 3: 250mm Ø FLANGED ELECTROMAGNETIC FLOW METER (450mm)	No	1.0			
2: 3.17		ID No 5: 250mm Ø FLANGED BALL CHECK VALVE (600mm)	No	1.0			
		The following Items to be supplied and installed with reference to Drawings 5473-0-C300-T,5473-0-C301-T and the relevant project specifications :					
2: 3.18		ID No 4: 250mm Ø FLANGED GATE VALVE (250mm)	No	7.0			
2: 3.19		ID No 6: 250mm Ø FLANGED ELECTROMAGNETIC FLOW METER (450mm)	No	2.0			
2: 3.20		ID No 9: 250mm Ø FLANGED PRESSURE REDUCING VALVE (730mm)	No	1.0			
2: 3.21		ID No 12: 100mm Ø FLANGED GATE VALVE (190mm)	No	2.0			
2: 3.22		ID No 13:100mm Ø FLANGED VENT - O - MAT SERIES RBxb AIR VALVE (OR SIMILAR APPROVED BY EA) (475mm)	No	2.0			
		The following Items to be supplied and installed with reference to Drawings 5473-0-C302-T and the relevant project specifications :					
2: 3.23		ID No 1: 150mm Ø FLOAT CONTROLLED EQUILIBRIUM VALVE - LEVELDEX OR EQUAL APPROVED	No	1.0			
2: 3.24	DS 11	Commission and testing of all equipment under item 2.3. Refer to Clause DS 11.0 of the specification.	Sum	1.0			
2: 3.25	DS 11	Commission and testing of all equipment under item 2.3. Refer to Clause DS 11.0 of the specification.	Sum	1.0			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		SECTION: MISCELLANEOUS					
		SUBSOIL DRAINAGE					
	SANS 1200 DB	SECTION DB : EARTHWORKS (PIPE TRENCHES)					
	8.3.2	Excavate in all materials for trenches, dewater, backfill, compact, and dispose of surplus or unsuitable material within pipe servitude, including shoring:					
		1. For Pipe Diameters up 110mm, for Trench Depths:					
2: 4.1		a) Exceeding 1.0m up to 2.0m	m	21.00			
2: 4.2		b) Exceeding 2.0m up to 3.0m	m	17.00			
		2. For Pipe Diameters up 160mm, for Trench Depths:					
2: 4.3		a) Exceeding 2.0m up to 3.0m	m	15.0			
	SANS 1200LB	SECTION LB: BEDDING					
		PROVISION OF BEDDING					
	8.2.1	Provision of bedding from trench excavation, compacted to 93% of MOD AASHTO density (100% for sand):					
2: 4.4		a) Selected granular material	m^3	12.0		Rate Only	
2: 4.5		b) Selected fill material	m^3	8.0		Rate Only	
	8.2.2.3	Provision of bedding by importation from commercial sources, compacted to 93% of MOD AASHTO density (100% for sand):					
2: 4.6		a) Selected granular material	m^3	12.0			
2: 4.7		b) Selected fill material	m^3	8.0			
	SANS 1200LE	SECTION LD: SEWERS					
		PIPE LAYING					
	8.2.1	Supply, handle, lay, bed (flexible pipe bedding) joint, test, and survey pipes complete with couplings:					
		a) uPVC Class 6 with couplings and fittings for the following pipe diameter:					
2: 4.8		i) 110mm diam.	m	100.0			
2: 4.9		ii) 110 mm diam. - 11,25° or 22,5° Bends	No	2.0			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
2: 4.10		iii) 160 x 110mm diameter Reducing Y-junction	No	2.0			
2: 4.11		iv) 160mm diam.	m	30.0			
2: 4.12		v) 160mm diam. - 45° Bend	No	1.0			
2: 4.13		vi) 110mm diam. - 45° Bend	No	2.0			
		RODDING EYES					
2: 4.14		Supply all fittings and construct Rodding Eye complete as per Drawings, including concrete, DI frame and cover, inside reservoir site as instructed by Employers Agent. Refer drawing 5473-0-C405-T.	No	1.0			
		CHAMBERS					
		Construct chambers as per details on respective drawings Drawings					
2: 4.15		a) New Reservoir combination chamber as per drawing 5473-0-C300-T and 5473-0-C301-T	Sum	1.0			
2: 4.16		b) Existing Reservoir combination chamber as per drawing 5473-0-C400-T, 5473-0-C401-T, 5473-0-C402-T.	Sum	1.0			
2: 4.17		c) Discharge Tie-in chamber, constructed to 250mm above NGL. Unknown pipe depth, Assume 1.5m total chamber height.	Sum	1.0			
2: 4.18		d) Valve and flow meter chamber, constructed to 250mm above NGL. Unknown pipe depth, Assume 1.5m total chamber height.	Sum	1.0			
		RESERVOIR PIPEWORK					
	SANS 1200 DB	SECTION DB : EARTHWORKS (PIPE TRENCHES)					
		EXCAVATION					
	8.3.2	Excavate in all materials for trenches, dewater, backfill, compact, and dispose of surplus or unsuitable material within pipe servitude, including shoring:					
		1. For Pipe Diameters up 355mm, for Trench Depths:					
2: 4.19		a) Exceeding 1.0m up to 2.0m	m	87.0			
2: 4.20		b) Exceeding 2.0m up to 3.0m	m	3.0			
		2. For Pipe Diameters up 315mm, for Trench Depths:					
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
2: 4.21		a) Exceeding 1.0m up to 2.0m	m	10.0			
2: 4.22		b) Exceeding 2.0m up to 3.0m	m	2.0			
	SANS 1200L	SECTION L: MEDIUM PRESSURE PIPELINES					
		PIPE LAYING					
	PSL 8.2.1	Supply, Handle, lay, bed (flexible pipe bedding) joint, test, and survey pipes complete with couplings:					
		a) HDPE PN16, PE 100					
2: 4.23		i) 355mm diam.	m	100.0			
2: 4.24		ii) 315mm diam.	m	12.0			
2: 4.25		iii) 250mm diam.	m	10.0			
		BENDS AND SPECIALS					
	8.2.2	Extra-over clause 8.2.1 for the Supply, Laying and Bedding of specials complete:					
		1. 355mm diam. HDPE Bends, Class PN16:					
2: 4.26		a) Spigot and Socket 90°	No	2.0			
2: 4.27		b) Spigot and Socket 45°	No	2.0			
2: 4.28		c) Spigot and Socket 22.5°	No	2.0			
2: 4.29		d) Spigot and Socket 11.25°	No	1.0			
		2. 315mm diam. HDPE Bends, Class PN16:					
2: 4.30		a) Spigot and Socket 90°	No	1.0			
		3. Fabricated HDPE Bends, Class PN16, as per Drawings 5473-0-C300-T, 5473-0-C301-T and 5473-0-C302-T.					
2: 4.31		ID No 1: 355mm Ø combination bend and bellmouth as shown for outlet pipe	No	1.0			
2: 4.32		ID No 14: 250mm Ø combination bend and bellmouth as shown for scour pipe	No	1.0			
2: 4.33		315mm Ø Combination bend and bellmouth as shown for overflow pipe	No	1.0			
	SANS 1200LB	SECTION LB: BEDDING					
		PROVISION OF BEDDING					
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
	8.2.1	Provision of bedding from trench excavation, compacted to 93% of MOD AASHTO density (100% for sand):					
2: 4.34		a) Selected granular material	m³	45.0		Rate Only	
2: 4.35		b) Selected fill material	m³	20.0		Rate Only	
	8.2.2.3	Provision of bedding by importation from commercial sources, compacted to 93% of MOD AASHTO density (100% for sand):					
2: 4.36		a) Selected granular material	m³	45.0			
2: 4.37		b) Selected fill material	m³	20.0			
		RESERVOIR FENCE AND GATE					
2: 4.38		Suppy and install 260m fence and gate as per drawing 5473-0-C404-T	Sum	1.0			
		TELEMETRY SLEEVE					
	SANS 1200 DB	SECTION DB : EARTHWORKS (PIPE TRENCHES)					
		EXCAVATION					
	8.3.2	Excavate in all materials for trenches, dewater, backfill, compact, and dispose of surplus or unsuitable material within pipe servitude, including shoring:					
		1. For Pipe Diameters up 160mm, for Trench Depths:					
2: 4.39		a) Exceeding 1.0m up to 2.0m	m	400.0			
	SANS 1200L	SECTION L: MEDIUM PRESSURE PIPELINES					
		PIPE LAYING					
	PSL 8.2.1	Supply, Handle, lay, bed (flexible pipe bedding) joint, test, and survey pipes complete with couplings:					
		a) HDPE PN3.2, PE 63					
2: 4.40		i) 160mm diam.	m	400.0			
		BENDS AND SPECIALS					
	8.2.2	Extra-over clause 8.2.1 for the Supply, Laying and Bedding of specials complete:					
		1. 160mm diam. HDPE Bends, Class PN3.2:					
2: 4.41		a) Spigot and Socket 90°	No	2.0			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
2: 4.42		b) Spigot and Socket 45°	No	2.0			
2: 4.43		c) Spigot and Socket 22.5°	No	2.0			
2: 4.44		d) Spigot and Socket 11.25°	No	4.0			
	SANS 1200LB	SECTION LB: BEDDING					
		PROVISION OF BEDDING					
	8.2.1	Provision of bedding from trench excavation, compacted to 93% of MOD AASHTO density (100% for sand):					
2: 4.45		a) Selected granular material	m³	102.0		Rate Only	
2: 4.46		b) Selected fill material	m³	61.0		Rate Only	
	8.2.2.3	Provision of bedding by importation from commercial sources, compacted to 93% of MOD AASHTO density (100% for sand):					
2: 4.47		a) Selected granular material	m³	102.0			
2: 4.48		b) Selected fill material	m³	61.0			
Total Carried Forward To Summary						0	00

SCHEDUILE 3: WATER PRESSURE MAIN - INFLOW

SECTION C : SITE CLEARANCE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 C	SECTION C : SITE CLEARANCE					
	PSC 8.2.1	Clear and grub:					
		a) Route for new inflow Rising Main					
3: 1.1		i) Grassland and scattered bush	m	42.00			
	PSC 8.2.5	Protect/Reinstate fences:					
3: 1.2		a) that intersect the pipe routes	No	2.0			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 DB	SECTION DB : EARTHWORKS (PIPE TRENCHES)					
		SITE PREPARATION					
3: 2.1	PSDB 8.3.1	Remove topsoil along pipe route to a nominal depth of 150mm, stockpile within freehaul distance and maintain	m²	42.00			
3: 2.2	PSDB 8.3.1	Strip and conserve gravel in roadways to a nominal depth of 300 mm	m²	493.00			
3: 2.3		Strip and conserve block pavers in roadways and stockpile within freehaul distance and maintain	m²	38.0			
		EXCAVATION					
	8.3.2	Excavate in all materials for trenches, dewater, backfill, compact, and dispose of surplus or unsuitable material within pipe servitude, including shoring:					
		For Pipe Diameters up 355mm, for Trench Depths:					
3: 2.4		a) Exceeding 1.0m up to 2.0m	m	468.00			
3: 2.5		c) Exceeding 2.0m up to 3.0m	m	67.00			
	PSDB 8.3.2 (b)	Extra-over Payment Items 8.3.2 for:					
3: 2.6		a) Hard rock excavation (provisional)	m³	100.00			
3: 2.7		b) Boulder Excavation (provisional)	m³	100.00			
3: 2.8	8.3.2(c)	Excavate and dispose of unsuitable material from the trench bottom (provisional)	m³	50.00			
	8.3.3.4	Overhaul					
3: 2.9		a) Limited overhaul (provisional)	m³	334.00			
3: 2.10	PSDB 8.3.4 (c)	Excavate by hand in all materials to verify existing service and backfill	m³	40.00			
		PROTECTION OF UNDERGROUND SERVICES					
	8.3.5	Existing services that adjoin or intersect a trench					
	8.3.5 (a)	a) Services that intersect a trench:					
3: 2.11		(i) Telecoms cables	No	1.00		Rate Only	
3: 2.12		(ii) Overhead telecoms cables	No	1.00			
3: 2.13		(iii) Electrical Cables	No	1.00			
3: 2.14		(iv) Overhead power lines	No	1.00			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
3: 2.15		(v) Irrgation pipes up to 100mm diam.	No	1.00			
3: 2.16		(vi) Water pipes up to 250mm diameter	No	5.00			
3: 2.17		(vii) Stormwater pipes up to 400mm diameter	No	1.00			
		b) Services that adjoin a trench:					
3: 2.18		(i) Telecoms cables	m	1.00			
3: 2.19		(ii) Electrical cables	m	1.00			
3: 2.20		(iii) Irrigation pipes up to 100mm diam.	m	1.00			
3: 2.21		(iv) Watermains up to 250mm diameter	m	1.00			
3: 2.22		(iv) Stormwater pipes up to 400mm diameter	m	1.00			
		FINISHING					
	8.3.6.1	Reinstate road surface complete with all courses:					
3: 2.23		a) Gravel	m²	493.00			
3: 2.24		b) Block paving in roadway	m²	38.0			
3: 2.25	8.3.6.1	Restore topsoil along pipe routes from stockpile	m²	42.00			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200L	SECTION L: MEDIUM PRESSURE PIPELINES					
		PIPE LAYING					
	PSL 8.2.1	Supply					
		a) HDPE PN16, PE 100					
3: 3.1		i) 355mm diam.	m	541.0			
	PSL 8.2.1	Handle, lay, bed (flexible pipe bedding) joint, test, and survey pipes complete with couplings:					
		a) HDPE PN16, PE 100					
3: 3.2		i) 355mm diam.	m	541.00			
		BENDS AND SPECIALS					
	8.2.2	Extra-over clause 8.2.1 for the Supply, Laying and Bedding of specials complete:					
		355mm diam. HDPE Bends, Class PN16:					
3: 3.3		a) Spigot and Socket 90°	No	5.00			
3: 3.4		b) Spigot and Socket 45°	No	5.00			
3: 3.5		b) Spigot and Socket 22.5°	No	1.00			
3: 3.6		c) Spigot and Socket 11.25°	No	4.00			
		VALVES AND FITTINGS					
	8.2.3	Extra over clause PSL 8.2.1. for the supply, bedding and fixing of valves and fittings:					
		Air valve, Vent-O-Mat RGX or equal approved including isolating valve and riser and connection pipework as per drawing 5473-0-C405-T:					
3: 3.7		a) 100 mm, PN 16 Air Valve	No	2.00			
		Steel equal tee, complete with couplings and flanged branch, including end plate with stub to receive air valve:					
3: 3.8		a) 355 x 355 x 100 mm, flanged	No	2.00			
		VJ-type mechanical coupling, Class 16:					
3: 3.9		a) 355 mm diam.	No	4.00			
		STRUCTURES					
3: 3.10	PSL 8.2.11	Thrust Blocks and anchor blocks	m^3	150.00			
3: 3.11	PSL 8.2.16	Marker Posts	No	10.00			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
	8.2.13	Valve Chambers					
		Valve chamber complete as shown on drawings:					
3: 3.12		a) Air valve chamber as per Drawing 5473-0-C405-T	No	2.00			
		SUNDRIES					
	PSL 8.2.17	Connections to existing mains:					
		a) Connect to existing Rising Main, including couplings:					
3: 3.13		i) 355 mm diam.	No	1.00			
Total Carried Forward To Summary						0	00

SCHEDUILE 3: WATER PRESSURE MAIN - INFLOW

SECTION LB: BEDDING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200LB	SECTION LB: BEDDING					
		PROVISION OF BEDDING					
	8.2.1	Provision of bedding from trench excavation, compacted to 93% of MOD AASHTO density (100% for sand):					
3: 4.1		a) Selected granular material	m³	232.00			
3: 4.2		b) Selected fill material	m³	103.00			
	8.2.2.3	Provision of bedding by importation from commercial sources, compacted to 93% of MOD AASHTO density (100% for sand):					
3: 4.3		a) Selected granular material	m³	232.00			
3: 4.4		b) Selected fill material	m³	103.00			
Total Carried Forward To Summary						0	00

SCHEDUILE 4: WATER PRESSURE MAIN - OUTFLOW

SECTION C : SITE CLEARANCE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 C	SECTION C : SITE CLEARANCE					
	PSC 8.2.1	Clear and grub:					
		a) Route for new inflow Rising Main					
4: 1.1		i) Grassland and scattered bush	m	180.00			
	PSC 8.2.5	Protect/Reinstate fences:					
4: 1.2		a) that intersect the pipe routes	No	2.0			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 DB	SECTION DB : EARTHWORKS (PIPE TRENCHES)					
		SITE PREPARATION					
4: 2.1	PSDB 8.3.1	Remove topsoil along pipe route to a nominal depth of 150mm, stockpile within free haul distance and maintain	m²	180.00			
4: 2.2	PSDB 8.3.1	Strip and conserve gravel in roadways to a nominal depth of 300 mm	m²	288.00			
4: 2.3		Strip and conserve block pavers in roadways and stockpile within free haul distance and maintain	m²	42.0			
		EXCAVATION					
	8.3.2	Excavate in all materials for trenches, dewater, backfill, compact, and dispose of surplus or unsuitable material within pipe servitude, including shoring:					
		For Pipe Diameters up 355mm, for Trench Depths:					
4: 2.4		a) Up to 1.0m	m	31.0			
4: 2.5		a) Exceeding 1.0m up to 2.0m	m	292.00			
4: 2.6		c) Exceeding 2.0m up to 3.0m	m	146.00			
	PSDB 8.3.2 (b)	Extra-over Payment Items 8.3.2 for:					
4: 2.7		a) Hard rock excavation (provisional)	m³	100.00			
4: 2.8		b) Boulder Excavation (provisional)	m³	100.00			
4: 2.9	8.3.2(c)	Excavate and dispose of unsuitable material from the trench bottom (provisional)	m³	50.00			
	8.3.3.4	Overhaul					
4: 2.10		a) Limited overhaul (provisional)	m³	292.00			
4: 2.11	PSDB 8.3.4 (c)	Excavate by hand in all materials to verify existing service and backfill	m³	40.00			
		PROTECTION OF UNDERGROUND SERVICES					
	8.3.5	Existing services that adjoin or intersect a trench					
	8.3.5 (a)	a) Services that intersect a trench:					
4: 2.12		(i) Telecoms cables	No	1.00		Rate Only	
4: 2.13		(ii) Overhead telecoms cables	No	1.00			
Total Carried Forward						0	00

SCHEDUILE 4: WATER PRESSURE MAIN - OUTFLOW

SECTION DB : EARTHWORKS (PIPE TRENCHES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
4: 2.14		(iii) Electrical Cables	No	1.00			
4: 2.15		(iv) Overhead power lines	No	1.00			
4: 2.16		(v) Irrigation pipes up to 100mm diam.	No	1.00			
4: 2.17		(vi) Water pipes up to 250mm diameter	No	3.00			
4: 2.18		(vii) Stormwater pipes up to 400mm diameter	No	1.00			
		b) Services that adjoin a trench:					
4: 2.19		(i) Telecoms cables	m	1.00			
4: 2.20		(ii) Electrical cables	m	1.00			
4: 2.21		(iii) Irrigation pipes up to 100mm diam.	m	1.00			
4: 2.22		(iv) Watermains up to 250mm diameter	m	1.00			
4: 2.23		(iv) Stormwater pipes up to 400mm diameter	m	1.00			
		FINISHING					
	8.3.6.1	Reinstate road surface complete with all courses:					
4: 2.24		a) Gravel	m²	288.00			
4: 2.25		b) Block paving in roadway	m²	42.00			
4: 2.26	8.3.6.1	Restore topsoil along pipe routes from stockpile	m²	180.00			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200L	SECTION L: MEDIUM PRESSURE PIPELINES					
		PIPE LAYING					
	PSL 8.2.1	Supply					
		a) HDPE PN16, PE 100					
4: 3.1		i) 355mm diam.	m	467.0			
	PSL 8.2.1	Handle, lay, bed (flexible pipe bedding) joint, test, and survey pipes complete with couplings:					
		a) HDPE PN16, PE 100					
4: 3.2		i) 355mm diam.	m	467.00			
		BENDS AND SPECIALS					
	8.2.2	Extra-over clause 8.2.1 for the Supply, Laying and Bedding of specials complete:					
		355mm diam. HDPE Bends, Class PN16:					
4: 3.3		a) Spigot and Socket 90°	No	6.00			
4: 3.4		b) Spigot and Socket 45°	No	3.00			
4: 3.5		b) Spigot and Socket 22.5°	No	2.00			
4: 3.6		c) Spigot and Socket 11.25°	No	4.00			
		VALVES AND FITTINGS					
	8.2.3	Extra over clause PSL 8.2.1. for the supply, bedding and fixing of valves and fittings:					
		Air valve, Vent-O-Mat RGX or equal approved including isolating valve and riser and connection pipework as per drawing 5473-0-C405-T:					
4: 3.7		a) 100 mm, PN 16 Air Valve	No	1.00			
		Steel equal tee, complete with couplings and flanged branch, including end plate with stub to receive air valve:					
4: 3.8		a) 355 x 355 x 100 mm, flanged	No	1.00			
		VJ-type mechanical coupling, Class 16:					
4: 3.9		a) 355 mm diam.	No	2.00			
		STRUCTURES					
4: 3.10	PSL 8.2.11	Thrust Blocks and anchor blocks	m^3	150.00			
4: 3.11	PSL 8.2.16	Marker Posts	No	10.00			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
	8.2.13	Valve Chambers					
		Valve chamber complete as shown on drawings:					
4: 3.12		a) Air valve chamber as per Drawing 5473-0-C405-T	No	1.00			
		SUNDRIES					
	PSL 8.2.17	Connections to existing mains:					
		a) Connect to existing pressure main, including couplings:					
4: 3.13		i) 250 mm diam.	No	1.00			
Total Carried Forward To Summary						0	00

SCHEDUILE 4: WATER PRESSURE MAIN - OUTFLOW

SECTION LB: BEDDING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200LB	SECTION LB: BEDDING					
		PROVISION OF BEDDING					
	8.2.1	Provision of bedding from trench excavation, compacted to 93% of MOD AASHTO density (100% for sand):					
4: 4.1		a) Selected granular material	m³	203.00			
4: 4.2		b) Selected fill material	m³	90.00			
	8.2.2.3	Provision of bedding by importation from commercial sources, compacted to 93% of MOD AASHTO density (100% for sand):					
4: 4.3		a) Selected granular material	m³	203.00			
4: 4.4		b) Selected fill material	m³	90.00			
Total Carried Forward To Summary						0	00

SCHEDULE 5: JAMESTOWN RESERVOIR SCOUR GRAVITY MAIN

SECTION C : SITE CLEARANCE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
5:1	SANS 1200 C	SECTION C : SITE CLEARANCE					
	PSC 8.2.1	Clear and grub:					
		a) Route for new Reservoir Scour Gravity Main					
5:1.1		i) Grassland and scattered bush	m	400.00			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 DB	SECTION DB : EARTHWORKS (PIPE TRENCHES)					
		SITE PREPARATION					
5: 2.1	PSDB 8.3.1	Remove topsoil along pipe route to a nominal depth of 150mm, stockpile within freehaul distance and maintain	m²	162.00			
5: 2.2	PSDB 8.3.1	Strip and conserve gravel in roadways to a nominal depth of 300 mm, stockpile within freehaul distance and maintain	m²	305.00			
5: 2.3		Strip and conserve block pavers in roadways and stockpile within freehaul distance and maintain	m²	20.0			
		EXCAVATION					
	8.3.2	Excavate in all materials for trenches, dewater, backfill, compact, and dispose of surplus or unsuitable material within pipe servitude, including shoring:					
		For Pipe Diameters up 250mm, for Trench Depths:					
5: 2.4		a) Up to 1.0m	m	17.00			
5: 2.5		b) Exceeding 1.0m up to 2.0m	m	295.00			
5: 2.6		c) Exceeding 2.0m up to 3.0m	m	155.00			
	PSDB 8.3.2 (b)	Extra-over Payment Items 8.3.2 for:					
5: 2.7		a) Hard rock excavation (provisional)	m³	100.00			
5: 2.8		b) Boulder Excavation (provisional)	m³	100.00			
5: 2.9	8.3.2(c)	Excavate and dispose of unsuitable material from the trench bottom (provisional)	m³	50.00			
	8.3.3.4	Overhaul					
5: 2.10		a) Limited overhaul (provisional)	m³	235.00			
5: 2.11	PSDB 8.3.4 (c)	Excavate by hand in all materials to verify existing service and backfill	m³	40.00			
		PROTECTION OF UNDERGROUND SERVICES					
	8.3.5	Existing services that adjoin or intersect a trench					
	8.3.5 (a)	a) Services that intersect a trench:					
5: 2.12		(i) Telecoms cables	No	1.00			
5: 2.13		(ii) Overhead telecoms cables	No	1.00			
Total Carried Forward						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward						0	00
5: 2.14		(iii) Electrical Cables	No	1.00			
5: 2.15		(iv) Overhead power lines	No	1.00			
5: 2.16		(v) Irrgation pipes up to 100mm diam.	No	1.00			
5: 2.17		(vi) Water pipes up to 250mm diameter	No	1.00			
5: 2.18		(vii) Stormwater pipes up to 400mm diameter	No	1.00			
		b) Services that adjoin a trench:					
5: 2.19		(i) Telecoms cables	m	1.00			
5: 2.20		(ii) Electrical cables	m	1.00			
5: 2.21		(iii) Irrigation pipes up to 100mm diam.	m	1.00			
5: 2.22		(iv) Watermains up to 250mm diameter	m	1.00			
5: 2.23		(iv) Stormwater pipes up to 400mm diameter	m	1.00			
		FINISHING					
	8.3.6.1	Reinstate road surface complete with all courses:					
5: 2.24		a) Gravel	m²	305.00			
5: 2.25		b) Block pavers in roadway	m²	20.00			
5: 2.26	8.3.6.1	Restore topsoil along pipe routes from stockpile	m²	162.00			
		TRAFFIC ACCOMODATION					
5: 2.27	8.3.7	Accommodation of traffic	Sum	1.00			
Total Carried Forward To Summary						0	00

SCHEDULE 5: JAMESTOWN RESERVOIR SCOUR GRAVITY MAIN

SECTION LB: BEDDING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200LB	SECTION LB: BEDDING					
		PROVISION OF BEDDING					
	8.2.1	Provision of bedding from trench excavation, compacted to 93% of MOD AASHTO density (100% for sand):					
5: 3.1		a) Selected granular material	m³	156.00			
5: 3.2		b) Selected fill material	m³	80.00			
	8.2.2.3	Provision of bedding by importation from commercial sources, compacted to 93% of MOD AASHTO density (100% for sand):					
5: 3.3		a) Selected granular material	m³	156.00			
5: 3.4		b) Selected fill material	m³	80.00			
Total Carried Forward To Summary						0	00

SCHEDULE 5: JAMESTOWN RESERVOIR SCOUR GRAVITY MAIN

SECTION LD: SEWERS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200LD	SECTION LD: SEWERS					
		PIPE LAYING					
	PSLD 8.2.1	Supply					
		a) uPVC Class 4 with couplings and fittings for the following pipe diameter:					
5: 4.1		i) 250mm diam.	m	467.00			
	PSLD 8.2.1	Handle, lay, bed (flexible pipe bedding) joint, test, and survey pipes complete with couplings:					
		a) uPVC Class 4					
5: 4.2		i) 250mm diam.	m	467.00			
		STRUCTURES					
	8.2.13	MH Chambers					
		1500mmø MH chambers complete as shown on drawing 5473-0-C404-T:					
5: 4.3		a) Exceeding 1.0m up to 2.0m	No	8.00			
5: 4.4		b) Exceeding 2.0m up to 3.0m	No	2.00			
		Headwall complete as shown on drawing 5473-0-C404-T					
5: 4.5		a) Up to 1.0m	No	1.0			
		SUNDRIES					
5: 4.6	PSL 8.2.17	Cut intersecting 200mmø pipe and connect to proposed MH	No	1.00			
SCHEDULE 6: SUNDRY ITEMS							
6		**SUNDRY ITEMS**					
6.1		Valve chambers as per dwg. 5473-0-C600					
6.1.1		Connection chamber	No	2			
6.1.2		Air valve chamber	No	4			
6.1.3		Valve chamber	No	4			
6.1.4		Valve-T-chamber	No	1			
6.1.5		Flow meter chamber	No	3			
6.2		Thrust blocks as per dwg. 5473-0-C601	m^3	9			
Total Carried Forward To Summary						0	00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
	SANS 1200 D	**SECTION: EARTHWORKS**				
	8.3	**Scheduled Items**				
7.1	8.3.1.2	Remove topsoil to nominal depth 150mm, stockpile and maintain or dispose within 1,0km.	m²	1 142		
7.2	8.3.3	a) Excavation for foundations	m³	113		
		b) Extra-over				
7.3		i) Intermediate excavation	m³	34		
7.4		i) Hard rock excavation	m³	23		
	8.3.4	Importing of materials				
7.5		a) G5 subbase compacted in layers not exceeding 150mm depth to 95% MOD AASHTO density	m³	171		
7.6	**8.2**	**Formwork**				
	8.2.1	Rough				
		i) Vertical faces				
7.6.1		a) Foundations	m²	63		
7.6.2		b) Cut-off beams	m²	22		
	8.2.2	Smooth				
		i) Vertical faces				
7.6.3		a) Beams and parapets	m²	156		
7.6.4		b) Walls	m²	1 679		
7.6.5		c) Circular columns	m²	123		
		ii) Horizontal faces				
7.6.6		a) Roof slab	m²	1 000		
		iii) Inclined faces				
7.6.7		a) Column drop heads	m²	26		
	8.2.6	Box out holes/form to voids				
7.6.8		d) Large, other than circular, of area over 0.1m^2 and to and including 0.5m^2	No.	5		
7.7	**8.3**	**Reinforcement**				
	8.3.1	a) High-tensile steel bars				
7.7.1		i) Foundations	t	28		
7.7.2		ii) Walls	t	59		
7.7.3		iii) Columns	t	2		
7.7.4		iv) Roof slab and beams	t	42		
Total Carried Forward						0.00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						0.00
		SITE PREPARATION				
7.7.5		b) Mild steel bars	t	7		
	8.3.2	High tensile welded mesh				
7.7.6		i) Mesh ref 617	m²	1 000		
7.7.7	PSG 8.3.4	Extra-over galvanizing of reinforcement	t	5		
7.8	**8.4**	**Concrete**				
7.8.1	8.4.1	20MPa no-fines blinding	m^3	91		
7.8.2	8.4.2	20MPa blinding and cut-off strips	m^3	49		
	PSG 8.4.3	35MPa Strength Concrete				
7.8.3		i) Foundations and surface beds	m^3	338		
7.8.4		ii) Walls	m^3	294		
7.8.5		iii) Columns and drop heads	m^3	15		
7.8.6		iv) Roof slab and beams	m^3	279		
	8.4.4	Unformed surface finishes				
		b) Steel-floated finish (Class I)				
7.8.7		i) Floor and foundations	m²	1 000		
7.8.8		ii) Walls and beams	m²	76		
7.8.9		iii) Roof slab	m²	908		
7.9	**8.5**	**Joints**				
7.9.1		i) Type A as per dwg 5473-ST-CO-100	m	216		
7.9.2		ii) Type B as per dwg 5473-ST-CO-100	m	108		
7.9.3		iii) Type C as dwg 5473-ST-CO-100	m	102		
7.9.4		iv) Type D as dwg 5473-ST-CO-100	m	200		
Total Carried Forward						0.00

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT R
Brought Forward						0.00
7.9.5		v) Type E as per dwg 5473-ST-CO-100	m	70		
7.9.6		vi) Type F as per dwg 5473-ST-CO-100	m	23		
7.9.7		vii) Roof construction joint as per dwg 5473-ST-CO-102	m	23		
7.9.8		viii) Sealing of box-outs as per dwg 5473-ST-CO-100	m	10		
7.10		Other items				
7.10.1	**PSG 8.9.1**	250micron DPM below surface bed	m^2	1 142		
7.10.2	**PSG 8.9.2**	Under floor drainage as per drawing as per drawing 5473-ST-CO-101	m	213		
7.10.3	**PSG 8.9.3**	3-ply Malthoid to top of walls	m	109		
7.10.4	**PSG 8.9.4**	100mm thick stone chip layer	m^3	100		
7.11	**SABS**	**SECTION: STRUCTURAL STEEL**				
	8.3.1	**Supply and Fabrication**				
	8.3.1.1	Preparation of shop detail drawings				
7.11.1		i) Cat ladders	Sum	1		
	PSH 8.3.1.2	Supply and fabrication of steelwork as per drawing 5473-ST-CO-102				
7.11.2		i) External galvanised mild steel catladder	No.	1.0		
7.11.3		ii) Internal Grade 316 stainless steel cat ladder	No.	1.0		
7.11.4		iii) Galvanised vent pipes and accessories	No.	7.0		
7.11.5		iv) Galvanised manhole covers with lock	No.	1.00		
7.11.6		v) 3mm galvanised mild steel downpipes with header box	No.	8		
7.11.7		vi) 100mm Full flow drainage outlet with grate (Saint Gobain Type 3550 or similar approved)	No.	8.0		
	8.3.6	Holding-down (HD) Bolts				
7.11.8		i) Galvanised M16 bolts	No.	18		
7.11.9		ii) Grade 316 stainless steel M16 bolts	No.	20		
Total Carried Forward To Summary						0.00

SUMMARY OF SCHEDULES

		Page No.		Amount R	c
1	SCHEDULE 1: GENERAL				
2	SCHEDULE 2: JAMESTOWN RESERVOIR				
3	SCHEDULE 3: WATER PRESSURE MAIN - INFLOW				
4	SCHEDULE 4: WATER PRESSURE MAIN - OUTFLOW				
5	SCHEDULE 5: JAMESTOWN RESERVOIR SCOUR GRAVITY MAIN				
6	SCHEDULE 6: SUNDRY ITEMS				
7	SCHEDULE 7: JAMESTOWN RESERVOIR STRUCTURAL				
	SUB-TOTAL	R			
	CONTINGENCIES Allow the sum of 10% (ten percent) of the above sub-total for contingencies to be spent as the Engineer may direct and to be deducted in whole or in part if not required.	R			
	SUB-TOTAL INCLUDING CONTINGENCIES	R			
	CONTRACT PRICE ADJUSTMENT Allow the provisional sum of 10% (ten percent of the above sub-total to allow for Contract Price Adjustment (CPA). The amount payable to the Contractor under this item shall be the actual final CPA as calculated in terms of clause 6.8 of the General Conditions of Contract	R			
	TOTAL INCLUDING CONTINGENCIES AND CPA	R			
	VALUE ADDED TAX ADD: VAT at the rate of 15%	R			
	Carried to part C1.1 Form of Offer and Acceptance		R		

Part C3: Scope of Work

Pages

C3.1 Description of the Works 175

C3.2 Engineering 178

C3.3 Procurement 181

C3.4 Construction 182

C3.5 Management 188

C3.6 Works Specifications 195

C3.7 Health and Safety Specifications 317

C3.8 Environmental Management Plan 318

C3.9 Annexes 319

Status

Should any requirement or provision in the parts of the Scope of Work conflict with any requirement of any Standardised Specification, or any drawings, the order of precedence, unless otherwise specified, is:

- Drawings
- Scope of Work
- SANS Standardised Specifications

C3.1 Description of the Works

1. EMPLOYER'S OBJECTIVES

The Employer's objective is to provide bulk water engineering services to augment the capacity of the existing municipal infrastructure and meet the needs of current and future development in the area.

2. OVERVIEW OF THE WORKS

The Stellenbosch Municipality Masterplan has identified the need for certain bulk infrastructure to be implemented to meet growing potable water needs in the Jamestown growth node.

This Contract is for the construction of the new bulk water infrastructure required. The work includes, but is not necessarily limited to:

- Construction of a new 5ML potable water reservoir;
- Construction of 2 x new 0.5 km x 315 mm diam. Water pressure main;
- Construction of a new 0.5km x 250 mm diam. gravity scour pipeline;
- Related ancillary works.

The above will entail:

Civil Works

- Clearance of the routes and sites and removal and preservation of topsoil and gravel in roadways;
- Excavation of trenches, including support and protection of existing services;
- Laying, bedding, jointing, testing of new pipelines;
- Installation of pipes by open trench excavation;
- Constructing valve chambers, manholes and thrust blocks;
- Connecting the new pipelines into the existing system with minimal disruption to service delivery;
- Bulk excavations for the potable water reservoir.
- Water retaining concrete works for the potable water reservoir;
- Backfilling, topsoiling and restoration of work areas;

Mechanical and Electrical Works

- Design, supply and installation of mechanical equipment, pipework and valves;
- Design, supply and installation of instrumentation;

All other work which, although not specifically mentioned, may be necessary for the proper performance of the work in this Contract.

The Works are described in detail on the drawings and the relevant sections of the Scope of Work.

3. LOCATION OF THE WORKS

The works are to be executed on a number of different sites in the Stellenbosch area (see Annexure 1: Site Locality Plan in Section C3.10).

Site conditions are described in detail in Section C4: Site Information.

4. TEMPORARY WORKS

4.1. Access Roads

Existing gravel roads provide access to certain points along the pipe route, however, the Contractor will be required to adequately clear and level the length of the pipeline routes to allow access for pipe deliveries and construction vehicles to all points along the routes.

4.2. River Crossings

If so required by the Contractor's work method, temporary bridges may be required to provide access across rivers. These bridges shall be designed and installed by the Contractor and removed after completion of the Works and shall be in accordance with the provisions in the Client's Water Use Licence for this project.

4.3. Temporary Pipework

The Contractor will be required to construct temporary pipework, end caps and restraints for pressure testing.

4.4. River Diversions and Dewatering

The Contractor will be required to design, construct and remove temporary river diversions and cofferdams to enable the construction of river crossings of pipelines.

The Contractor will also be required design, install, operate, maintain and remove dewatering facilities for deep excavations required for the reservoir and trenches.

4.5. Shoring of Excavations

The Contractor will be required to design and install adequate shoring for excavations. This will require special attention at the Jamestown 5ML reservoir, but will also apply to pipe trenches and other excavations. The pricing of shoring is to be included under the relevant items for earthworks.

4.6. Existing Services

The Contractor will be required to protect, and main existing services crossed, or where work takes place adjacent to existing services. Special precaution to be taken where existing services cross or are adjacent to deep trench conditions.

4.7. Formwork for concrete work

The Contractor will be required provide formwork for the concrete work. The pricing is to be included under the relevant items in the Schedule of Quantities.

5. CONSTRUCTION PROGRAMME

As soon as practicable after the acceptance of the Contractors Tender, prior to commencement of construction work but in any event within a period of fourteen (14) days after the Contractor has received the Letter of Acceptance, the Contractor shall submit his programme, as required in terms of Clause 5.6 of the GCC 2015, to the Employer's Agent for approval.

The programme shall further be explained clearly and in detail by methods statements and any other necessary information.

If the programme is to be revised by reason of the Contractor falling behind his programme, he shall produce a revised programme showing the modifications to the original programme necessary to ensure completion of the works or any part thereof within the time for completion as defined or any extended time granted.

Any proposal to increase the tempo of work must be accompanied by positive steps to increase production by providing more labour and plant to site, or by using the available labour and plant in a more efficient manner.

Failure on the part of the Contractor to submit or to work according to the programme or revised programmes shall be sufficient reason for the Employer to take necessary steps as provided for in the Conditions of Contract.

The approval of any programme by the Employer's Agent shall have no contractual significance other than that the Employer's Agent would be satisfied if the work is carried out according to such programme and that the Contractor undertakes to carry out the work in accordance with the programme. It shall not limit the right of the Employer's Agent to instruct the Contractor to vary the programme should circumstances make this necessary.

6. METHOD STATEMENT

A method statement clearly stating how the work will be executed including the resource to be employed shall be submitted together with the programme of Works.

The construction methods to be followed shall be environmentally friendly as far as possible. No construction methods that will result in long term or permanent damage to the surrounding natural environment shall be allowed.

C3.2 Engineering

1. DESIGN BY THE EMPLOYER'S AGENT

The Employer's Agent (on behalf of the Employer) has designed the permanent civil and structural works to be executed under this Contract.

In respect of the mechanical and electrical work, the Employer's Agent has determined the general performance requirements, specifications and general arrangement of the equipment required, however the detailed design shall be undertaken by the Contractor.

The Employer's Agent's design is documented on the drawings and in the Works Specifications which form part of this Procurement Document.

2. DESIGN BY THE CONTRACTOR

2.1. Mechanical and Electrical Works

The Contractor shall be responsible for the detailed design of mechanical and electrical plant and its installation to give effect to the Employer's Agent's performance criteria and specifications. This will include:

- The detailed design of all mechanical and electrical equipment in accordance with the general arrangements and specifications and criteria prepared by the Employer's Agent;
- The detailed design of all mounting brackets and frames, pipe supports and plinths required for the new mechanical and electrical equipment;
- The detailed design of all pipework and valves required within the various pump stations.
- The production of an operation and maintenance manual as specified.

Where adaptations of the Employer's Agent's design are necessary to meet the Contractor's specific requirements, approval shall be obtained from the Employer's Agent.

Where any alternative to the Works Specifications is agreed to, the onus shall be upon the Contractor to design such alternative, to the satisfaction of the Employer's Agent, to meet all performance and operational specifications given in the Works Specifications.

2.2. Alterations to Civil Works

The drawings will show all penetrations, plinths, ducts and sleeves which are anticipated will be necessary to accommodate the mechanical and electrical equipment.

The Contractor shall assess the sufficiency of these provisions and design any modifications or additions which may be necessary for his installation. All alterations required to the civil or structural works to accommodate the mechanical and electrical equipment shall be communicated to the Employer's Agent with the submission of the Contractor's design drawings.

2.3. Temporary Works

The Contractor shall be responsible for the design of all incidental temporary works such as shoring, scaffolding and formwork.

The Contractor shall be responsible for the design of all temporary works listed in Clause 4 of C3.1.

The Contractor shall also design all temporary arrangements for capping, and anchoring of unrestrained bends and temporary caps during the field pressure testing. The Employer's Agent will, on request, provide the magnitude of the forces to be resisted.

3. DRAWINGS PREPARED BY THE EMPLOYER'S AGENT

The Works shall be carried out in accordance with the following drawings, as well as any further drawings and instructions which may be issued by the Employer's Agent.

VOLUME 4

LOCALITY PLAN DRAWINGS

5473-0-C001	Locality Plan

SITE LAYOUT DRAWINGS

5473-0-C100	Site Layout - Bulk Water Infrastructure
5473-0-C101	Site Layout - Jamestown Reservoir
5473-0-C102	Site Layout - Decommission existing Reservoir

PLAN AND PROFILE DRAWINGS

5473-0-C200	Proposed 355mm Ø HDPE Inflow Rising Main LS (Sheet 1 of 2)
5473-0-C201	Proposed 355mm Ø HDPE Inflow Rising Main LS (Sheet 2 of 2)
5473-0-C202	Proposed 355mm Ø HDPE Outflow Pipeline LS (Sheet 1 of 2)
5473-0-C203	Proposed 355mm Ø HDPE Outflow Pipeline LS (Sheet 2 of 2)
5473-0-C204	Proposed 250mm Ø Scour Pipeline LS (Sheet 1 of 2)
5473-0-C205	Proposed 250mm Ø Scour Pipeline LS (Sheet 2 of 2)

JAMESTOWN 5ML RESERVOIR DRAWINGS

5473-0-C300	Outlet and Scour Details (sheet 1 of 2)
5473-0-C301	Outlet and Scour Details (sheet 2 of 2)
5473-0-C302	Inlet and overflow details
5473-0-C303	Reservoir plan and long section

SITE WORKS DETAILS

5473-0-C400	Site Works Details (Sheet 1 of 6)
5473-0-C401	Site Works Details (Sheet 2 of 6)
5473-0-C402	Site Works Details (Sheet 3 of 6)
5473-0-C403	Site Works Details (Sheet 4 of 6)
5473-0-C404	Site Works Details (Sheet 5 of 6)
5473-0-C405	Site Works Details (Sheet 6 of 6)

Three full-sized paper prints of each drawing will be issued to the Contractor, free of charge. The Contractor shall make any additional copies he may require at his own cost.

4. DRAWINGS PREPARED BY THE CONTRACTOR

4.1. Mechanical and Electrical Works

The Contractor shall be responsible for the production of the following drawings:

- General arrangements and details documenting the Contractor's design;
- Wiring diagrams and detailed electrical drawings as detailed in Portion 6 of Part 3.6 of this Contract;
- Fabrications drawings for pipework and sundry steelwork;
- As-built drawings documenting the mechanical and electrical works.

The Contractor shall also submit technical data sheets and performance curves for all equipment and instrumentation offered.

Drawings shall comply with the requirements given in the General Specifications for Mechanical and Electrical Work.

4.2. Temporary Works

On the Employer's Agent's request, the Contractor shall provide drawings and sketches showing the temporary works for approval.

4.3. Shop Details for Structural Steelwork

The Contractor shall be responsible for the production of all shop details for structural steelwork, in accordance with clause 5.1 of SANS 1200 H and/or SANS 1200 HA.

4.4. 'As-Built' Drawings

The Contractor shall record all amendments and deviations from the drawings issued at the start of the Contract. This shall be done on a set of drawings specially issued for this purpose. These shall be handed to the Employer's Agent on completion of the Works. The Certificate of Completion will not be issued without this information having been submitted to the Employer's Agent.

4.5. Employer's Agent's Approval

All drawings, schedules and technical data sheets pertaining to plant and equipment forming part of the permanent works shall be submitted to the Employer's Agent for approval, prior to placing firm orders or commencing manufacture.

Drawings issued to the Employer's Agent for approval shall be full size paper copies.

The Contractor shall allow for a period of 14 days, in his programme, for review of each submission by the Employer's Agent. The Contractor shall supply the Employer's Agent with supporting calculations or data if so requested.

The Employer's Agent's approval or acceptance of any drawings, method statement, design or document will not relieve the Contractor of his responsibilities in terms of the Contract and the Specification, neither will it relieve the Contractor of any liability in terms of Health and Safety, Environmental or any other legislation.

5. OPERATION AND MAINTENANCE MANUALS

The Contractor shall prepare operation and maintenance (O&M) manuals in respect of all mechanical and electrical plant supplied under this contract.

The manuals shall comply with the requirements given in the General Specifications for Mechanical and Electrical Work

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C3.3 Procurement

1. PREFERENTIAL PROCUREMENT PROCEDURES

The Contract will be awarded on the basis of price and preferences, preferences being awarded for the Contractors B-BBEE contributor level. The Contractor shall comply with the conditions associated with the granting of preferences given in the Preferencing Schedule.

2. SUBCONTRACTING

The selection of all subcontractors shall be subject to the approval of the Employer's Agent.

The Contractors attention is drawn to the diverse array of specialist work required under this contract. The Contractor shall form a Joint Venture with or engage suitably qualified and experienced sub-contractors to carry out all such specialist work.

Subcontractors shall have a CIDB grading appropriate to the class and value of the work to be undertaken by them.

The main Contractor or any subcontractor shall not undertake the mechanical work unless he has a CIDB contractor grading designation in the ME class of work appropriate to the value of the mechanical portion of the works.

Similarly, the main Contractor or any subcontractor shall not undertake the electrical work unless he has a CIDB contractor grading designation in the EE class of work appropriate to the value of the electrical portion of the works.

3. MANDATORY SUB-CONTRACTING

The following clause is NOT applicable to this tender "In terms of Regulation 9 of the Preferential Procurement Regulations, 2017, issued in terms of the Preferential Procurement Policy Framework Act (PPPFA) (Act No 5 of 2000), At least **30%** of the value of the Works shall be subcontracted to Exempt Micro-Enterprises (EMEs) or Qualifying Small Enterprises (QSEs) as defined in the PPPFA".

The Contractor shall identify suitable EMEs or QSEs from the National Treasury's Central supplier Database and/or the CIDB register of contractors when required.

A monthly report on payments made to designated sub-contractors shall be submitted to the Employer for monitoring compliance with this requirement.

4. EMPLOYMENT OF LOCAL COMMUNITY LABOUR

The maximum possible number of workers is to be employed from the labour lists provided by the Employer of the currently unemployed persons in the local community. To this end the Contractor is required to give preference to the use of local community labour and limit the use of non-local labour to key personnel only.

100% of all unskilled labour shall be sourced from the local community.
At least 10% of semi-skilled labour shall be sourced from the local community.

Local community labour is defined as people who reside in the local community and who have been identified and names placed on the labour list by the Employer.

Key personnel are defined as supervisors and skilled labourers without whom a specific task cannot be executed. As far as possible these people should impart their management and other skills to individuals within the local workforce who show a keen interest and display a willingness to learn.

A monthly report on employment of local labour in relation to other employees must be submitted for the information of the Employer.

C3.4 Construction

1. WORKS SPECIFICATIONS

The applicable standardised specifications, variations and additions thereto and particular specifications are given in Section C3.6: Works Specifications.

2. SITE ESTABLISHMENT

2.1. Services and Facilities Provided by the Employer

2.1.1. Disclaimer

The Employer does not guarantee the adequacy or continuous availability of any service or facility. The Contractor is deemed to have assessed the availability, adequacy and risks associated with services and to have allowed for any additional services required to meet his contractual requirements.

2.1.2. Contractor's Camp

The Contractor shall make his own arrangements to lease the land from the registered owner, for the property on which the Contractor's stores and offices will be located.

The Contractor shall make his own arrangements for the accommodation of all labour, the provision of toilet facilities for all his employees and for the supply of electrical power and lighting if required. In doing so, the Contractor shall comply with the requirements of the respective authorities. Housing may furthermore not be erected at any areas along the site *(except for an approved number of night watchmen, see Clause 2.2.6)*. Temporary shelters or canopies may be erected where labourers may rest, eg during tea and lunch breaks, to enjoy a meal. However, no open fires will be allowed on site to prepare food at the temporary site areas.

2.1.3. Source of Water

Existing water supply reticulation is available at the following locations:

- Jamestown residential area
- Stellenbosch Waste Water Treatment Plant.

At these locations, water can be supplied for construction and drinking purposes from the existing watermains, via a metered connection. The contractor shall apply to the Municipality for a temporary water connection. At other locations the contractor shall make his own arrangements for the supply of water.

The provision of the metered connection and the supply of water used by the Contractor will be charged for and the costs thereof must be included in the tendered rates. Water will be charged for at the standard municipal rates.

Water for pressure testing of pipelines may be drawn off the existing reticulation by prior arrangement with the Municipality. The Contractor shall supply all necessary tee-pieces, valves and pipe work. An isolating valve shall be installed immediately downstream of the connection tee. All pipework connected to the rising main shall have a 12 bar rating.

The Contractor shall make use of water from non-potable sources for construction wherever possible.

Furthermore, the Contractor will be held responsible for any wastage of water due to his negligence.

2.1.4. Disposal Site

All material cleared on the site, rubble, spoil and refuse shall be disposed of at a designated area.

2.2. Facilities Provided by Contractor

2.2.1. Water

The Contractor shall make his own arrangements for the supply of water at locations where there is no existing potable water reticulation.

2.2.2. Electricity

There is no readily available source of electricity on site. The Contractor shall make his own arrangements for the provision of electricity and may make use of generators or apply to the relevant supply authority for an electrical connection.

2.2.3. Telephone

The Contractor shall make his own arrangements for the supply of telephone facilities for his own use.

2.2.4. Office and Storage Facilities

All offices, storerooms, etc. required by the Contractor are to be supplied by the Contractor. No storage facilities, shelters or eating facilities are available on Site and the Contractor shall make his own arrangements and pay all costs associated with such facilities if required.

2.2.5. Security

The security and safety of the Contractor's equipment, the storage, safekeeping and prevention of deterioration of all material, goods, plant and equipment delivered to Site shall be the responsibility of the Contractor until the Certificate of Completion has been issued, notwithstanding that the Employer may have previously paid for such items.

The Contractor shall make his own arrangements for a security fence enclosing the camp.

2.2.6. Housing and Transport

The Contractor's employees, except for an approved number of night watchmen, shall not be housed on Site and the Contractor shall make his own arrangements and pay all costs associated with housing his employees and/or transporting them to Site.

The Contractor will have to make his own arrangements for accommodating night watchmen.

2.2.7. Sanitary Facilities

The Contractor shall provide portable toilet facilities at his depot and within reasonable distances of work fronts along the pipeline routes. These shall be regularly serviced and maintained in a sanitary condition.

2.2.8. Laboratory Facilities

No on-site laboratory facilities will be required. The Contractor is to make his own arrangements for the testing of materials where specified. All specified tests shall be done at an approved laboratory.

The laboratory shall be SANAS approved for the testing being undertaken.

2.2.9. Medical Attendance

The Contractor shall at all times maintain adequate medical attendance on Site. A person holding a current first aid certificate shall be immediately available on Site at all times when work is in progress. Arrangements, with the nearest suitable hospital, shall also be made by the Contractor for the acceptance of urgent cases of injury.

2.2.10. Facilities Provided by the Contractor for the Employer's Agent

The Contractor shall provide facilities for the Employer's Agent as specified in standardised specification SANS 1200 AB and the Works Specifications. The Contractor shall provide a suitable venue for the purposes of monthly site meetings, with adequate space and seating for at least eight people.

2.2.11. Removal of Facilities on Completion

The Contractor shall remove all temporary offices and storage facilities, toilets, temporary water connections and the like on completion of the contract and leave the areas used in a neat and tidy condition free of any rubble, debris, oils spillage, concrete and the like.

3. SITE USAGE

The Contractor shall not use the site for any purposes other than the execution of the Works. The Contractor shall confine her/his activities to the site of the works and to the area allocated to her/him for her/his site offices and materials storage. The Contractor may not use or damage in any way any area that falls outside the boundaries of the site. Any area damaged by the Contractor outside the site boundaries shall be rehabilitated to the satisfaction of the Employer's Agent at the Contractor's expense.

4. ALTERATIONS, ADDITIONS, EXTENSIONS AND MODIFICATION TO EXISTING WORKS

The contractor shall satisfy himself within 14 days of moving onto site that the dimensional accuracy, alignment, levels and setting out of existing structures or components thereof are compatible with the proposed works and procedures. Any discrepancies shall be brought to the attention of the Employer's Agent in writing where this is not the case.

Failure by the contractor to timeously give written notice to the Employer's Agent in this regard shall result in any claim for additional time and / or costs being rejected.

5. WAYLEAVES AND PERMITS

The Contractor will be required to apply for wayleaves and pay all sureties, bank guarantees or deposits required by the service authority issuing the wayleave, as detailed in the Scope of Work.

Known services are indicated on the drawings and include:

- Eskom overhead and underground power lines;
- Telkom overhead telephone lines
- Private irrigation pipework

6. TREATMENT OF EXISTING SERVICES

The positions of existing services, insofar as they are known, are shown on the Site Development Drawings. Items have been allowed in the Bill of Quantities for dealing with and protecting such services. Refer to Site Development Drawings for the positions of the existing services.

The exact location and depth of all existing services, such as sewers, stormwater pipes, culverts, water mains, manholes, valve boxes, conduits, cables for electricity and telephone lines, electricity, lightning and telephone poles and any other services or features on the ground which may infer the existence of services, must be verified prior to the commencement of any excavations – either for trench excavations or for the relocation or adjustment of existing services.

The Contractor shall take whatever precautions as deemed necessary to protect these services from damage during the period of the Contract.

7. DAMAGE TO SERVICES

Any known services damaged by the Contractor shall immediately be reported to the relevant service authority. The cost of repair of these services will be for the Contractor's account. Known services include those services shown on the drawings as well as services not shown on the drawings but the presence of which can be reasonably expected or determined on site.

Any unmarked or unknown services that may be damaged shall immediately be reported to the relevant service authority. The repair cost for such services will not be the Contractors' responsibility. In the event that the Contractor is requested to repair the damaged service, she/he shall submit the actual cost of repair with his next claim for payment and shall be paid the actual cost plus 10%.

8. REINSTATEMENT OF SERVICES AND STRUCTURE DAMAGED DURING CONSTRUCTION

The Contractor shall liaise directly with the responsible Municipal Services Silos,Telkom, etc with regards to the reinstatement of existing services. The Contractor shall take whatever actions are required to have

damaged services repaired by Municipal Services Silos, Telkom or any other relevant service provider as soon as possible.

9. CERTIFICATION BY RECOGNISED BODIES

Where materials to be used in the works are required to comply with a SABS/SANS specification, they will be accepted as complying with the SABS/SANS specification if one of the following is satisfied:

- The display of a SABS/SANS mark on the product with a copy of the SABS/SANS certificate that allows the manufacturer to use the mark, or
- All the criteria in the relevant SABS/SANS specification is measured and confirmed on site or in an approved laboratory.

The same will apply to materials specified to comply with ISO, BS, ASTM or other international specifications.

Only SANAS accredited laboratories or other institutions may be used for certification purposes. For concrete durability testing, the laboratory shall be approved by the Employer's Agent.

10. AGRÉMENT CERTIFICATES

The use of alternative materials, which may be fit for purpose and are subject to an Agrément certificate, may be considered providing the following are adhered to:

- A full copy of the Agrément certificate must be provided,
- The certificate must be currently active,
- All work must be done in accordance with the terms of a specific certificate for the product,
- Details of any and all variations approved by Agrément South Africa must be provided,
- Details of who will erect or install the product must be provided

11. PLANT AND MATERIALS SUPPLIED BY THE EMPLOYER

The employer will not supply any materials or plant to the Contractor. The Contractor shall be responsible for procuring all plant and materials required for construction of the works.

12. MATERIALS SAMPLES AND SHOP DRAWINGS

The Contractor shall timeously provide the Employer's Agent with samples and/or test results of all materials he intends to use in the works. All materials are to be approved by the Employer's Agent in writing before being used in the Works. Such approval shall not relieve the Contractor of his obligation to ensure that materials supplied comply with the Specifications.

The Contractor shall ensure that all materials are ordered timeously so as not to result in delays to the programme. Delays in delivery of materials necessary for completion of the works shall not be considered grounds for compensation. The Contractor shall make allowance in her/his programme for any anticipated lead times or delays in procuring specific materials.

Where material to be used in this contract is specified to comply with the requirements of a South African National Standard Specification and such material is available with the official SANS (SABS) mark, the material shall bear the official mark.
The Contractor shall supply samples of sufficient size of proposed bedding, imported material and concrete materials, as applicable, to a SANS accredited laboratory for testing prior to any such materials being used. Only materials that comply with the specifications may be used. No separate payment shall be made for the testing of materials, the cost of which shall be deemed to be covered by the rate for the relevant items.

Copies of all test results shall be given to the Employer's Agent for his approval.

13. CONSTRUCTION PLANT

All construction plant and equipment used on this contract shall be in good working order, well maintained, of adequate size and fit for purpose. No machinery that leaks oil, fuel or hydraulic fluids may be used on site. Any plant or equipment that, in the opinion of the Employer's Agent, is not of adequate size or fit for use shall be removed from site and replaced with acceptable plant or equipment, all at the Contractor's cost.

14. CONNECTION TO EXISTING SERVICES

Seven (7) days written notice shall be given to the Employer's Agent and to the Employer of intention to connect to any existing service or structure. Such connection may only be undertaken once written

approval is granted. The work to connect to existing services may have to be done outside of normal working hours to accommodate the requirements of the Employer. Allowance for this must be made in the tendered rates as no additional payments shall be made in this regard.

15. SURVEY CONTROL AND SETTING OUT OF THE WORKS

Survey pegs and reference marks shall be pointed out to the Contractor. The Contractor is solely responsible for the setting out of the works from the pegs and reference marks. The Contractor is also solely responsible for the protection of the pegs and reference marks. The Contractor's attention is specifically drawn to the requirements of SANS 1200 A: General, Clause 5.1 Survey, in this regard.

The Contractor shall be responsible for the preservation of all land survey, erf or other pegs, benchmarks and beacons. If damage or disturbance of any such pegs or beacons is caused by the operations of the Contractor or his subcontractors, the pegs are to be replaced by a Registered Land Surveyor at the cost of the Contractor. Benchmarks will be replaced by the Employer's Agent at the Contractor's expense.

Information regarding the position of all such pegs will be made available to the Contractor by the Employer's Agent on request.

The Contractor is to ensure that no spoil is placed over any erf peg or benchmarks and that these are adequately protected for the full duration of the Contract.

Where disturbances of boundary pegs are unavoidable due to excavation or other operations adjacent to the pegs, the Contractor shall advise the Employer's Agent or his Representative immediately, and agreement is to be reached that the disturbance of the peg is unavoidable and a strict record of such disturbed pegs is to be kept. Such pegs are to be replaced by a Registered Land Surveyor as described above and the Contractor is to submit proof of the cost of replacement of pegs. The Contractor will be reimbursed on a basis pro-rata to the total cost of peg replacement determined on completion of the Works.

16. PROTECTION OF EXISTING WORKS

The Contractor shall take all necessary steps to protect any existing works 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 service, the possible existence of which could reasonably have been ascertained by him in good time.

Where the Contractor is responsible for damage for which repairs have to be carried out by the Employer or an outside Authority, the costs of these repairs will be recovered by means of a deduction from the Contractor's monthly Payment Certificate. The Employer will attend to the payment of monies due to outside authorities, should the Contractor not make direct payment, to the outside authorities, timeously.

17. TIDYING UP OF THE WORKS

The Contractor shall take note that progressive and systematic finishing and tidying will form an essential part of this contract. On no account shall spoil, rubble, materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily be a hindrance to or impede the activities of other contractors or service providers. In the event of this occurring, the Employer shall have the right to withhold payment for as long as may be necessary in respect of the relevant works in the area(s) concerned.

Upon completion of the Works or any portion thereof, the ground, fences, gates and any structures that have been interfered with are to be carefully restored to their original condition and all rubbish, tools, tackle, plant and material must be removed so as to leave the Site in a clean and orderly condition. No additional payment shall be made for work set out above.

18. RECORD DRAWINGS

As the work progresses, the Contractor shall keep full sets of records of all the true levels, sizes and positions of structures as well as all amendments to and deviations from the drawings issue by the Employer's Agent from time to time. This information must be submitted monthly at the Site Meetings. A separate set of drawings will be issued to the Contractor for this purpose.

The completion certificate shall only be issued after the Employer's Agent has received a properly completed set of "record" drawings from the Contractor. No separate payment shall be made for this service as all costs related thereto shall be deemed to be included in the rates for the relevant items.

19. CONSTRUCTION WORK IN THE VICINITY OF BULK WATER MAINS

The Contractor will be required to expose existing bulk water mains for the purposes of tying in or for crossings. The Contractor shall proceed in accordance with all conditions of the relevant wayleaves and the following specific requirements:

Excavation to locate water mains shall be carried out only with the permission and in accordance with the requirements of relevant authority and with their personnel in attendance.

Where at any stage during excavation or construction, cover over the water mains and services will be less than 0,6 m, or in special cases where the Employer's Agent deems it necessary, excavation shall be carried out by hand over a width extending to 1,0 m clear on each side of these services. No excavation shall be carried out behind any bend, cap, valve, or tee before the service authority has undertaken any necessary precautionary measures.

Only the service authority's staff shall operate valves on existing water mains.

Where alterations or connections to water mains are required, at least 72 hours' notice of the commencement of work is to be given to the service authority and at least 48 hours' notice to affected consumers.

The Contractor shall programme the activities required to connect into the supply lines to ensure that all work is complete within one day (per connection) with disruption to the supply being limited to 12 hours maximum. Should there be more than one connection on the same supply line, the time period between each successive supply interruption shall be subject to the approval of the Employer's Agent and the supply authority.

The cost of any damages and consequential losses incurred as a result of these operations shall be borne by the party causing the damage.

The Contractor must take the above into account when drawing up the works programme and calculating rates. Unless specifically itemised in the bills of quantities, no additional payment shall be made for any expense or delays incurred as a direct consequence of adhering to these procedures.

At the start of the Contract, The Contractor shall obtain from the relevant service authority, the contact details of the emergency control room or other personnel to be contacted in the event of burst mains or damaged services. These emergency numbers shall be kept readily available on site.

20. FEATURES REQUIRING SPECIAL ATTENTION

20.1. High Standard of Work Required

The Contractor's attention is drawn to the fact that a high standard of materials, testing and performance is applicable. Compliance to specifications and tolerances will be strictly enforced.

Throughout the duration of the Contract, the work shall be supervised by an approved representative of the Contractor with proven experience and competence in civil engineering projects of a similar size and nature.

All materials supplied by the Contractor shall be unused and of the highest quality.

C3.5 Management

1. MANAGEMENT OF THE WORKS

1.1. Planning and Programming

1.1.1. Format of Programme

The programme shall be in the form of a bar chart (Gantt chart) or any other time-activity form acceptable to the Employer's Agent, and shall clearly show:

(i) The proposed rate of progress in order to complete the Works within the required period as specified, showing the various activities, their durations and proposed resourcing levels (major plant and labour) for each element of the Works. Sufficient detail shall be provided to enable the Employer's Agent to be able to gauge construction progress. All activities, including establishment on site, trimming and finishing and the completion of all minor ancillary works are to be included in the programme.
(ii) A Work breakdown structure that identifies all major work activities, including connections to existing infrastructure,
(iii) Scheduled start and end dates for each activity,
(iv) The linkage of activities and any dependencies (time or resource related) between them.
(v) The sequence of activities clearly identifying floats and critical path activities.
(vi) Key dates in respect of work to be carried out, information required or due delivery,
(vii) The anticipated value of work to be done during each month.
(viii) Other information specifically required by the Employer's Agent.

The Contractor shall base his initial programme of work on the scope of the work as described in the Scope of Work and the Bill of Quantities. This programme shall be reviewed on a regular basis by the Contractor in accordance with changing circumstances, delays and variations to the work ordered by the Employer's Agent.

The Contractor shall submit to the Employer's Agent, at least one working day before each monthly site meeting copies of the following:

(i) The contract programme with progress charts and programme graphs updated to reflect the actual progress to date and a summary of progress on site over the month preceding the site meeting.
(ii) Details of activities running late, indicating what steps have been or will be taken to ensure that the work is completed within the specified time.
(iii) A report on all labour, plant and materials on site.

If any change to the critical path occurs, the Contractor shall as soon as is practicable notify the Employer's Agent in writing.

When drawing up the programme the Contractor shall, among other issues, take into consideration and make allowance for:
(i) the sequencing of the Works (if applicable) as described in section C3: Scope of Work and taking all pertinent information contained in the documents into account;
(ii) expected weather conditions and their effects;
(iii) known physical conditions or artificial obstructions;
(iv) searching for, dealing with and carrying out alterations to the existing services;
(v) the provision and implementation of the Environmental Management Plan (EMP) in terms of the Environmental Management Specification and Environmental Impact Assessment (EIA) conditions;
(vi) the restrictions on the length of trench open at any one time as specified;
(vii) the requirements and effects of employing Labour intensive Construction (LIC) methods (if applicable);
(viii) the accommodation and safeguarding of public access and traffic;

(ix) the lead time required for compliance with the Site Specific Health and Safety Specification and Site Specific Baseline Risk Assessment (Section C3.7);
(x) provision and implementation of the Health and Safety Plan in terms of the 2014 Construction regulations and the Occupational Health and Safety Act (1993)
(xi) election day;
(xii) official builders break;
(xiii) special non-working days; and
(xiv) non-working days.

It should be noted that it is in the Contractor's best interest to provide a comprehensive programme giving as much information as possible about the times allowed for the various activities as well as resource or other limitations affecting the programme, since the approved programme may be used to evaluate any claims in terms of the General Conditions of Contract for extensions of time.

1.1.2. Employer's Agent Inspection and Approval of the Works

The Contractor shall allow reasonable time in his programme for the Employer's Agent to carry out examination of the work before covering up. Requests for inspections should be made in writing to the Employer's Agent or his representative at least 24 hours before such inspections are required. Requests for inspections should be planned in such a way to coincide with the Employer's Agent or his representative daily site visit.

If the Employer's Agent or his representative attends with the purpose of examining any part or materials of the works at the date and time agreed on with the Contractor and it is found that the works or materials are not ready for inspection, the Contractor shall be responsible for the cost of that visit by the Employer's Agent or his representative.

The Employer's Agent or his representative will visit the site approximately daily for the purpose of supervision of the Contract and inspection and approval of completed work. The Contractor shall therefore arrange his working programme in such a way that all work is inspected and approved at the required time. Under no circumstances shall he proceed with any activity that covers up previous work before the previous work has been approved in writing (e.g. no trench shall be backfilled until the laid pipes and bedding have been inspected and approved).

1.1.3. Review of Progress

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

The Contractor is required together with his monthly updated programme to submit a cash flow indicating the anticipated total and monthly expenditure value for the contract at the monthly site/progress meetings.

With reference to paragraph 56 of the Contract Data the programme and cash flow will be reviewed at the monthly site meetings at which time the contractor shall provide sufficient detail that will allow a comparison of completed work per activity against the original approved programme. The Contractor shall indicate what resources and programme changes he intends to implement in order to remedy any activity that has fallen behind. The Employer's Agent may demand from the contractor a major revision of the programme. Such a revision shall be submitted for approval within fourteen (14) days of the demand.

1.1.4. Interim Asset Expenditure Reporting

If construction is still in progress over the year-end period of the Stellenbosch Municipality, being 30 June of each year, the Municipality shall be furnished with a report / certificate at year-end (30 June), which details (a) The cumulative expenditure incurred up to 30 June for the project. (b) any details if the project is taking a significant longer period of time to complete than expected, including reasons for any delays. (c) details where construction or development has been halted either during the current or previous reporting period(s), including reasons for halting the construction or development of the asset/project.

1.2. Health and Safety

The Contractor shall take particular note of the health and safety requirements contained Section C3.7 of the Scope of Work.

1.3. Environmental Requirements

The Contractor shall take particular note of the environmental requirements contained in Section C3.8 of the Scope or Work.

1.4. Recording of Weather

The Contractor shall supply and install a rain gauge on site and record weather conditions, on a daily basis in a book which will be available on site at all times.

Any weather conditions affecting the progress of the work shall be recorded.

1.5. Format of Communications

Throughout the construction period the Employer's Agent shall supply a carbon triplicate Site Request and Memorandum book. These books shall be kept on Site at all times.

The Site Request book shall be issued to and used by the Contractor for:

(i) providing the Employer's Agent 's Representative with any information regarding the construction of the Works which may be requested,

(ii) requesting information from the Employer's Agent's Representative regarding the works that is not obtainable by any other means, and

(iii) giving notification in writing as required by any of the relevant clauses of the General Conditions of Contract.

The Site Memorandum book shall be used by the Employer's Agent 's Representative for the purpose of writing day to day instructions and confirming any verbal information or instructions given to the Contractor, as well as requesting variations to the works that may be required.

One copy of each site memorandum or request issued by either party shall remain in the book.

Further to the abovementioned Site Memorandum book, the Contractor shall, throughout the construction period, supply and maintain the following documentation that shall be kept on site, accessible to both the Contractor and the Employer's Agent or representative at all times:

a) Site Request/ Instruction book

For the Contractor to provide the Employer's Agent or Representative with information required, for giving notification in writing of inspections, drawings, etc., required by the Contractor, and for use by the Employer's Agent or Representative for the purpose of writing day-to-day instructions or confirming verbal information or instructions given to the Contractor.

b) Health and Safety File

Containing the site and safety hierarchy, contact details, safety plan, audits, safety equipment, safety training, injuries log, inspections and all other relevant safety data.

c) Quality Control File

Containing Quality Assurance and Quality Control Forms to be operated and maintained by the Contractor.

d) Measurement File

Containing records of work measurement and calculations

e) Daily Register

Listing labour and plant status. A complete record of staff employed on the Contract is to be kept on site for use by the Employer's Agent.

f) Daily Contract Diary

For recording the work carried out on site each day – shall reference the specific area of work and shall be signed by the Construction Manager and the Employers Agents Representative.

g) Monthly Labour Return Schedule

h) One full set of contract drawings and contract documents

i) Approved Construction Programme

1.6. Site Meetings

Site meetings will be held at regular intervals (at least monthly), with representatives of the Contractor, the Employer and the Employer's Agent.

The Contractor shall attend all progress/site meetings and ensure that all persons under his jurisdiction are notified timeously of all progress/site meetings should their attendance be required. All persons attending progress/site meetings are to have the necessary delegated authority in respect of aspects such as planning, change managements, health and safety and environmental.

1.7. Methods and Procedures

1.7.1. Safeguarding & protection of excavations

Portions of the work will be carried out within a Wastewater Treatment Works staffed 24 hours per day. Excavations will be barricaded off, at all times, with clearly visible protection measures. Where deep excavations exist, the barricading shall be adequate to prevent accidental entry.

1.7.2. Disposal of excess material

Where material is surplus or unsuitable for use in embankments or spreading on site, the Engineer may order such material to be carted away and disposed of off-site at a location determined by the Contractor. The rate shall cover loading and transport and all disposal charges. The volume shall be computed on the basis of the volume of hauling vehicles. Disposal slips as proof of disposal will be provided to the Employer's Agent as part of Environmental Management, monitoring and compliance.

1.7.3. Giving notice of work to be covered up

The Contractor shall give the Employer's Agent reasonable time to accommodate examinations in his programme, in which case times for inspection can be agreed on. Requests for examination of work shall be made in the site request book at least 24 hours before the examination is required.

1.7.4. Cost of test specimens and tests

The Contractor must make allowance in his Tender for all such services and tests required from him. It is the duty of the Contractor to, at his own cost and by means of the necessary tests, prove to the Employers Agent or his representative that the works and compaction where prescribed, comply with the specification.

1.7.5. Progress Photographs

The Contractor shall set up a system of taking digital photographs on site on a weekly basis to monitor the progress of works. This digital photography shall be labelled with the date, location and description of the photograph and a copy handed to the Employer's Agent on a CD or other storage medium on a weekly basis for safe storage. The format shall be JPG, BMP or any other common format.

1.7.6. Materials handling, use and storage

All materials shall be stored in the designated Contractor's camp area or as indicated by the Employer's Agent. Any material to be stored and handled must be done in such a way as not to endanger any person on site or cause damage to the environment. The Contractor shall also ensure that all suppliers or delivery vehicles abide by all restrictions and procedures (speed limits, dust control, "no-go areas" etc.).

1.8. Quality Plans and Control

Quality Control Plans, methods and testing shall be as specified in the contract.

1.8.1. Control Testing of Earthworks, Road Layers and Bedding

The Contractor is required to carry out his own control testing.

Any additional tests requested by the Contractor or any retests required, due to failure of the initial tests, will be charged to the Contractor at the rates ruling at the time.

The Contractor is required to carry out his own control testing, but if he so wishes, and agrees to abide by the results of the Employer's Agent check test, he may dispense with his own tests. However, if the Contractor should wish to use the Employer's Agent testing facilities, he will be charged for the various tests at the rates ruling at the time.

The Contractor shall engage the services of an approved independent laboratory or other institution – as applicable for quality testing – to ensure that his work complies with the Specifications.

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

The onus to produce work that confirms in quality and accuracy of details to the requirements of the Specifications and Drawings, rests with the Contractor, and the Contractor shall, at his own expense, institute a quality control system and provide experienced engineers, foreman, surveyors, material technicians, other technicians and technical staff together with all transport, instruments and equipment to ensure adequate supervision and positive control of the Works at all times.

The cost of supervision and process control, including testing carried out by the Contractor, will be deemed to be included in the rates tendered for the related works items.

The Contractors attention is drawn to the provisions of the various specifications regarding the minimum frequency of testing required. The Contractor, shall, at his own discretion, increase this frequency, where necessary, to ensure adequate control.

On completion and submission of every part of the work to the Employer's Agent for examination, the Contractor shall furnish the Employer's Agent with the results of the relevant tests to indicate compliance with the specifications.

1.8.2. Valves – Test Certificates

All valves supplied for installation under this contract shall be provided with test certificates. Batch test certificates are acceptable provided that the actual valves delivered to site are covered under these certificates.

1.9. Accommodation of Traffic on Public Roads Occupied by the Contractor

The operation of construction vehicles on existing roads shall be limited to traffic with an axle load not exceeding that allowed by the Road Traffic Ordnance of the authority concerned, or any amendment thereof.

If the Contractor use existing roads for the hauling of materials to or from site, he shall be held responsible to clear any spillage caused by his activities on or near the roads by whatever means necessary and immediately. No additional payment will be made for the clearance of spillage and all other relevant costs.

Where work is to be executed close to existing residential properties, the Contactor shall ensure that at all times pedestrian and vehicle access are provided for house owners to their properties. Where crossing of existing driveways are to be done, the Contractor must liaise with the relevant property owners regarding the time and period when such access will not be available. However, access shall be made available between 17:00 and 07:00 on weekdays and on Saturdays and Sundays.

1.10. Testing, Completion, Commissioning, and Correction of Defects

Practical completion of the works will only be considered once the connections to the existing mains are completed, all pipelines and structures are completed, tested and approved.

1.11. Key Personnel and Supervision

A schedule of key personnel to be used on site, including contact particulars, is to be provided to the Employer's Agent before commencement of works.

The Key Personnel presented as part of the tender submission in returnable SCHEDULE 14: PRELIMINARY WORK PLAN AND PROGRAMME in compliance with Clause F.2.1.4.3 (Methodology) of the Standard Conditions of Tender in Part T1.2, shall apply. If the personnel indicated are no longer available, personnel with similar or better qualifications and experience shall be presented to the Employer's Agent for approval.

1.12. Normal Working Hours

Normal working hours shall be those as stated in the Government Gazette for Civil Engineering and Roadmaking Industries as applicable to a 5 (five) day week, Monday's to Friday's.

1.13. Electronic Payments

The Contractor will be responsible for supplying correct bank details to the Employer for electronic payments and the Employer will not be held responsible for any incorrect bank details supplied by the Contractor.

The Contractor's tax invoice shall contain the following information as a minimum:

- contract number and description;
- date of invoice;
- invoice number;
- clearly stipulate the words "Tax Invoice";
- be addressed to the Stellenbosch Municipality;
- contain the details of the Stellenbosch Municipality;
- contain the banking details, Vat number; and
- contain the logo of the contractor or contractors in the case of a joint venture

1.14. Guarantees

The Contractor shall deliver to the Employer the original fixed performance guarantee before commencement of works. The guarantee shall be held by the Employer for safekeeping until completion of the work.

1.15. Payment Certificates

Payment certificates are to be agreed upon by the Construction Manager and Employer's Agent Representative and signed by them and submitted to the Employer's Agent by the 25th day of each month.

Payment certificates shall be submitted in the form of the Bill of Quantities. Columns shall be provided showing the previous quantity, current quantity and total quantity claimed under each item. Calculations to substantiate the quantities claimed must be submitted with each monthly claim.

Payment certificates are to be agreed upon by the Construction Manager and Employer's Agent Representative. Once agreed, the Contractor is to submit a signed payment certificate to the Employer's Agent for certification including a signed tax invoice addressed to the NMBM.

1.16. Neatness of the Site

Progressive and systematic finishing and tidying will form part of this contract. Spoil, rubble, materials, equipment or unfinished operations shall not be allowed to accumulate unnecessarily and in the event of this happening, the Employer's Agent shall have the right to withhold payment for as long as the condition prevails in respect of the relevant works in the area(s) concerned.

The general neatness and tidiness of the site is of particular concern. The Contractor shall therefore, on a day-to-day basis, keep the Works in a condition acceptable to the Employer's Agent.

1.17. Maintenance of access and streets

The operation of construction vehicles on existing roads or streets shall be limited to traffic with an axle load not exceeding that allowed by the Road Traffic Ordinance of the authority concerned, or any amendment thereof.

All access roads used by the Contractor shall be maintained for the duration of the contract and shall be rehabilitated to their original condition on completion of the contract. The Contractor must note that no additional payment will be made for construction, maintenance and rehabilitation of any access roads to the site.

1.18. Protecting the Site

The Contractor shall be solely responsible for the protection of the Site against all damage to property, services, terrain, trees etc. If in the normal execution of this Contract, disturbance to the Site of the Works is necessary, the Contractor shall obtain the prior permission of the Employer's Agent. After completion of this work, the Contractor shall reinstate the area concerned to its original condition at his own cost or as covered under the rates in the Bill of Quantities. The Employer's Agent ruling of what was the original condition of the Site or part thereof shall be final.

If the Contractor fails to reinstate the Site, the Employer shall do the reinstatement and the Employer's Agent shall establish the extent of the work as well as its costs. The Employer's Agent ruling shall be final and payment for the work will be deducted from the Contractor's monthly certificate.

The Contractor shall ensure that his actions do not cause any nuisance to the public. Should spillages occur, the Contractor must adequately disinfect the work site, including the container area.

1.19. Protecting the Works against flooding

The Contractor shall provide sumps, pumps, furrows, berms and/or coffer dams to divert water flow away from construction activities; and any other temporary measure/works as may be necessary to minimise damage, inconvenience or interference, for 24 hours a day 7 days a week throughout the period of construction, to adequately protect the works from flooding and damage.

The Contractors programme must include and item and information regarding the dealing with water.

1.20. Landowners

The Contractor is to ensure that all landowners are notified 1 month prior to construction commencing in their properties. The Contractor shall submit copies of the notification to the Employers Agent.

The Contractor is to minimise disruption and ensure access and security for the landowners are maintained at all times. The following measures are to be adhered to for the duration of the contract:

- The construction of activities should proceed as discussed with the landowner and Employers Representative
- Landowner to have access to his property at all times
- Temporary fences to be installed as required by the Contractor without limiting access to the landowner
- Tidying up, removing temporary fencing, reinstating existing fencing and opening the existing access to be performed before completion of the contract

1.21. Other Contractors

During this contract there will be other Contractors operating within the boundaries of the site. The Contractor is to allow for the attendance and dealing with other Contractors in the construction programme and priced rates.

1.22. Protecting the Works against flooding

Pro forma approval forms to be used on this contract shall be provided by the Employers Agent at the inaugural meeting.

Forms for reporting on employment of local labour (EPWP) are required. These reports shall be submitted monthly to the Employers Agent in accordance with the stipulated requirements.

STELLENBOSCH MUNICIPALITY

CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C3.6 Works Specifications

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PORTION 3: PARTICULAR SPECIFICATIONS FOR MECHANICAL AND ELECTRICAL WORK (DS) – TO BE READ IN CONJUNCTION WITH PORTION 6 OF THIS CONTRACT

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PORTION 5: GENERAL SPECIFICATION FOR MECHANICAL AND ELECTRICAL WORK

PORTION 1: STANDARDISED SPECIFICATIONS

The following SANS 1200 Standardised Specifications for Civil Engineering Construction prepared by the South African Bureau of Standards are applicable:

SANS 1200 A	General
SANS 1200 AB	Engineer's Office
SANS 1200 C	Site Clearance
SANS 1200 D	Earthworks
SANS 1200 DB	Earthworks (Pipe Trenches)
SANS 1200 DM	Earthworks (Roads, Subgrade)
SANS 1200 G	Concrete (Structural)
SANS 1200 GA	Concrete (Small Works)
SANS 1200 HA	Structural Steel (Sundry Items)
SANS 1200 L	Medium Pressure Pipelines
SANS 1200 LB	Bedding (Pipes)
SANS 1200 LD	Sewers
SANS 1200 M	Roads (General)
SANS 1200 ME	Subbase
SANS 1200 MF	Base
SANS 1200 MJ	Segmented Paving
SANS 1200 MK	Kerbing and Channeling

These standardised specifications are obtainable from the South African Bureau of Standards. The Contractor shall obtain copies of these documents at his own costs.

Interpretations of and variations to the Standardised Specifications are set out in Portion 2 of the Works Specifications.

The term “Engineer” appearing in any of the SANS 1200 Standardised Specifications must be replaced with the terms “Employer’s Agent”.

PORTION 2: VARIATIONS AND ADDITIONS TO STANDARDISED SPECIFICATIONS

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PORTION 2: VARIATIONS AND ADDITIONS TO STANDARDISED SPECIFICATIONS

The variations and additions to the SANS 1200 specifications listed above are as follows:

The term “Project Specification” must be replaced by the term “Scope of Work” wherever it appears in the standardized specifications.

The term “Schedule of Quantities” must be replaced by the term “Bill of Quantities” wherever it appears in the standardized specifications.

The term “Engineer” appearing in any of the SANS 1200 Standardised Specifications must be replaced with the terms “Employer’s Agent”.

The prefix “PSA” denotes an amendment to SANS 1200A. “PSAB” denotes an amendment to SABS 1200AB and so forth. The number following these prefixes refers to the relevant clause numbers of SABS 1200. For example: “PSA 8.1” refers to Clause 8.1 of SANS 1200A.

Further to the above, it should be noted that, where in a specific Standardised Specification reference is made to a subclause in another Standardised Specification, any amendment or addition to the subclause referred to, as provided in the Works Specification, shall apply.

PSA SANS 1200 A: GENERAL

PSA 2 INTERPRETATIONS

PSA 2.3 DEFINITIONS

Add the following definitions:

Commercial source: A source for the supply of materials or services chosen by the Contractor and for which he assumes full responsibility for the quality and supply thereof.

Construction Width: The strip of land along a pipeline route in which all construction activities are to be contained, as defined in PSA 5.8.

Landowner: The term Landowner shall be read to include any lessee of the land concerned.

PSA 2.8 ITEMS IN SCHEDULE OF QUANTITIES

PSA 2.8.1 Principle

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

PSA 3 MATERIALS

PSA 3.1 QUALITY

Where there is a standardisation mark programme for any material, all such material supplied shall bear the official standardisation mark.

Alternative materials or equipment proposed by the Contractor shall be tested. The test, as well as the materials or equipment, shall be approved by the Engineer prior to any such materials or equipment being built into the works, and all costs involved in testing shall be deemed to be included in the rates tendered.

PSA 4 PLANT

PSA 4.2 CONTRACTOR’S OFFICES, STORES AND SERVICES

The Contractor’s site establishment shall also comply with the requirements of the Environmental Management Plan herein (Section C3.8).

PSA 5 CONSTRUCTION

PSA 5.1 SURVEY

PSA 5.1.1 Setting Out of the Works

The Contractor shall engage an engineering surveyor to establish sufficient control points for the subsequent setting out and checking of the new pipeline alignments.

Any control point disturbed by the Contractor in the course of construction shall be reinstated at the Contractor's own expense.

The setting out of the Works shall be carried out by the Contractor, according to the setting out coordinates given on the drawings and the control points referred to above. All dimensions, levels and data necessary for the complete setting out of the Works will be provided on the Drawings. The Contractor shall not scale dimensions from the Drawings, but shall request from the Engineer any information which is not clearly stated on the Drawings.

PSA 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

Add the following to Sub-Clause 5.4:-

(i) Location and Protection

All available information relating to known existing services and structures has been included on the Drawings. Although this information is reflected as accurately as possible, all positions and levels must be taken as approximate only. At the commencement of the contract the Contractor shall verify the information on the plans.

The Contractor shall liaise with the landowners to determine the location of any privately owned services.

At locations where there is a reasonable possibility of unknown underground services being present, the Contractor shall open trenches across such locations before commencing with excavations and, if services are found, these shall be plotted and thereafter be considered as 'known services'. Such work is to be carried out only on the instruction of and under the direct control of the Engineer.

All known services shall be adequately protected from damage during construction operations. The requirements of the relevant service departments relating to limits of heavy plant usage, departmental supervision etc., shall be ascertained and adhered to.

Any damage to known services shall be made good at the Contractor's expense.

No pegs or stakes are to be driven into the ground in the vicinity of the underground services, particularly Electricity or telecommunication services.

Any services or structures damaged during construction shall immediately be reported to the Engineer, and as soon as possible after such damage a written report stating the exact circumstances of the occurrence shall be submitted to the Engineer.

All practical measures shall be taken to effect immediate repairs, either by contacting the relevant authority, or where instructed by the Engineer, the Contractor shall perform temporary repairs himself.

(ii) Wayleaves

As soon as the Contract has been awarded, the Contractor shall apply for the applicable wayleaves or permits from Eskom, and the Stellenbosch Municipality for working in the vicinity of electrical cables.

The Contractor shall also apply to Telkom, Neotel and any other services authorities in respect of any other services which may be present on site.

Copies of these wayleaves or permits shall be submitted to the Engineer prior to any excavations being carried out.

The Contractor shall provide any sureties or bank guarantees (over and above any other contractual monies) required by Eskom, the Municipality or any other Service Authority, which will be fully refundable provided that the funds are not required to repair cables damaged by the Contractor. The Contractor shall make provision for excavating by hand when working within 3 m of existing electrical cables (underground or overhead). The Contractor shall liaise closely with Eskom in this regard.

PSA 5.6 POLLUTION

Add the following to Sub-Clause 5.6:

The Contractor is required to take all necessary precautions, watering where appropriate, to prevent dust blowing from construction material and spoil heaps and/or ground stripped of vegetation cover. Unless a specific item is included in the Bill of Quantities, the costs shall be deemed to be included in the tendered rates.

This item shall receive special attention due to the presence of vineyards in the vicinity of the site.

PSA 5.7 SAFETY

The Contractor shall comply with all further provisions pertaining to safety, contained in the Section C3.7: Health and Safety Specifications.

PSA 5.8 GROUND AND ACCESS TO THE WORKS

PSA 5.8.1 Construction Width

The Works are to be executed within privately owned land, public roads and land owned by the Municipality. Parts of the site are currently leased out for agricultural use and are under vines. The Employer will arrange to exercise a right of way over a strip of land 12 m wide, along the pipeline route. Narrower construction widths shall apply in many instances where physical constraints such as existing vines, embankments, structures etc exist.

The Contractor shall restrict his activities, including the pipe trench, top soil and excavated material heaps, temporary stringing out of pipes and stacking of materials, access and operation of plant and all other work, to within this Construction Width, or such narrower width as may be indicated in certain areas.

PSA 5.8.2 Site Demarcation

Prior to starting work on any section of the pipelines, the Contractor shall erect and maintain site demarcation along both edges of the Construction Width. The demarcation shall only be removed after completion of the backfill.

Site demarcation shall comprise orange, UV stabilised, HDPE construction safety netting, 1,2 m high, adequately supported on timber stakes.

The pump station sites shall be fenced for the duration of the construction work and no unauthorised persons shall be allowed onto the site.

PSA 5.8.3 Work in Agricultural Property

Work is to be undertaken in private agricultural property and the Contractor shall respect all existing fence lines and gates, and ensure that no livestock is allowed to stray as a result of the construction activities.

PSA 5.8.5 Access Roads

Where there are no existing roads or tracks, the Contractor shall provide suitable access roads, for the purposes of construction and delivery of materials and for access by the Engineer to carry out inspections of the work

These shall be maintained in a satisfactory condition until they are no longer required, after which the areas affected shall be reinstated to their original condition.

Temporary gates shall be provided at points where access roads cross existing fences.

All existing access roads on the site, used by the Contractor for the works or affected by the works shall be maintained for the duration of the Contract and reinstated to their original condition after completion of the works.

The Contractor shall ensure that all existing access roads required by the general public, the Employer or the Landowners are kept open or that acceptable alternative routes are provided.

PSA 5.8.6 Fences

Before commencing work, the Contractor shall, consult the affected landowners to determine which fences, if any, can be temporarily removed.

Fences that cross the Construction Width shall be suitably propped, protected and maintained during construction.

Fences which run parallel to and within the Construction Width, shall be replaced with a temporary fence erected along the edge of the Construction Width, and restored to their original lines after completion of the Works.

Where so agreed to by the landowners, the fences may be dismantled, the materials set aside until completion of the work, after which they shall be reinstated. All fences affected by the Works shall be reinstated to their original condition.

PSA 5.9 ACCOMMODATION OF TRAFFIC

(New Clause) Temporary traffic signs shall be erected at all diversions.

The **number and layout** of the traffic signs shall comply with the Site Manual entitled **"Safety at Roadwork's in Urban Areas"**, as published by the Department of Transport.

Traffic signs shall have a yellow background with either a red or black border.

PSA 5.10 PROVIDING ACCESS TO ADJACENT ERVEN AND PROPERTIES

(New Clause) Access to adjacent erven and properties where affected must be provided by the Contractor at all times. To this end suitable road and trench crossings shall be constructed where required. Temporary trench crossings shall be in the form of portable bridges, temporary backfill or other approved means and shall be capable to permitting the safe passage of vehicles of mass not exceeding 2 tonnes. The Contractor shall also be responsible for maintaining crossings and for removing same when they are no longer required.

The Contractor may, with the approval of the Employer's Agent, arrange with the occupiers of the affected erven and properties to temporarily close off a portion of a street, road, footpath or entrance, provided that the Contractor shall give due notice of the intended closure and its probable duration to the occupiers and shall as punctually as possible re-open the route at the prescribed time. Where possible the access route shall be made safe and re-opened to pedestrian/vehicular traffic overnight. Any such closure shall be an arrangement between the Contractor and the occupiers and shall not absolve the Contractor from his obligations under the contract to provide access at all times. Barricades, traffic signs and drums shall be provided by the Contractor to suit the specific conditions".

PSA 5.11 MAINTAINING WATER SUPPLY

(New Clause) The Contractor shall take note that he shall not cut off the existing water supply without the prior approval of the Stellenbosch Municipality and of the Employer's Agent and the knowledge of the affected residents.

No water pipeline shall remain cut off for more than 5 hours or overnight.

Failure on the part of the Contractor to comply with any of the above provisions will constitute sufficient reason for the Employer's Agent to stop the works until the situation has been remedied, or should he deem it necessary, arrange for the situation to be remedied at the Contractor's cost.

No direct payment will be made for the cost of maintaining the existing water supply. Payment will be deemed to be covered by the rates and sums tendered and paid for the various items of work included under the contract.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.2 PAYMENT

PSA 8.2.2 Time Related Items

For the purposes of interim payment certificates and valuation of the adjustment to time-related costs for extensions of time in terms of clause 5.12.3 of the General Conditions of Contract, the time-related items shall be split pro-rata between Portion 1 and Portion 2 of the Works, unless specific items are scheduled for Portions 1 and 2 respectively.

PSA 8.3 SCHEDULED FIXED-CHARGE ITEMS AND VALUE-RELATED SUMS

PSA 8.3.1 Contractual Requirements

Add the following to Subclause 8.3.1:

"In addition, the sum tendered shall cover all initial costs incurred in complying with the requirements of the Special Conditions of Contract".

PSA 8.3.2 Fixed establishment costs

The Contractor shall tender a lump sum in the Bill of Quantities to cover his fixed establishment costs. The amount tendered and paid shall be full compensation to the Contractor for:

(i) The establishment of his organisation and equipment on the site, the transfer of all personnel, equipment tools, office, ablution and storage facilities to the site, establishment of water, power and telephone facilities, and the removal of all the above mentioned items on completion of the works.

(ii) Compliance with all other general conditions and requirements that are not specifically measured elsewhere for payment in these Contract Documents.

Payment shall be effected as follows:

(i) Seventy-five percent (75%) of the lump sum tendered shall be paid when the Contractor's stores, offices, etc. are substantially complete, provided that sufficient plant and labour to commence construction at the programmed rate has arrived at the site of the Contract and is in working order.

(ii) Twenty-five percent (25%) of the lump sum tendered will be paid after issue of the Certificate of Completion. The Certificate of Completion will only be issued when the Contractor has cleared the entire site to the satisfaction of the Engineer and removed all the plant, offices and stores that might have been used for the duration of the Contract. Also, this portion will not be paid and the certificate of complete will not be issued until all the as-built information has been provided to the Engineers satisfaction.

Only the tendered amount shall be paid under this item which in no way shall be affected by modifications of the Contract Amount.

Item	**Unit**
Contractor's Fixed establishment cost	**Sum**

PSA 8.3.2.2 Rain gauge

(New Clause) Add the following to Subclause 8.3.2.2 (k):

The costs for complying with this clause shall be deemed to be included in PSA 8.3.2. The tendered rate shall cover the cost of supplying and installing the rain gauge in a suitable spot, and away from any obstacles that can direct rainwater into or away from the opening of the gauge and cause inaccurate measurements. It is further deemed that the tendered rate covers the Contractor's time-related costs for the maintenance of the rain gauge for the duration of the contract".

PSA 8.3.5 Contractor's Obligations with Respect to Health and Safety

(New Clause) The Contractor shall tender a lump sum in the Bill of Quantities to cover his fixed costs for the proper compliance with the requirements of the Occupational Health and Safety Act, the Construction Regulations 2003 issued in terms of Section 43 of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) and the Health and Safety Specifications in Section C3.7 herein. The amount tendered and paid shall be full compensation for:

(i) The drawing up of a detailed Health and Safety Plan in respect of the Works for submission to the Engineer and Employer prior to the handing over of the Site to the Contractor.

(ii) The execution of all training, precautions, monitoring, liaison, consultation and review as detailed in the Health and Safety Plan.

(iii) Ensuring that all Sub-Contractors comply with the requirements of the Act and the Health and Safety Plan.

(iv) The preparation and maintenance of a Health and Safety File, which is to be submitted to the Employer upon completion of the Works.

(v) Compliance in all other respects with the relevant health and safety legislations

Payment shall be effected as follows:

(i) Seventy-five percent (75%) of the lump sum tendered shall be paid when the Contractor's Health and Safety Plan has been submitted to the Engineer and Employer, provided that the Plan is complete and acceptable in terms of the Regulations.

(ii) Twenty-five percent (25%) after the Certificate of Completion is issued, and once the Health and Safety file has been handed over to the Employer.

Item	**Unit**
Fixed costs with respect to health and safety	**Sum**

PSA 8.3.7 Items Requiring Special Attention (Fixed Charge)

(New Clause) a) Wayleaves

The item shall cover all general costs associated with protection of services and compliance with wayleave requirements as detailed in PSA 5.4, including financing of any deposits required and/or costs of providing any sureties or guarantees required.

b) Survey

The item shall cover all costs of establishing control points and general costs associated with setting out the works, as described in PSA 5.1.1 above.

Item	**Unit**
a) Wayleaves	**Sum**
b) Survey	**Sum**

PSA 8.3.9 Removal and re-establishment of Contractor's site establishment

(New Clause) If so instructed, the Contractor shall delay the execution of Portion 2 of the Works and remove the site establishment and re-establish at a later date to be determined by the Employer. This item shall cover all fixed costs associated with the complete removal from site of the Contractor's establishment and the cost re-establishment. 50% of this item shall be paid upon removal of the site establishment and the balance shall be payable upon re-establishment.

The costs for removal and reinstatement of the Employer's Agent's office, vehicle and equipment as specified in Section AB shall also be included in the rate for this item.

No payment will be due under this item in the event that Portion 2 commences immediately after Portion 1 without removal of the site establishment.

PSA 8.3.10 Provision of Advance Payment Guarantee

(New Clause) The Employer may instruct the Contractor to obtain and advance payment certificate for the supply of materials, up to an amount of R 7 000 000, in accordance with clause 6.10.10 of the Contract Data. The certificate shall remain valid until such time as all materials covered by it have been built into the Works as certified by the Employer's Agent.

This item shall cover all costs, premiums and charges associated with providing an acceptable Advance Payment Guarantee.

PSA 8.4 SCHEDULED TIME-RELATED ITEMS

PSA 8.4.1 Contractual Requirements

Add the following to Subclause 8.4.1:
"The Contractor shall tender a lump sum in the Schedule of Quantities to cover his time-related establishment costs. The amount tendered and paid shall be full compensation to the Contractor for:

- the maintenance of his whole organisation as established for this Contract;
- the maintenance of all insurances, indemnities and guarantees required in terms of the Conditions of Contract or Tender where applicable; and
- compliance with all general conditions and requirements which are not specifically measured elsewhere for payment in these Contract Documents.

The Contractor shall tender a lump sum for the abovementioned items. Payment of the lump sum shall be made monthly in compliance with the method laid down in Sub-clause 8.2.2 of SANS 1200: A.

The Contractor will not be paid Time-Related Preliminary and General charges for any Special Non-Working Days, as stipulated in the Appendix, which shall be deemed to have been allowed for in his rates."

"Adjusted Payment for Time-Related Costs"

The payment to the Contractor for time-related costs shall be adjusted in accordance with the following formula in the event of the Engineer granting an extension of time in terms of the provisions of the Contract:

$$\text{Sum of Tendered amount for Time-Related items} \times \frac{\text{Extended contract period as authorised by Engineer}}{\text{Tender contract period}}$$

The above mentioned adjustment of the payment for Time-Related Items shall be made in the Completion Payment Certificate and shall be the only payment for additional time-related costs irrespective of the actual period required to complete the Contract including its authorised extensions.

PSA 8.4.2 Time Related Establishment Costs

The Contractor shall tender a lump sum in the Bill of Quantities to cover his time-related establishment costs. Other than the items which have been separately scheduled in PSA 8.4.5, the amount tendered and paid shall be full compensation to the Contractor for:

(i) The maintenance of his whole organisation as established for this Contract;

(ii) Compliance with all general conditions and requirements which are not specifically measured elsewhere for payment in these Contract Documents.

The Contractor shall tender a lump sum for the above-mentioned items.

Payment of the lump sum shall be made monthly in compliance with the method laid down in Sub-Clause 8.2.2 of SANS 1200 A.

Item	**Unit**
Time related establishment	**Sum**

PSA 8.4.5 Items Requiring Special Attention

The following items shall cover time-related costs associated with complying with specific items requiring special attention, as identified in the Scope of Work.

Item	Unit
a) Dealing with water	**Sum**

The sum tendered shall cover all costs not included in the rates for earthworks or other billed items for complying with Clause 5.5 of SANS 1200 A in dealing with water on the works.

Fixed costs (if any) shall be deemed to be included in PSA 8.3.2.

b) Search for, record and protect all survey bench marks	**Sum**

The sum tendered shall be deemed to be full compensation for complying with the requirements of Clause 5.1.2 of SANS 1200 A.

Fixed costs (if any) shall be deemed to be included in PSA 8.3.2.

c) Nightwatch and Security	**Sum**

The sum tendered shall cover all costs of providing watchmen and security for the duration of the Contract, for the Contractor's establishment and materials stored on site including after hours, on weekend and on public holidays.

The Contractor's attention is drawn to the fact there are informal housing settlements in the vicinity of the site. The Contractor is deemed to have assessed the risk associated therewith and made appropriate provision in his rates.

Fixed costs (if any) shall be deemed to be included in PSA 8.3.2.

d) Maintenance of Access Roads	**Sum**

The sum tendered shall cover all time related costs associated with operating and maintaining access roads for the duration of construction, and reinstating them to their original condition upon completion, as specified in PSA 5.8.5.

Fixed costs, if any, shall be deemed to be included under item PSA 8.8.2.

e) Dust Control	**Sum**

The item shall cover all time related costs associated with dust control and pollution prevention as detailed in PSA 5.6.

Fixed costs, if any, shall be deemed to be included under item PSA 8.3.2.

PSA 8.4.6 Contractor's Obligations with Respect to Health and Safety

The Contractor shall tender a lump sum to cover his time related costs of with respect to health and safety. The amount shall cover all of the Contractor's obligations as described in PSA 8.3.5 above.

Item	Unit
Time related costs with respect to health and safety	**Sum**

PSA 8.4.7 Compliance with Construction Environmental Management specifications

The Contractor shall tender a lump sum to cover all time-related costs (over and above the costs of site establishment) for complying with the Environmental Management specifications contained in Section C3.8. The amount tendered shall be deemed to be full compensation for all administration, labour, plant, materials, services and risks associated with complying with the Environmental Management Specifications in every respect.

Item	Unit
Time related costs with respect to environmental management	**Sum**

PSA 8.4.8 Compensation in terms of Clause 5.12.2.4 of the General Conditions of Contract, 2015 and Clause 9.1.4 of the Contract Data, for delays incurred

(a) Plant ..... Unit : Sum per working day
(b) Labour : ..... ……..Unit : Sum per working day
(c) Supervision..... Unit : Sum per working day
(d) Other services, facilities etc. not covered by (a), (b) and (c)..... Unit : Sum per working day

The sum tendered for each item shall cover the full and final standing cost per day of delaying the specified resource or facility and no additional compensation shall apply, notwithstanding any provisions to the contrary in the contract documents, or in respect of any extension of time granted in relation to the circumstances described in Clauses 5.12.2.4, 9.1.1 and 9.1.2 of the GCC 2015.

For the purposes of calculating the total delay, a working week shall be held to consist of five working days and a working day 9 hours.

Payment for partial standing of any of the scheduled resources for a day or part thereof, or the standing of a complete resource for a part day, will be made pro-rata in proportion to an appropriate factor assessed by the Employer's Agent.

The amount by which compensation for delays is adjusted shall be subject to the contract price adjustment formula as defined in the GCC 2015.

This payment item shall only apply to delays which in the opinion of the Employer's Agent are due to the circumstances described in Clauses 5.12.2.4, 9.1.1 and 9.1.2 of the GCC 2015.

The cost of delays incurred for all other circumstances shall be treated as provided for in the GCC 2015.

The provision of this clause shall in no way prejudice the rights of either the Employer or the Contractor to cancel the contract in terms of the provisions in Clause 9.1 of the GCC 2015.

The Contractor shall take note that no payment will be considered for any additional cost incurred in protecting his plant and site establishment, as well as for costs incurred in respect of damage to constructional plant and equipment.

PSA 8.4.10 Time-related costs of delayed start of Portion 2

If so instructed, the Contractor shall delay the execution of Portion 2 of the Works and remove the site establishment and re-establish at a later date to be determined by the Employer.

This item shall cover all time-related costs, including administrative costs, company overheads and maintenance of security and insurance during the period after completion of Portion 1 and before commencement of Portion 2. The period of time paid for shall be the number of weeks from date of issue of instruction to disestablish site, to the date of issue of the instruction to re-establish for Portion 2.

Item	**Unit**
Time related costs of delayed start of Portion 2	**Weeks**

PSA 8.5 SUMS STATED PROVISIONALLY BY THE ENGINEER

PSA 8.5.1 Testing of materials by Engineer

The provisional sum provided in the Schedule of Quantities is to cover the payment of the SANAS registered soils laboratory to conduct any additional tests as directed by the Employer's Agent.

The percentage tendered shall be paid to the Contractor on the actual amount paid to the soils laboratory and shall cover the following:

- All costs involved in arranging the tests with the laboratory.
- Setting out the positions for the tests to be taken by the laboratory as indicated by the Employer's Agent.
- Making good all test holes.
- The cost of all overheads, charges and profits, etc.

Item	Unit
a) Testing of materials ordered by the Engineer	**PC Sum**
b) Overheads, charges and profit on a) above	**%**

PSA 8.5.2 Survey by Engineer

The item shall cover survey work (additional to any survey work specified herein) to be undertaken as directed by the Engineer and by a surveyor nominated by the Engineer.

The Contractor's tendered mark up shall allow for all necessary administrative costs in complying with the above.

Item	Unit
a) Survey work by Engineer	**PC Sum**
b) Overheads, charges and profit on a) above	**%**

PSA 8.5.3 Relocation of Services

A sum has been allowed for the relocation of services affected by the works to be carried out by the service authority concerned, if necessary.

The Contractor's tendered mark up shall allow for all necessary liaison and cooperation with the service authority concerned.

Item	Unit
a) Relocation of services by service authority	**PC Sum**
b) Overheads, charges and profit on a) above	**%**

PSA 8.5.4 Employment of CLO

A sum has been allowed for the employment of a Community Liaison Officer (CLO). The Contractor shall pay the CLO all fees and costs due to him, which shall be recoverable under this item.

The Contractor's tendered mark up shall allow for all necessary administrative costs in complying with the above.

Item	Unit
a) Employment of CLO	**PC Sum**
b) Overheads, charges and profit on a) above	**%**

PSA 8.5.5 Geotechnical Services

A site investigation and/ or testing will be required during the excavations for the Pump Station.

The sum shall cover the costs of the investigation by a Geotechnical Specialist who will be verifying the conclusions of the geotechnical report including tests and any other work that may be required for proper execution of the task.

The Contractor's tendered mark up shall allow for all necessary administrative costs in complying with the above.

Item	Unit
a) Geotechnical Services	**PC Sum**
b) Overheads, charges and profit on a) above	**%**

PSA 8.5.6 Variation Order carried out by Sub-Contractors

The percentage rate tendered shall cover the main contractor's overheads and profit on any work executed by a subcontractor in respect of any Variation Order issued in terms of the Contract, as provided for by clause 6.6.1.2.1 of the Contract Data.

Item	Unit
a) Additional works under any Variation Order carried out by Subcontractors in accordance with clauses 6.6 of the General Conditions of Contract	**Sum**
b) Contractor's commission on (a) above (as per GCC clause 6.6.1.2.1)	**%**

PSA 8.7 DAYWORK

Certain amounts have been allowed under Dayworks for items of work which were not measurable at the time of tender. Depending on the overall contract price and budget constraints, some or all of these items may be omitted during the construction stage. Work for these items will be by written instruction only, and will be compensated for on a dayworks basis.

PSA 8.8 TEMPORARY WORKS

PSA 8.8.1 Site Demarcation

The sum tendered shall cover all costs associated with erecting, maintaining and removing Construction Width demarcation as specified in PSA 5.8.2.

Site Demarcation ..... Sum

PSA 8.8.2 Access Roads

The sum tendered shall cover the costs associated with establishing and reinstating access roads as specified in PSA 5.8.5.

25% of the sum tendered will be paid once the necessary access roads are substantially established and the balance will be paid after all areas have been reinstated to the satisfaction of the Engineer.

Item	**Unit**
Access roads	**Sum**

PSA 8.8.3 Traffic Accommodation

Access through public roads, to residential and commercial properties shall be maintained at all times. Should temporary diversions become necessary, the Contractor shall give reasonable notice to the affected residents and take adequate measures to maintain the temporary deviation in good condition at all times.

This item shall cover all costs of complying with the above as well as all signage, labour, plant, material and all other costs involved with accommodating traffic in accordance with the latest edition of the South African Traffic Signs Manual.

Item	**Unit**
Traffic accommodation	**Sum**

PSAB SANS 1200 AB: ENGINEER'S OFFICE

PSAB 3 MATERIALS

PSAB 3.1 NAMEBOARDS

The size, painting, decorating and detail of the nameboards shall be as shown in Annexure 2.
The text to appear on the nameboard (names, contract title etc.) shall be confirmed with the Engineer prior to fabrication. One name board shall be in English and the other shall be in Afrikaans or Xhosa as instructed by the Engineer.

PSAB 3.2 OFFICE BUILDINGS

Add the following to Sub-Clause 3.2:

The Contractor shall provide 3 offices for the Employer's Agent and representatives, equipped with air conditioners for summer and heaters for winter periods. In addition, the Contractor shall provide shaded carports for 3 vehicles, roofed and enclosed on three sides and adequately designed and constructed to resist wind and other loads. The available area for each vehicle shall be 5,5 m x 2.7 m.

On completion of the works, ownership of the office buildings, carport, boardroom, toilet, fittings and furnishings will revert to the Contractor who shall remove them from Site.

PSAB 3.3 OFFICE FOR SITE MEETINGS

The Contractor shall make available when required, a suitable office with a table and adequate seating for twelve people, for the purposes of holding site meetings.

PSAB 4 PLANT

PSAB 4.1 TELEPHONE

A fixed line telephone is required.

If so directed the Contractor shall provide one cellular phone, complete with carry case and charger for the exclusive use of the Engineer's Representative. The phone shall be fully insured.

The Contractor shall make the necessary arrangements with a service provider for a suitable cell phone contract for the duration of the Contract. Furthermore, the contractor shall make provision for the reimbursement of cell phone calls made from the Employer's Agent's personal cellphone.

PSAB 4.2 COMPUTER

The Contractor shall provide one approved laptop computer for the exclusive use of the Employer's Agent's Representative. The computer shall be an E560, i5-6200U Processor, 4GB DDR3 (+1 slot free), 500GB/ 7200rpm, DVD+RW DL, Intel HD 520 Integrated Graphics, 15.6 HD Anti-Glare, Graphite Black, ThinkPad BGN 1x1 BT4.0, NO 3G, WIFI, BT, BT, CAM, Windows 10 Pro, 1 year Carry In Warranty. The computer shall also include Kasper Sky Anti-Virus 2016 Africa Edition SA-ENG. 2-Desktop 1-year DVD as well as 3YR Onsite Next Business Day (Top Seller Services) and Office 365 Home (Medialess. 1 Year Subscription) – P2.

The computer shall include a colour monitor, A4 inkjet printer, mouse, keyboard, 1 Gig USB flash drive, USB 3G modem and internet subscription for the duration of the contract.

The computer shall be fully insured. The insurance shall include any excess, which may be imposed in the event of a claim.

PSAB 4.3 SURVEY EQUIPMENT

If so requested, the Contractor shall provide the following survey equipment for the use of the Engineer on the site, until the completion of the Works:

(a) One Engineer's level and level staff, including tripod.
(b) One steel tape of 100 m and one of 30 m length.

The Contractor shall service and maintain all survey equipment in good order. He shall insure them and he shall indemnify the Employer and the Engineer against all claims for loss, damage, breakage or theft of the said equipment. By agreement, the survey equipment may be shared between the Contractor and the Engineer.

Upon completion of the Works the equipment shall revert to the Contractor who shall remove it from the site.

PSAB 4.4 ENGINEER'S VEHICLE

The Contractor shall provide one 1-ton bakkie for the exclusive use, on the Site, by the Engineer's Representative. The vehicle shall be either new or sound second-hand quality and shall be maintained in good condition and supplied with fuel throughout the duration of the Contract. It shall not be older than three years at any time during the Contract. The vehicle shall revert to the Contractor on the date of the Certificate of Completion.

The Contractor shall be arrange for licensing and insurance of the vehicle for the duration of the Contract.

A suitable alternative vehicle must be available when vehicle maintenance is being carried out.

PSAB 5 CONSTRUCTION

PSAB 5.1 NAMEBOARDS

Contract nameboards shall be erected within two weeks of the Contractor receiving occupation of the Site. Any damage to these boards will be repaired within 14 days of a written instruction received from the Engineer.

The Engineer may at any time order the removal, repair and/or relocation of the nameboards if any objections are received with regard to them.

All name boards shall be removed 14 days prior to the date of issue of the Final Approval Certificate.

PSAB 5.5 SURVEY AND MATERIALS ASSISTANTS

The Contractor shall make available to the Engineer two suitably experienced survey and materials assistants to assist on and about the Site with surveys, measurements and materials testing, as and when required during normal working hours

PSAB 8 MEASUREMENT AND PAYMENT

PSAB 8.3 SCHEDULED ITEMS

PSAB 8.3.1 Fixed Charge and Value-Related Items

Payment for fixed charge and value-related items with respect to facilities to be provided for the Engineer will be effected in accordance with Clause PSA 8.3 as applicable.

The sum for the Engineer's office shall include the furniture and ablution facilities as specified. It shall also include costs of providing a meeting room as specified.

The prices shall include all fixed contract costs associated with providing the following items for the Engineer.

Item	**Unit**
Fixed Charge Items	
a) Engineer's office	**Sum**
b) Cellular Phone	**Sum**
c) Computer	**Sum**
d) Survey equipment	**Sum**
e) Vehicle	**Sum**
f) Contract nameboards (2 No)	**Sum**

PSAB 8.3.2 Time-Related Items

Payment for time-related items with respect to facilities to be provided for the Engineer, will be effected in accordance with Clause PSA 8.4 as applicable.

The sum for the Engineer's office, shall include costs of providing a meeting room as specified under PSAB 3.3.

The sum for the items listed below shall be full compensation for all fixed monthly charges and costs including contract payments and insurance but shall exclude charges for phone calls.

The sum for the Engineer's vehicle shall cover all costs of licensing, insurance, maintenance and servicing, but shall exclude fuel and oil.

Item		Unit
Fixed Charge Items		
a)	**Engineer's office**	**Sum**
b)	**Cellular Phone**	**Sum**
c)	**Computer**	**Sum**
d)	**Survey equipment**	**Sum**
e)	**Vehicle**	**Sum**
f)	**Contract nameboards (2 No)**	**Sum**

PSAB 8.4 SURVEY AND MATERIALS ASSISTANTS

The unit of payment shall be by man.hour and shall be full compensation for the use of the labour by the Engineer's Representative.

Item		Unit
a)	**Survey Assistants**	**Man.hours**
b)	**Materials Assistants**	**Man.hours**

PSAB 8.5 CELLULAR PHONE CALLS

The Contractor shall pay all cell phone accounts. However, the cost of phone calls by the Engineer's representative shall be recoverable from the Employer. Data transfer via the modem will be included in this item.

Item		Unit
a)	**Monthly cellular phone call charges**	**Prov Sum**
b)	**Overheads, charges and profit on (a) above**	**%**

PSAB 8.6 FUEL

The Contractor shall cover all costs for refuelling the Engineer's vehicle, however the costs of fuel shall be recoverable from the Employer.

Item		Unit
a)	**Fuel for Engineer's vehicle**	**Prov Sum**
b)	**Overheads, charges and profit on (a) above**	**%**

PSC SANS 1200 C: SITE CLEARANCE

PSC 3 MATERIALS

PSC 3.1 DISPOSAL OF MATERIAL

Natural material comprising stones, gravel, soil and topsoil shall be stockpiled along the edge of the Construction Width and spread over the Construction width after completion of the backfill.

All rubble and waste arising from the demolition of structures shall be removed from site.

Tree trunks, branches and any other cleared vegetation constituting a fire hazard shall be removed from site.

All cleared material removed from site shall be disposed of at an approved landfill site selected by the Contractor.

Burning of material on site will not be permitted.

PSC 5 CONSTRUCTION

PSC 5.1 AREAS TO BE CLEARED

The Contractor shall clear the Construction Width, to the extent necessary to allow access and the execution of the Works as specified.

No established trees or wild olives shall be removed without the Engineer's prior approval. Prior to commencing clearing, the Contractor shall give adequate notice to the Engineer and the area to be cleared shall be inspected jointly by the Contractor's representative and a botanical specialist designated by the Engineer. Any vegetation to be protected shall be identified and marked and where necessary, minor adjustments to the pipeline alignment will be made to avoid damage to significant vegetation.

No vines shall be removed without prior approval from the Engineer. Prior to removal of any vines, the Contractor shall give adequate notice to the owner and give him the opportunity to recover any plants and or materials.

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.1 PRINCIPLES

PSC 8.1.1 Demolition

Payment for demolition work, should it arise, shall only be made after all waste generated from the demolition work concerned has been cleared from site to the satisfaction of the Engineer.

Where indicated that materials recovered from demolition or dismantling of existing structures or plant are to be handed over to the Employer, the rate shall include all costs of removing, transporting and stacking the material at the designated location. No additional payment will be made for transport of material from any location along the pipe route to any location within 500 m of the Construction Width.

Where indicated that materials are to be reused in the Works, the rate shall cover all costs associated with dismantling, setting aside and storing the materials and protecting them from damage, until they are reused.

PSC 8.2 SCHEDULED ITEMS

PSC 8.2.1 Clear and Grub

Clearing and grubbing will not be measured where the pipeline is laid within existing gravel roads.

PSC 8.2.5 Fences

Protection/Reinstatement of Fences

Where existing fences cross the pipeline route, the item shall cover the costs of adequately supporting them, protecting them from damage and reinstating them, as well as providing temporary gates as required by the Contractor.
Where existing fences run along and within the Construction Width, the item shall cover the costs of protecting the fence from damage or temporarily relocating it outside of the Construction Width and reinstating it after completion of the works.

The fences may be reinstated using the original materials recovered from the existing fences provided that the Contractor shall, at his own cost, replace any materials that have been lost or damaged during the construction period.

The quantity measured shall be the number of fences affected, or in the case of fences running longitudinally the length of the portion of fence lying within the Construction Width.

Item	Unit
Protect/Reinstate fences that intersect the pipe route	**No**
Protect/Reinstate fences that follow the pipe route	**m**

PSD SANS 1200 D: EARTHWORKS

PSD 1 SCOPE

Items of work covered by this specification shall include, bulk and restricted earthworks for the pump stations as well as all other incidental excavations required to complete the Works.

PSD 3 MATERIALS

PSD 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES

PSD 3.1.1 Method of Classifying

The Contractor may use any method he chooses to excavate any class of material but his chosen method of excavation shall not determine the classification of the excavation. The Engineer or his Representative will decide on the classification of the materials. In the first instance the classification will be based on inspection of the material to be excavated and on the criteria given in PSD 3.1.2 below. All material shall be considered to be soft material unless agreed and approved otherwise in writing with the Engineer prior to excavation taking place.

In the application of this classification, no differentiation shall be made between "bulk" or "restricted" excavations.

PSD 3.1.2 Classes of Excavation

All material encountered in any excavations for any purpose including restricted excavation will be classified as follows:

a) Hard rock excavation
Hard rock excavation shall be excavation in material (including un-decomposed boulders exceeding 0,17 cubic metres in individual volume) that cannot be efficiently removed without blasting or without wedging and splitting.

b) Boulder excavation
Boulder excavation shall be excavation in material containing more than 40% by volume of boulders of sizes ranging between 0,01 m^3 and 0,17 m^3.

c) Soft excavation
Soft excavation shall be all material not falling into the categories of hard rock or boulder excavation.

PSD 3.2 CLASSIFICATION FOR PLACING PURPOSES

PSD 3.2.1 Material suitable for Embankments and Terraces

(d) The material arising from excavations for structures, foundations, footings and the like shall be used for the embankments, berms and terraces or as directed by the Employer's Agent and shall be compacted to a minimum of 90% modified AASHTO density (100% for sand).

PSD 3.2.2 Material suitable for Replacing Overbreak in Excavations for Foundations

Add the following Subclause to 3.2.2:

"Any overbreak, in locations where concrete work is to be cast against excavated undisturbed surfaces (eg. below bulk excavation) is to be refilled with Grade 10 concrete".

PSD 3.2.4 Backfilling and Embankments

Sufficient material arising from excavations for structures, foundations, footings and the like and which is suitable for forming and shaping including compaction of embankments, berms and backfilling against finished structures shall be temporarily stockpiled in the vicinity of the constructions. All other material from the excavations shall be disposed of at the designated area.

PSD 5 CONSTRUCTION

PSD 5.1 PRECAUTIONS

PSD 5.1.1 Safety

PSD 5.1.1.2 *Safeguarding of Excavations*

The Contractor shall be responsible for all lateral support and the safe-guarding of all excavations, and all costs involved with the proper safeguarding of the excavations shall be included in the tendered rates.

PSD 5.1.1.4 *Excavation of Rock by Blasting*

In addition to complying with the provisions of Sub-clause 5.1.1.3, the Contractor shall record for the information of the Employer's Agent the spacing and loading of the charge in each blast and compliance with this requirement will not relieve the Contractor of any responsibility in terms of the said Sub-clause.

PSD 5.2 METHODS AND PROCEDURES

PSD 5.2.1 Site Preparation

PSD 5.2.1.2 *Conservation of Topsoil*

Add the following to Subclause 5.2.1.2:
"Topsoil shall not be stockpiled higher than 2,0m. Care shall be exercised to prevent the contamination and compaction of topsoil in any way especially by vehicles travelling over such material."

Topsoil shall consist of fertile, friable soil of loamy character obtained from areas having a good coverage of natural vegetation, preferably grasses. It shall be free from deleterious matter such as large roots, stones, refuse, stiff or heavy clays and the seeds of noxious weeds.

Topsoil shall be obtained from wherever suitable material occurs on the site or borrow areas. The Employer's Agent shall indicate the areas from where topsoil is to be removed, and unless otherwise permitted by the Employer's Agent, topsoil shall be taken from within 400mm of the surface. If the Contractor fails to stockpile the topsoil indicated, he shall obtain suitable topsoil from other sources at no extra cost to the Employer.

PSD 5.2.2 Excavation

PSD 5.2.2.3 *Disposal*

Where excavated material is disposed of on site or at location designated by the Engineer, the top soil shall be stripped to a depth of 150 mm or as directed, stockpiled and reinstated to its original depth over the spoil. The spoil site shall be graded to smooth, free-draining contours.

PSD 5.2.4 Finishing

PSD 5.2.4.2 *Topsoiling*

Delete the contents of Subclause 5.2.4.2 and replace with the following:

"Before topsoiling, the area must be shaped to line and level and then loosened to a depth of 150mm. All rubble, large rocks, stones, etc shall be raked up and removed from the site prior to the top soil being evenly distributed over the area to be grassed at a thickness of not less than 100mm. The topsoil shall be levelled with rakes. Following topsoiling, the contractor shall apply 2:3:2 fertilizers at a rate of 40gm/m^2 prior to planting of vegetation cover".

PSD 5.2.5 Transport for Earthworks

All haulage for materials obtained from commercial sources selected by the Contractor or disposed of off-site by the Contractor shall be regarded as free-haul.

PSD 8 MEASUREMENT AND PAYMENT

PSD 8.3 SCHEDULED ITEMS

PSD 8.3.2 Bulk Excavation

Unless an item has been specifically scheduled for dewatering, the cost of dewatering of excavations will be held to have been included in the tendered rates for excavation. Provision is

made under item PSA 8.4.5 (a) which shall cover all the Contractor's costs involved with the control of surface and subsurface water, not included in the rates for excavation and trench excavations.

The Contractor shall provide adequate temporary drains in and around the excavations to control surface water. Such drains may be self-draining or lead to sumps equipped with pumps.

Should the Contractor allow saturated conditions to develop he shall take such steps to rectify the conditions as the Engineer may order, entirely at his own cost, including dewatering.

The tendered price for excavation shall also include for trimming, levelling and compacting the floor of the excavation ready for the application of the blinding layer.

Where embankments are to be constructed with boulder material, embankments are to be laid and compacted in layers (specified by the Engineer in writing) and boulders of diameter greater than the layer thickness are to be removed before compaction. The cost for this exercise is deemed to be included in the tendered rates.

PSD 8.3.2 a) *Excavate in all materials and use in embankment or backfill or dispose of as ordered*

Where the sequence of operations requires temporary stockpiling of excavated material, the rates for excavation shall cover temporarily stockpiling the excavated material on site and maintaining stockpiles until the material is used.

Removal of Excess Material
Where material is surplus or unsuitable for use in embankments or spreading on site, the Engineer may order such material to be carted away and disposed of off-site at a location determined by the Contractor. The rate shall cover loading and transport and all disposal charges. The volume shall be computed on the basis of the volume of hauling vehicles in accordance with 8.2.2.

PSD 8.3.3 Restricted Excavation

The provisions of PSD 8.3.2 shall apply. Rates tendered shall include for restricted backfilling around the structure.

PSD 8.3.14 Importation of Top Soil

The item shall cover all costs in sourcing, transporting to site and offloading, topsoil material from an approved source, for vegetating of site.

Item	**Unit**
Importation of topsoil	**m³**

PSDB SANS 1200 DB: EARTHWORKS (PIPE TRENCHES)

PSDB 3 MATERIALS

PSDB 3.1 CLASSES OF EXCAVATION

The excavation of material will be classified as specified in Clause PSD 3.1.

PSDB 3.2 BACKFILL MATERIAL

Delete the contents of Clause 3.5(b) and replace with the following:

"Materials used in the reinstatement of trenches beneath or within a new roadway, up to underside of the road layers, shall be 37,5mm basecourse quality material conforming to SANS 1200 MF compacted in 150mm layers to 98% Modified AASHTO density. The area subject to loads from road traffic shall be held to apply for a width of 150mm beyond the back of kerb."

PSDB 5 CONSTRUCTION

PSDB 5.1 PRECAUTIONS

PSDB 5.1.5 Shoring of Pipe Trenches

The Contractor shall be responsible for ensuring that pipe trenches are safe by either cutting back the walls to safe slopes or shoring. The rates for trench excavation shall be deemed to include for this.

When excavating the Contractor shall exercise due caution to ensure that the excavations does not undermine any existing structures or services, including existing thrust blocks.

PSDB 5.4 EXCAVATION

Trench Depths
All trenches are to be excavated to a depth sufficient to accommodate the pipes at the levels and cover as shown on the drawings. Unless otherwise stated, a minimum cover of 1000 mm will generally be required. Allowance must also be made for the required depth of pipe bedding.

PSDB 5.6.3 Disposal of Surplus Material

Surplus material shall be disposed of off site or spoiled on site, as directed, in accordance with the provision of PSD 5.2.2.3.

PSDB 5.6.6 Completion of Backfilling

Add the following to Subclause 5.6.6:

"If in the opinion of the Employer's Agent's Representative the Contractor is lagging in the backfilling of trenches, he will be entitled to order that no further excavation takes place until the backfilling operation has caught up."

PSDB 5.7 COMPACTION OF TRENCH BACKFILL

Compaction of trench backfill above the bedding (fill blanket) shall be 90% Modified AASHTO density (100% for non-cohesive materials).

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.3 SCHEDULED ITEMS

PSDB 8.3.1 Site Clearance and Removal of Topsoil

The rate tendered shall include all costs of complying with the relevant requirements of the Environmental Management Plan.

d) Strip and Conserve Gravel in Road Ways

Where pipes are laid within gravel roads, the contractor shall strip and conserve separately the existing gravel to a depth of 150 mm (or such other depth ordered) for use in reinstating the road surface. Any shortfall in gravel due to loss of material or contamination shall be made up at the Contractor's cost by importing laterite gravel from an approved source.

The quantity shall be calculated from the trench width determined in accordance with 8.2.3, and the length of pipe along the centreline between road edges. The quantity shall be adjusted for depths other than 150 mm where so ordered.

The rate tendered shall include all costs in stripping, stockpiling and conserving the material and replacing shortfall as specified.

Item	Unit
Strip and conserve gravel in roadways	**m^2**

PSDB 8.3.2 Excavation

PSDB 8.3.2 (b) *Extra-over item (a) above for:*

Delete (1) and (2) of Sub-Clause 8.3.2 (a) and replace with the following:

a) Hard rock excavation
b) Boulder excavation

Hard rock excavation and boulder excavation will only be paid when written permission is obtained from the Engineer prior to the excavation operation actually commencing.

PSD 8.3.4 Particular Items

Add the following to Sub-Clause 8.3.4:

PSDB 8.3.4 (c) *Excavate by hand in all materials to verify existing services, or as directed by the Engineer and backfill*

This item shall apply where the excavation is only required to confirm the position of an existing service and the removal of the service is not intended.

Measurement shall be the cubic metres actually excavated by hand to expose the services or hand excavations as directed by the Engineer.

The rate shall cover the additional cost of care in excavation necessitated by the presence of the service.

Excavations by hand will only be paid upon written order by the Engineer to perform excavations by hand.

Item	Unit
Excavation by hand in all materials to verify existing services and backfill	**m^3**

PSG SANS 1200 G: CONCRETE

PSG 1 SCOPE

All concrete works are to be carried out in accordance with the requirements of SANS 1200 G. This includes the construction of all reinforced and plain concrete structures, foundations, chambers, thrust blocks, haunching and encasement to pipes.

PSG 2 INTERPRETATIONS

PSG 2.4 EXPLANATION OF TERMS

PSG 2.4.3 Joints

Delete the fourth sentence and substitute:

The Employer's Agent may order further joints prior to the commencement of casting the relevant concrete wherein they are situated. Such joints will become "designated joints" and will be paid for in terms of Subclause 8.5, or as may be otherwise agreed. However, should the Contractor require further joints to suit his own purposes he shall first obtain the approval of the Employer's Agent. Such further joints may then be constructed but these will not be "designated joints" and their cost shall be borne by the contractor.

PSG 3 MATERIALS

PSG 3.2 CEMENT

PSG 3.2.1 Applicable Specifications

Unless agreed to otherwise by the Employer's Agent, the cement used on the Works shall be Sulphate Resisting Cement, or Ordinary Portland Cement as specified.

The cement shall be common cement of strength class 42,5N or higher that complies with SANS 50197-1,

All cement shall be to the Engineer's approval and have a guaranteed equivalent Na_2O content of less than 0,5%.

For each cement consignment, the Contractor shall furnish a certificate stating that the cement has been tested and analysed by the manufacturer and complies with the above requirements.

A similar procedure should be followed when use is made of ready mixed concrete.

Extenders shall comply with the relevant part of SANS 1491.

PSG 3.2.3 Storage of Cement

Cement shall be stored in such a way that the oldest cement is used first. Cement shall not be kept in storage for longer than 8 weeks.

PSG 3.5 ADMIXTURES

PSG 3.5.1 Approval of Admixtures

Admixtures shall comply with the requirements of ASTM C 494.

PSG 3.5.3 Curing Agents (New Clause)

Curing agents shall be tested in accordance with ASTM C 156 and shall comply with the requirements of ASTM C 309, except that the loss of water within 72 h shall not exceed 0,40 kg/m².

PSG 3.5.2 Air-Entraining Agents

The use of air entraining agents will not be permitted.

PSG 4.5 FORMWORK

PSG 4.5.1 Design

Add the following to Subclause 4.5.1

"The Contractor shall be responsible for the design of the formwork and such design including its erection shall be signed off by a suitably experienced Professional Technologist or Engineer.

PSG 5 CONSTRUCTION

PSG 5.1 REINFORCEMENT

PSG 5.1.2 Fixing

Welding of reinforcement as a means of securing it against displacement will not be permitted.

PSG 5.1.6 Cutting

Cutting of reinforcement shall be done cold. The use of cutting torches will not be permitted.

PSG 5.2 FORMWORK

PSG 5.2.6 Formwork to Foundations

The Engineer may at his discretion, and depending on the nature of the soil, determine on site that the vertical earth excavation sides may form the vertical formwork to footings, bases, etc. In this situation the Contractor shall not be paid for formwork, and the measurement of the dimensions of the concrete construction shall be determined by the Engineer on site.

PSG 5.5 CONCRETE

PSG 5.5.1 Quality

PSG 5.5.1.2 *Durability*

Add the following to Subclause 5.5.1.5:

"The exposure conditions at the site of the Works are to be considered as being severe".

PSG 5.5.1.7 *Strength Concrete*

All concrete to the structures shall be strength concrete to the specified strengths. Concrete in blinding layers and benching shall be strength concrete grade 10 MPa/19 mm, unless indicated otherwise.

PSG 5.5.3 Mixing

PSG 5.5.3.1 *Mixing at construction Site*

Add the following to Subclause 5.5.3.1:

Notwithstanding the requirements of Subclause 5.5.3.1, the mixing of concrete at the construction site shall be subject to approval.

PSG 5.5.5 Placing

PSG 5.5.5.5 Delete "3m" and replace with "2m".

PSG 5.5.5.10 *Placing*

"In the case of continuous walls (eg. pump station walls), these are to be cast in lifts of such height that each lift can be poured uninterruptedly 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 authorised 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 if possible, and the Contractor may be required by the Employer's Agent to make the operation continuous by working shifts. A workable arrangement must be made before each concreting operation commences".

PSG 5.5.6 Compaction

PSG 5.5.6.3 Delete "…or (if approved) by spading, rodding, or forking" in the end of Subclause 5.5.6.3 and replace with "using approved vibrators".

PSG 5.5.7 Construction Joints

PSG 5.5.7.2 Delete the contents of Subclause 5.5.7.2 and replace with the following:

"No vertical, inclined or unforeseen construction joints of any kind will be permitted in continuous walls unless they have been specifically ordered or authorised by the Employer's Agent".

PSG 5.5.8 Curing and Protection

Add the following to Subclause 5.5.8:

"Delete all references to the curing periods relating to concrete made with Portland Blast Furnace Cement since the use of the latter is not permitted in terms of the Contract".

PSG 5.5.9 Adverse weather conditions

PSG 5.5.9.2 *Hot weather concreting*

Note: When concrete operations are being carried out at ambient temperatures in excess of 32°C, the Contractor shall apply the relevant recommendations for hot weather concreting set out in American Concrete Institute publication ACI 305R-77 "Recommended practice for hot weather concreting".

PSG 5.5.10 Concrete surfaces

All unformed concrete surfaces shall be given a wood float finish.

PSG 5.5.11 Watertight Concrete

Add the following to Subclause 5.5.11:

"The pump station is to be subject to watertightness tests.

No vertical or inclined construction joints of any kind will be permitted in the perimeter walls of water-retaining structures unless these have been specially ordered or authorised by the Employer's Agent".

PSG 5.5.12 Concrete in Wet Ground

Delete the contents of Subclause 5.5.12 and substitute with the following:

'The design for the structures to be built in wet ground makes full allowance for the conditions likely to be encountered on Site. The documents and drawings indicate what is required to be built. However, the Contractor shall be fully responsible for keeping the excavations free from water whilst the construction work is being carried out. The method by which she or he proposes to achieve this shall be approved by the Employer's Agent before being implemented".

PSG 5.5.13 Grouting

Add the following to Subclause 5.5.13:

Grouting shall be done to the instruction of the Employer's Agent using materials of suitable consistency as follows: Unless otherwise directed, grouting mixtures shall consist of 1 part cement to two parts concrete sand by volume, well mixed and with sufficient water added to obtain the required consistency. Where recesses to be filled are of appreciable dimensions, the Employer's Agent may direct the Contractor to replace a proportion of sand with fine stone to reduce shrinkage. The Employer's Agent may also require the Contractor to use non-shrink or other additives in grouting mixtures where these are allowed for in the Bill of Quantities.

PSG 5.5.13.1 *Liquid Grout*

Add the following to Subclause 5.5.13.1:

"Where liquid grout is required for bolt holes etc., water shall be added in such quantity that, when the material is thoroughly mixed and stirred, it shall flow readily so as to fill all recesses and air spaces in the work to be grouted. Before grouting any section of the work with liquid grout, the surfaces to receive grout shall first be thoroughly cleaned and flushed with water. The grout shall then be introduced in such a manner as to fill effectively all recesses. When the grout has set, the surface of the work shall be finished off flush and smooth with cement mortar

No payment will be made if the work is not signed off by the Employer's Agent's Representative".

PSG 5.5.13.2 *Grouting of Pipes /Specials through Walls*

Add the following to Subclause 5.5.13.2:

"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:

(a) remove all shuttering and boxing remaining in the holes;
(b) make any alterations required to the position and shape of the holes;
(c) thoroughly clean and scabble the sides of the holes so as to obtain satisfactory bond surface for the new concrete; and
(d) free all surfaces of the pipes/specials of all coatings, and thoroughly scrape and clean the pipes/specials.

After accurately positioning the pipes/specials in the respective holes, the Contractor shall fix the pipes/specials in the holes.

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 whole shall, when set, form a dense, homogeneous, and waterproof mass. A spare vibrator with an independent power source shall be kept in readiness to ensure continuity of placing in the event of the breakdown of the duty vibrator.

Smooth formwork that has been suitable strengthened for use with a vibrator shall be provided for facing the concrete around each pipe/special.

The type of grouting to be used shall be an expansive cementitious grout or similar approved by the Employer's Agent. The grouting shall be done in the presence of the Employer's Agent

No payment will be made if the work is not signed off by the Employer's Agent's Representative".

PSG 5.5.13.3 *Dry-packed Grout*

"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. The grouting shall be done in the presence of the Employer's Agent. 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 which the Contractor shall not fail to obtain. If necessary, the Employer's Agent may require the Contractor to undertake preliminary tests to check the behaviour of proprietary additives under the conditions obtaining on the site.
The type of grouting to be used shall be an expansive cementitious grout or similar approved by the Employer's Agent.

No payment will be made if the work is not signed off by the Employer's Agent's Representative".

PSG 5.5.13.4 *Expoxy Grout (Epoxy mortar type only)*

"The manufacturer's instructions shall be observed when an epoxy grout is used".

PSG 5.5.16 Cement Mortar

"Where cement mortar is specified for filling around pipes etc., water shall be added to obtain a firm paste which can be worked with a trowel but is not fluid. Surfaces to receive mortar shall be well wetted and excess water allowed to drain, or be removed. The mortar shall be worked into place with

a trowel or tamping rod, exposed surfaces floated off and covered with wet hessian for 24 hours and allowed to harden without disturbance".

PSG 6 TOLERANCES

PSG 6.1 BASIS OF MEASUREMENT

PSG 6.1.1 General

The degree of accuracy of the permissible deviations shall be II.

PSG 7 TESTS

PSG 7.1 FACILITIES AND FREQUENCY OF SAMPLING

PSG 7.1.2 Frequency and Sampling

Notwithstanding the requirements of Subclause 7.1.2, a sample shall consist of six (6) standard 150mm cubes. Each sample shall be tested on the basis of three (3) cubes being crushed when 7 days old and three (3) when 28 days old. These samples shall be taken from each day's casting and/or from at least every $50m^3$ of concrete poured.

Test results from the Ready Mix supplier will not be accepted as the sole evidence of the concrete quality. These may be sumitted as corroboratory evidence but a full programme of site based testing as specified in SANS 1200G is required for all concrete, including Ready Mix.

The Contractor shall keep the following minimum records of all cubes taken and tested:

Date cast; section of work from which samples were taken; results of 7 and 28 day tests

PSG 7.2 TESTING

PSG 7.2.3 Laboratory Testing

"The Contractor will be liable for all costs incurred in making structural concrete cubes and having these tested at an approved SANAS Accredited laboratory. Furthermore, the Contractor shall take note that he is responsible for taking an adequate number of tests to ensure that the concrete being used complies with the specification. The Employer's Agent will only carry out such check testing as she or he requires".

PSG 7.2.6 Watertightness Tests

"Unless otherwise ordered by the Employer's Agent, all water containing structures shall be tested for watertightness. Each structure shall be filled, in stages, to top water level unless it is obvious that some appreciable leak has developed and that a test is not possible.

As soon as the water surface is reasonably steady after filling, the water level is to be established and recorded by means of a hook gauge to be provided by the Contractor, and thereafter, is to be measured and recorded by the Employer's Agent, in relation to a fixed bench mark, each successive 24 hours or less and the results graphed so as to establish the progressive rate of absorption and leakage.

If the rate of leakage at any stage exceeds one litre per m^2 of wetted concrete surface per 24 hours (plus an allowance for evaporation if the structure is unroofed) at the end of three days in the case of the first three stages, and at the end of seven days in the case of the fourth stage, and there is no prospect, in the opinion of the Employer's Agent, of the rate of leakage becoming as low as that, he shall have the right to deem the water containing structure to be not watertight, and to notify the Contractor accordingly, who shall forthwith take such steps, at his own expense and to the approval of the Employer's Agent, as may be considered necessary to achieve watertightness, other than plastering the floor and inside walls.

In the event of the steps taken by the Contractor proving ineffective in reducing the rate of drop in water level over a period of 7 days to less than the equivalent of one litre per square metre of wetted concrete surface per 24 hours (plus an allowance for evaporation if the structure is unroofed) the Employer's Agent shall have the right, if he considers there is no prospect of the leakage taking up in a reasonable period to the rate stated, to order the Contractor to carry out at his own expense, approved steps, on completion of which the Contractor shall again clean out and test in the manner specified and at his own expense.

Notwithstanding the fact that a structure may have passed the test described in the aforementioned paragraph, it will not be accepted if there are any leaks or damp spots on any exterior surface. Any such defects shall be sealed and repaired in a manner and to a standard acceptable to the Employer's Agent.

Watertightness of concrete roofs shall be tested by the continuous sprinkling of water over the roof with approved sprinklers so that a film of water is maintained on the surface of the slab. The roof shall be considered watertight if there are no damp patches visible on the underside after 48 hours of sprinkling or ponding.

In the event of leakage being evident at any time during the Period of Maintenance, the Employer's Agent, before issuing his Final Certificate may call for further rectification and testing as already described, if he considers such to be necessary, and will have the right to withhold this Certificate until he considers the work to be satisfactory".

PSG 8 MEASUREMENT AND PAYMENT

PSG 8.1 MEASUREMENT AND RATES

PSG 8.1.2 Reinforcement

Replace the contents of this clause with the following:

"The unit of measurement for steel bars shall be the tonne of reinforcement in place in accordance with the drawings or as authorised by the Employer's Agent.

Clips, ties, separators, stools and other steel used for positioning reinforcement shall not be measured unless shown on the bending schedules.

The rate tendered shall cover the cost of the supply, delivery, cutting, bending, placing and fixing of the steel reinforcement irrespective of bar diameter, including all tying wire, stools, supports and waste".

Item	**Unit**
Reinforcement	**t**

PSG 8.2 FORMWAORK

Add the following to Clause 8.2:

"The rate shall further include the cost for complying with Clause PSG 4.5".

Item	**Unit**
Formwork	**m^2**

PSG 8.4 SCHEDULED CONCRETE ITEMS

PSG 8.4.3 Strength Concrete, Grade

Add the following to Subclause 8.4.3:

"The rate shall further include the cost for complying with Clause PSG 2.4; 3; 5.5; 6; and 7".

Item	**Unit**
Strength of Concrete, Grade	**m^3**

PSG 8.5 JOINTS

Add the following to Subclause 8.5:

"The rate shall further include the cost for complying with Clause PSG 2.4; 5.5; 6; and 7".

Item	**Unit**
Joints	**m**

PSG 8.9 GROUTING OF PIPES / SPECIALS THROUGH WALLS OR SLABS

Items have been included in the Bill of Quantities for the grouting of pipes or specials through box-outs or broken out openings in walls or slabs. The rates shall include for all necessary labour, an expansive

Cementous grout and equipment required to carry out this work and for finishing to the required quality including complying with Subclause PSG 5.5.13. The rate shall further include the testing of voids where required by the Employer's Agent. No payment will be made if the work is not signed off by the Employer's Agent's Representative.

Item	Unit
Grouting of pipes/specials through walls or slabs	**No**

PSG 8.10 CASTING OF PIPES/SPECIALS THROUGH WALLS OR SLABS

Items have been included in the Bill of Quantities for the casting of pipes or specials through walls or slabs. The rates shall include for any modifications of formwork to allow the pipe or special in question to be cast in, the positioning of the pipe or special and for finishing the concrete surface to the required quality at the end of the concreting operation.

Item	Unit
Casting of pipes/specials through walls or slabs	**m or No**

PSG 8.11 TESTING FOR WATERTIGHTNESS

The rate shall cover the cost of supplying all labour, equipment and water including for the removal of equipment and water after the testing has been approved by the Employer's Agent as well as complying with Subclause PSG 7.2.6.

Item	Unit
Testing for Watertightness	**Sum**

PSGA SANS 1200 GA: CONCRETE (SMALL WORKS)

PSGA 3 MATERIALS

PSGA 3.8 CURING COMPOUND

Curing compound shall be white pigmented natural resin based liquid curing compound complying with ASTM C 309-74."

PSGA 4 PLANT

PSGA 4.4 FORMWORK

PSGA 4.4.2 Finish

The finish to all exposed concrete shall be smooth and that to buried or backfilled surfaces, rough.

PSGA 5 CONSTRUCTION

PSGA 5.1 REINFORCEMENT

PSGA 5.1.2 Fixing

Delete the words "or, if permitted by the Employer's Agent, by welding" in the second paragraph of this subclause. Welding will not be permitted.

PSGA 5.4 CONCRETE

PSGA 5.4.1 Quality

PSGA 5.4.1.5 *Strength Concrete*

Add the following to subclause 5.4.1.5:

"The Contractor shall when requesting approval of a mix design, submit the constituent proportions of the proposed mix together with the results of compressive strength tests carried out."

PSGA 5.4.1.6 *Ready-mixed concrete*

Notwithstanding the provisions of this subclause, the results of tests carried out by the manufacturer as part of his quality control system will not be used as a basis for evaluating the acceptability of delivered concrete in terms of subclause 7.3.

PSGA 5.4.2 Batching

Notwithstanding the requirements of this subclause, the method of batching shall be subject to approval. If volume batching is allowed, only full standard 50kg bags of cement may be used to make up a batch.

PSGA 5.4.6 Compaction

Replace "or (if approved) .... forking" in the first sentence of subclause 5.4.6.3 with "using approved vibrators".

PSGA 5.4.7 Curing and Protection

Notwithstanding the provisions of this subclause, all cast in situ concrete shall, except where otherwise authorised, be cured in accordance with the requirements of subclause (c) using curing compound of the type specified in PSGA 3.8.

PSGA 5.4.8 Concrete surfaces

All unformed concrete surfaces shall be given a wood float finish.

PSGA 7 TESTS

PSGA 7.1 FACILITIES AND FREQUENCY OF SAMPLING

PSGA 7.1.2 Frequency and Sampling

Notwithstanding the requirements of this subclause, the Contractor shall take note that he is responsible for taking an adequate number of tests to ensure that the concrete being used complies with the specification. The Employer's Agent will only carry out such check testing as he requires.

PSGA 8 MEASUREMENT AND PAYMENT

PSGA 8.1 MEASUREMENT AND RATES

PSGA 8.1.3 Concrete

Add after "testing" in the second line of subclause 8.1.3.3(a) "including transport to an approved laboratory".

PSGA 8.4 SCHEDULED CONCRETE ITEMS

PSGA 8.4.4 Unformed Surface Finishes

Add the following to Subclause 8.4.4:

"The rate shall further include the cost for complying with Clause PSGA 5.4.8".

Item	Description	Unit
PSG 8.3.4	**Extra-over galvanizing of reinforcement bars…….**	**t (tonne)**

The rate shall cover the additional cost of galvanising reinforcement bars in accordance with the requirements of SANS 1200 HC. The rate shall include transport and delivery to and from the coating Site.

Item	Description	Unit
PSG 8.4.3	**35MPa Strength Concrete……**	**m^3 (cubic meter)**

In addition to the requirements as specified under SANS 1200G Item 8.4, concrete mixes specified as 35MPa shall meet the following mix design requirements:

- Cement to meet the requirements of CEM II/V 42.5
- Minimum 300kg/m^3 cementitious content
- Maximum WC ratio of 0.55

The rate is to be inclusive of additional materials as specified as well as those required to meet workability requirements such as plasticizers, etc.

Item	Description	Unit
PSG 8.9.1	**250micron DPM below surface bed…….**	**m^2 (square meter)**

The rate shall cover the cost of supply, delivery, and installation of SABS approved 250 micron damp proof membrane (DPM) plastic sheeting.

Item	Description	Unit
PSG 8.9.2	**Under floor drainage as per drawing 5473-ST-CO-101…….**	**m (meter)**

The rate shall cover the cost of supply, delivery and installation of under floor and toe drainage systems as per the details indicated on drawing 5473-ST-CO-101. The rate shall include all materials indicated in the details such as slotted drain pipes wrapped in A4 geotextile (bidim), 19mm filter stone encasement of 300mm width and maximum 600mm depth, and A4 geotextile (bidim) around stone, as well as all fittings and connections required to connect and link the system to stormwater outlets.

Item	Description	Unit
PSG 8.9.3	**3-ply Malthoid to top of walls……**	**m (meter)**

The rate shall cover the cost of supply, delivery, and installation of SABS approved 3-ply malthoid roofing felt, laid on top of walls to a width of 350mm prior to casting roof slab and beam elements.

Item	Description	Unit
PSH 8.3.1.2	**Supply and fabrication of steelwork as per drawing 5473-ST-CO-102**	
	i) External galvanised mild steel catladder……..	No.
	ii) Internal Grade 316 stainless steel catladder……..	No.
	iii) Galvanised vent pipes and accessories……..	No.
	iv) Galvanised manhole covers with lock……..	No.
	v) 3mm galvanised mild steel downpipes with header box ……..……..	No.
	vi) 100mm Full flow drainage outlet with grate (Saint Gobain Type 3550 or similar approved) ..…...	No.

The rate shall cover the cost of supply, delivery, and installation of steel items as per the details indicated on drawing 5473-ST-CO-102. The rate shall include the fabrication of elements complete with cleats, brackets, gussets, fasteners, and other accessories as indicated, trial assembly as required, and erection or installation on site inclusive of installation of HD bolts and anchoring systems as required. Downpipes and ladders shall extend the full height of the reservoir to a maximum overall height of 8.5m each and any lengths more than this shall be claimed pro rata. The rate shall also include galvanising corrosion protection as specified in accordance with SANS 1200 HC.

PSL SANS 1200 L: MEDIUM PRESSURE PIPELINES

PSL 1 SCOPE

PSL 1.1 This section covers the supply and installation of the following piping systems for the rising mains:

a) High-Density Polyethylene (HDPE) pipes and,
b) Stainless Steel pipework and fittings

PSL 2 INTERPRETATIONS

PSL 2.3 DEFINITIONS

Allowable Operating Pressure: Internal pressure, excluding water hammer, that a component can safely and continuously withstand under permanent hydraulic service.

Maximum Operating Pressure: Maximum internal pressure, including water hammer, that a component can safely withstand during service.

Allowable Test Pressure: Maximum hydrostatic pressure that can be applied on site to a newly installed component

PSL 2.4 ABBREVIATIONS

DI	:	Ductile Iron
DN	:	Nominal Diameter

PSL 3 MATERIALS

PSL 3.1 GENERAL

Add to Sub-Clause 3.1

Unless otherwise scheduled or shown on the drawings, the pipes to be used on the contract are as follows:

(i) Pipelines shall be high-density polyethylene (HDPE) pipes are specified.
(ii) Pipework specials in pump stations, chambers and crossing the rivers via pipe bridge shall be steel.

The following alternatives will be considered for pipeline and rising mains, subject to the Engineer's approval:

(i) Ductile iron, spigot and socket pipes, cement mortar lined (DI)
(ii) Spigot and socket steel pipes

In the event of the Contractor proposing an alternative pipe material, the Contractor shall demonstrate to the Engineer that the alternative offered is equal or better than the specified materials in respect of head losses at the design flow, pressure class, resistance to external loads and durability.

The Contractor shall provide adequate storage facilities for pipes, couplings and specials to conform with the following:

(a) Couplings and specials

Until required for use, the rubber rings shall be stored in a cool dark place, away from grease, oil or harmful chemicals. If rubber rings have been tied, they shall be separated a few days before they are required for use in order to eliminate minor impressions, which the ties may have caused.

Couplings, into which rubber rings have been fitted, ready for use, shall be stored under cover. All couplings and specials shall be stacked off the ground to ensure that the protective coatings are not damaged.

(b) Stacking of pipes.

Pipes may be placed off the ground alongside the pipe route. When stacking is necessary, the Contractor shall make necessary arrangements for stacking areas and shall stack as recommended by the manufacturer.

(c) Valves.

Valves shall be stored under cover and shall be stacked off the ground in a manner which will prevent the ingress of dirt and ensure that the valve faces, spindles and coatings are not damaged.

PSL 3.3 C.I. PIPES, FITTINGS AND SPECIALS (SUB-CLAUSE 3.3)

Add the following to Subclause 3.3 :

Cast iron fittings shall comply with SANS 546 class D.

PSL 3.4 STEEL PIPES, FITTINGS, AND SPECIALS

PSL 3.4.1 General

The contractor shall submit to the Engineer or his representative, the certificates covering the chemical analysis and physical properties of the iron used in the manufacture of pipes and specials.

Written confirmation that welding has been carried out by coded welders shall also be provided if required.

Each pipe or fitting shall have its relevant item number painted onto the exterior surface prior to despatch from the factory.

PSL 3.4.3 Pipes of Nominal Bore over 150mm

Add to the Subclause 3.4.3:

All steel pipes, fittings and specials shall be manufactured from 4,5mm thick Grade B steel plate and shall comply with the requirements of SABS 719.

PSL 3.4.4 Fittings and Specials

Add to the Subclause 3.4.4:

All fittings and specials shall be manufactured from straight pipe materials specified under the previous Clauses; the pipe so used shall have satisfactorily passed the stipulated hydraulic pressure test.

PSL 3.4.5 Welds

Pipes shall be manufactured from steel strips or plates continuously welded along the seams and the height of the inner weld reinforcement shall not exceed 1mm. In the case of pipes to be used with couplings, the external weld reinforcement shall be ground flush with the outer wall of the pipe over a suitable distance from the end. Pipes shall preferably have a continuous helical seam but nevertheless, longitudinal and circumferential seams would be acceptable for this Contract.

PSL 3.7 OTHER TYPES OF PIPES

PSL 3.7.1 uPVC Pipes

The uPVC pipes shall be Class 12 spigot and socket complying with SANS 966.

PSL 3.7.2 Polyethylene Pipes

Polyethylene pipes shall be high density polyethylene (HDPE), in accordance with SANS 4427. The pressure class shall be as specified on the drawings or in the Bill of Quantities. The class of material shall be PE 100.

Unless otherwise indicated, all bends shall be long radius bends and all branches shall be 45 degree branches.

PSL 3.8 JOINTING MATERIALS

PSL 3.8.2 Flexible Couplings

Flexible couplings for steel pipes shall be of the "Viking Johnson" type. All nuts and bolts shall be hot dipped galvanised (heavy duty).

The plain end of the steel pipe shall be properly prepared, before corrosion protection, so as to accept the flexible coupling

PSL 3.8.3 Flanges and Accessories

Where new pipework is to be joined onto existing pipework, the Contractor shall measure the existing flanges and report the dimensions to the Engineer. The drilling of new flanges shall match the existing flanges.

In new installations, where pipes are not coupled onto existing pipework, the flanges shall be in accordance with SANS 1123. The dimension and drilling of flanges shall be in accordance with the requirements of SABS 1123, table 1600, unless scheduled otherwise. All flanges shall be truly at right angles to the axis of the pipe or fitting.

Puddle flanges used as pipe anchorage shall be of the same dimensions as corresponding flanges but are to be undrilled. The flange shall be welded to the pipe with sufficient strength to be capable of transmitting a longitudinal force 50% greater than the force to be applied under test conditions.

Flanges shall be machined flat and without a raised joint face.

Flanges for low-pressure applications (less than 10 bar) shall be of the slip on type. Flanges for high-pressure applications (greater than 10 bar) shall be of the socket weld type, unless otherwise agreed with the Engineer.

Flanges shall be manufactured from materials equal to or better than the pipes to which they are connected.

PSL 3.8.6 Spigot and socket Pipes

Add the following:

The shortest length of pipe which may be used in the pipeline is 0,5m, thus the shortening of an adjacent pipe may be necessary so as to ensure compliance with the position of specials. When pipes of 1m or less in length are used or where specials are laid within 1m of each other, they shall be jointed by means of C.I. repair couplings.

PSL 3.8.8 Jointing Gaskets

Jointing gaskets for flanged joints shall comply with the requirements of BS 4865 and be cut to the full width of the flange. The materials shall be suitable for and compatible with the required pressure and temperature duties, and characteristics of the material conveyed.

PSL 3.8.9 Fasteners

Bolts and nuts shall be hexagon head type complying with SANS 1700 with threads of the coarse pitch series.

Washers of similar material to the bolts shall be provided under each nut and bolt head. Multiple washers or shims shall not be used. Spring washers or other approved locking arrangement shall be used, together with flat washers on all fasteners subject to vibration.

All fasteners shall be manufactured of grade 316 stainless steel.

PSL 3.8.10 Anti-seize Compound

Before assembly, threads shall be treated with a nickel based, anti-seize/corrosion protection compound such as Chesterton 725: Nickel Anti Seize Compound, or equivalent and approved.

Copper based compounds are not acceptable and, if used, shall be cleaned off before the correct compound is applied.

If it is found during inspection that compound has not been applied, the Contractor shall disassemble all fasteners and comply with this requirement.

A small amount of compound shall be applied along the full length of the thread before the nut is applied. Excessive compound visible on the thread after the nut has been applied shall be cleaned off.

PSL 3.9 CORROSION PROTECTION

PSL 3.9.6 Corrosive Soil

Saddles, cast iron detachable and flanged joints together with their bolts, and a minimum of 100mm of pipe on each side of the joint shall be protected by means of either an approved protective petrolatum paste, then wrapped with three layers of an approved petrolatum impregnated tape, or other means of inhibiting corrosion approved by the Engineer. All overlaps shall be 30mm minimum. This protection shall also be applied to the bolts and flanges used by the manufacturer in the construction of valves and hydrants.

The rates shall cover the cost of corrosion protection for the complete joint.

PSL 3.10 VALVES

Valves shall comply with the requirements of SANS 1200 LK, and the following requirements:

PSL 3.10.1 Gate Valves

All valves shall be AVK or similar approved by the Local Authority. Resilient seal valves shall be used for general applications and shall:

a) bear the SABS mark of approval, and have the direction of opening clearly marked on the valve body or spindle cap.
b) be double socketed for PVC pipes or flanged for steel pipes, or as scheduled by the manufacturer;
c) be clockwise opening, anti-clockwise closing;
d) be heavy duty Class 16;
e) have non-rising spindles along pipelines but have rising spindles within the Pump Stations;
f) be fitted with cast iron cap tops or handwheels (as specified) secured with retaining bolts, top permanently marked with the direction of closing;
g) be protected against corrosion by:
    ii) Electrostatically applied epoxy resin to DIN 30677 with a minimum coating thickness of 250 micron; or
    i) coating with a minimum thickness of 250 micron copon KSIR 88 epoxy paint applied to all internal and external surfaces after it has been thoroughly cleaned by grit blasting to SA 2 ½ finish in compliance with the requirements of SIS 05 09 00, or similar approved coatings.

PSL 3.10.2 Sluice Valves

Sluice valves shall be double flanged and shall comply with the requirements of SABS 664, Class 10. Valves shall be drop tight under test and working conditions and shall have non-rising spindle, wedge closure, and flanged suitable for repacking under pressure. Bodies, gates and glands shall be cast iron or cast steel, spindles bronze, and sealing rings on gate and body gunmetal or stainless steel. Dimensions and drilling of flanges shall be in accordance with the requirements of SABS 1123 Table 1600 unless scheduled otherwise.

All sluice valves shall be fitted with square caps. The direction of rotation shall be anti-clockwise for closing when viewed from above. The direction of opening or closing of each valve, and the appropriate words shall be embossed on the cap and gland.

Before or after completion of the factory tests, whichever is applicable, all valves shall be thoroughly cleaned and painted at the factory prior to despatch to Site.

All cast iron surfaces of every valve shall be prepared for painting to a thoroughly clean condition free of all grease and deleterious matter. Steel surfaces shall be prepared in accordance with Swedish Standard SIS 05 5900 for an Sa2,5 finish.

Internal surfaces shall then be treated with two coats of Copon EP 2300 or other approved non-toxic epoxy resin paint to give a total dry film thickness of 160 micrometres, both coats being applied within 48 hours of commencement of painting.

External surfaces shall receive three coats of Copon EP 2300 epoxy paint to give a minimum total dry film thickness of 300 micrometres. All three coats shall be applied within 72 hours of commencing the first coat. Non-ferrous metal or stainless steel surfaces shall not be painted.

Rates shall include for testing and providing the test certificates and the specifications from the manufacturer before installation of the valves commence. The batch serial numbers for

cross reference shall be clearly marked on the body. No payment will be made unless the test certificates and specifications have been submitted.

PSL 3.10.3 Air Valves

The materials and workmanship employed in the manufacture of air valves shall be of a similar standard to that set out in SABS 664 for gate valves. Air valves shall be tested in the factory to pressures of 3 200, 5 000 and 8 000 kPa respectively shall be suitable for operating pressures of 1 600, 2 500 and 4 000 kPa and shall be suitable for a normal working pressure in the range 15 m to 400 m of water and also for site test pressures.

All double air valves required shall combine the following functions:

- exhausting accumulated air under pressure
- exhausting air in bulk when mains are being filled and ventilating mains when being emptied.

The large orifice shall contain a vulcanite covered ball, closing on a rubber seating outlet ring and fitted with an external dirt shield. The small orifice is to be suitable for the automatic release of entrained air under pressure, with a rubber covered ball seating on a bronze outlet nipple.

The air valves are to be flanged, with inlet diameter 80 mm as scheduled, and all flanges are to be in accordance with and drilled to SABS 1123 except where stated otherwise.

The air valves must be complete with isolating valves to permit inspection and maintenance without shutting off the main. The operating spindle of the isolating valve must be fitted with a hand wheel, the direction of rotation of which must be clockwise for opening when viewed from above. The direction for opening and closing of the gate valve must be indicated on the body of the valve.

Each air valve shall be drilled and tapped 9,5 mm BSPT on the air vent side of the isolating valve seat and fitted with 9,5 mm cock.

Air valves shall be reliable in operation and of a design which shall preclude the possibility of being blown shut by the passage of air when the pipeline is being filled.

After completion of factory tests, all air valves are to be thoroughly cleaned and twice coated with approved protective paint.

A complete Specification accompanied by drawings should be submitted at the time of tendering.

PSL 3.11 MANHOLES AND SURFACE BOXES

PSL 3.11.4 Step Irons

Step irons shall be copolymer polypropylene with a 12mm diameter high tensile steel core (“Calcamite” or equal approved) installed according to the manufactures specification.

PSL 3.11.5 Manhole Cover and Frames

Unless otherwise indicated, all covers and frames shall be constructed of ductile iron, in accordance with the requirements of EN 124, Class C250, or D400, as indicated on the Drawings.

Once installed, all covers must be securely seated in the frame and may not wobble, rock or exhibit any instability. Unstable covers will not be accepted and shall be replaced at the Contractor’s own cost. Any associated costs, such as the removal, replacement and making good of frames, layerworks, kerbing and surfacing, shall also be borne by the Contractor.

PSL 3.11.6 Surface boxes

Unless otherwise indicated, surface boxes for valves and hydrants shall be of the same dimensions and shapes shown in SANS 558 and shall be constructed of cast iron in accordance with SANS 558 or ductile iron ductile iron in accordance with EN 124.

PSL 4 PLANT

PSL 4.3 TESTING

Pipelines shall be tested in sections, to allow joints to be backfilled as soon as possible. The sequence of testing shall be subject to the Engineer’s approval

The Contractor shall provide all necessary pipework, valves, pumps and fittings required to temporarily connect to a water supply to fill the pipe and to pressurise it to the specified test pressure.

Suitable equipment shall be provided to allow the test pressure to be maintained and for the volume of water admitted to the pipeline to be accurately measured.

The Contractor shall supply all necessary temporary end-caps and fittings to close off sections of pipeline being tested. These shall be adequately designed for the specified test pressures and shall be equipped with acceptable venting valves to allow air to be release from the pipeline during filling.

PSL 5 CONSTRUCTION

PSL 5.1 LAYING

PSL 5.1.3 Keeping Pipelines Clean

All pipes and specials strung out above ground along the line of the trench shall have both ends closed by means of an adequately fixed plastic cap or other approved material, supplied by the Contractor, in order to prevent the ingress of foreign material.

PSL 5.1.4 Depths and Cover

PSL 5.1.4.1 *Add the following to Sub-Clause 5.1.4.1*

Watermains and rising mains shall be laid so that the cover to the top of the pipe barrel from finished surface level is generally, but not less than, 800 mm in the case of watermains less than 250 mm diameter, and 1.0 m in the case of the 300 mm and larger diameter pipelines.

The value of 800 mm above shall be increase to 1 m within road reserves.

During construction there shall be not less than 0,5 metre of cover over the pipes, where construction traffic is liable to cross them, hence road crossings, shall be constructed after the construction of the road layers has reached the stage where 0,5 metre cover is available.

PSL 5.1.4.3 *Add the following to Sub-Clause 5.1.4.3*

Where the minimum clearance between pipe crossings would be less than that specified in Sub-Clause 5.1.4.3, the watermain shall be laid beneath the service crossed at an invert level which allows for the clear space as specified. The watermain shall be laid horizontally at this level for a distance of at least 1,0 m on either side of the centreline of the service crossed and then revert to the specified cover.

No decrease in cover or clear space between the pipe barrels as specified will be permitted unless otherwise instructed by the Engineer in writing.

PSL 5.1.6 Changes in Direction

Vertical and horizontal direction changes less than 11¼º shall be achieved by deflecting the pipes at the joints. The deflection at each joint shall not exceed the value recommended by the pipe manufacturer and if necessary, the specified change in direction shall be achieved over a number of pipe lengths.

PSL 5.2 JOINTING METHODS

PSL 5.2.1 Detachable Couplings (AC and uPVC Pipelines

Add the following to Sub-Clause 5.2.1 :

Unless otherwise specifically detailed on the drawings, uPVC water pipes, specials and fittings shall be coupled with spigot and socket joints fitted with rubber sealing rings. In the following cases, ductile iron repair couplings shall be used:

(a) on one end of each valve and hydrant;
(b) where pipes have to be cut to fit specials in designated positions, refer to PSL 3.8.6.

PSL 5.2.5 Welding HDPe Pipelines

Unless otherwise indicated, field joints in HDPE pipes shall be formed by heated tool butt-welding or electrofusion couplings.

Welding of HDPE pipes shall be in accordance with SANS 10268, and shall only be carried out by thermoplastic welders who are certified by the Plastics Federation of South Africa (PFSA).

PSL 5.2.6 Joints between HDPE and Other Materials

Joints between HDPE and pipes, valves or fittings of other materials shall be flanged. Flanges shall be loose Grade 304 stainless steel flanges (backing rings) in accordance with SANS 1123.

PSL 5.3 SETTING OF VALVES, SPECIALS AND FITTINGS

Add the following :

Valves and hydrants shall be so sited that the valve spindle or hydrant outlet is directly opposite an erf side boundary or splay corner peg, to within 150 mm, or as otherwise dimensioned on the drawing.

Where specials are required in close proximity of one another the minimum pipe length between specials shall not be less than one metre unless adequate precautions are taken to prevent excessive movement of the numerous flexible couplings.

The shortening of the adjacent pipes may be necessary to achieve the above and ensure compliance with the position of specials" (see sub-clause PSL 3.8.6).

PSL 5.5 THRUST BLOCKS

All thrust blocks shall be cast against undisturbed material. In the event of the Contractor over-excavating, he shall carry the cost of any additional concrete required to comply with this provision.

Prior to casting any thrust blocks, the Contractor shall notify the Engineer who shall inspect the nature of the ground against which the thrust block is to be cast and either confirm that the specific conditions do not differ from those on the basis of which the thrust blocks shown on the drawings were designed, or instruct the Contractor to alter the dimensions of the thrust block to suit the actual ground conditions.

Any pipe laid on a gradient exceeding 25% shall be anchored as directed by the Engineer.

PSL 5.6 VALVE AND HYDRANT CHAMBERS

PSL 5.6.1 General

Delete in Sub-Clause 5.6.1. and 5.6.2 the reference to drawings L1, L2, and L3 and replace by "the standard drawings."

PSL 5.6.2 Construction of Chambers

Add the following to Sub-Clause 5.6.2 :

The depth from the cover of the surface box at final level to the top of a valve spindle shall be not less than 75mm nor more than 400mm. Hydrant outlets shall be not more than 400mm below the level of the hydrant cover.

To achieve the above cover requirements in the case of hydrants and double air valves, double-flanged distance pieces shall be provided when necessary.

Where for practical purposes it is not possible to provide the required cover for gate valves, an extension spindle may, subject to approval of the Engineer, be provided.

PSL 5.11 PIPE MARKERS (NEW CLAUSE)

Pipe markers shall be installed above the pipeline centreline at all horizontal changes of direction and at intersections with property boundaries.

PSL 5.12 CONNECT TO EXISTING MAINS

Where connections have to be made to the existing water mains, the following procedure has to be followed:

(a) Liaise with the Local Authority to arrange a suitable time period for the proposed connection.

(b) Ensure all tools and fittings of the correct size and type are on site prior to requesting the shut down of the mains.
(c) Advise the Local Authority at least 3 days in advance of the intention to commence work, in order for them to shut down the mains.
(d) Arrange with the Local Authority to have an official present on site when the work commences.
(e) Advise the Local Authority when work is complete and thrust block in place and sufficiently cured, for the system to be recharged. Work to be completed to minimise the disruption to the supply to a maximum of 12 hours.

All arrangements and planning must be made in close collaboration and with the approval of the Engineer's Representative on site. Names and contact personnel at the Local Authority will be advised at the required time.

PSL 5.13 AS BUILT SURVEYS

The Contractor shall survey the final position of all buried pipework installed, prior to backfilling.

The pipework shall be surveyed and the information submitted to the Engineer as the work progresses. No joint shall be backfilled before the survey information has been approved by the Engineer.

The pipelines shall be coordinated at centrelines of all bends, specials and fittings and intermediate points at intervals of not more than 50 m.

The survey data shall be presented in tabular format giving Y-Coordinate, X-Coordinate, chainage and level. All coordinates and levels shall be referenced to the WGS 84 system and Mean Sea Level (MSL).

PSL 7 TESTING

PSL 7.3 STANDARD HYDRAULIC PIPE TEST

PSL 7.3.1 Test Pressure and Time of Test

PSL 7.3.1.2 Delete Sub-Clause 7.3.1.2 and replace with :

Subject to the provisions of 7.3.1.3 and 7.3.1.4 the test pressure for field-testing shall be 1,5 times the maximum working pressure. The maximum working pressure shall be 12 bar.

No testing against closed valves will be allowed, unless approved by the Engineer. Field tests on mains should be carried out prior to the installation of saddles, ferrules and/or erf connections.

Payment for field-testing of pipelines shall be included in the rate for supply, lay and bed pipes as described in SANS 1200:L Clause 8.2.1.

PSL 7.5 COMMISSIONING TEST

Prior to the handing over to the Employer of a particular area or zone, it shall be subjected to a commissioning test.

The section to be tested shall be isolated by closing sluice valves in the line and brought up to a pressure equivalent to the working pressure of 12 bar being applied at the lowest point in the installation.

The duration of the test and the permissible leakage rates shall be in accordance with SANS 1200L Clause 7.3.3.

Payment for commissioning tests of pipelines shall be included in the rate for supply, lay and bed pipes as described in SANS 1200L Clause 8.2.1.

PSL 8 MEASUREMENT AND PAYMENT

PSL 8.1 GENERAL

Add the following to Sub-Clause 8.1 :

The tendered rates for the supply of materials shall cover the cost of all protective coatings and linings.

No extra payment will be made for any cutting, etc., required for permanent closure pipes (Sub-Clause 8.2.1).

No extra payment will be made for testing, nor for temporary water supply connections for testing, which will be held to be included in the price for laying of pipes, valves and specials.

The cost of conforming to the requirement to install repair couplings as specified in PSL 3.8.6 and PSL 5.2.1 must be allowed for in the cost of the pipes and fittings.

Notwithstanding instructions for backfilling, the Contractor shall bear the cost of finding and repairing leaks.

PSL 8.2 SCHEDULED ITEMS

PSL 8.2.1 Supply, Lay and Bed Pipes

No additional payment will be made for small changes of direction achieved by deflections at pipe joints as specified in PSL 5.1.6.

The rate for pipe laying shall include all costs associated with carrying out as-built survey as specified in PSL 5.13.

The quantity measured shall exclude sections of pipe installed by horizontal directional drilling and measured separately under Section PLX.

No payment will be made under this sub-clause until acceptable as-built survey data has been submitted to the Engineer in respect of the length of pipeline concerned.

PSL 8.2.2 Extra-Over for Specials

Add the following:

The item shall cover the supply, laying and bedding of specials, complete with couplings.

The rate shall include cutting of pipes and tape wrapping of couplings with fasteners.

Thrust blocks shall be measured separately.

Bulk Flow Meters
Bulk flow meters shall be Endress and Hauser Promag 50W or equal approved electromagnetic flow meters suitable for wastewater applications.

The sensor unit shall have an IP 68 protection rating.
The Transmitter shall be remote mounted with an IP 65 protection rating.

The transmitter shall be installed in a stainless steel weather proof enclosure. The reading shall be visible through a glass window with the enclosure closed.

PSL 8.2.11 Anchor/thrust Blocks and Pedestals

Add the following:

Anchor/thrust blocks will be measured by the cubic metre of concrete. The tendered rate shall cover the cost of the concrete, formwork, excavation and additional plant, labour and material to complete the construction of the blocks.

PSL 8.2.16 Markers for Valves and Fire Hydrants

Markers shall be measured by the number, as detailed on the drawings.

(a) Marker posts

The tendered rate shall cover the supply and installation of the marker posts including painting, excavation and disposal of spoil all as detailed on the drawings.

Item	**Unit**
Markers Posts	**No**

PSL 8.2.17 Connection to Existing Mains

Connection to existing mains shall be measured by number for each diameter of existing pipe.

The tendered rate shall cover the cost of excavating to expose existing main, the removal of thrust block and/or end caps, cutting into the existing main as necessary, dealing with water and completing the connection, backfilling, disposal of spoil and making good. It shall also allow for all dealings with the Local Authority to arrange for the temporary termination of supply, as specified in Clause PSL 5.1. Fittings required for the connections shall be measured elsewhere.

Item	**Unit**
Connection to existing main (diameter and type stated)	**No.**

PSLB SANS 1200 LB: BEDDING (PIPES)

PSLB 3 MATERIALS

PSLB 3.1 SELECTED GRANULAR MATERIAL (BEDDING CRADLE)

Selected granular material shall comply with the provisions of Clause 3.1 of SANS 1200 LB and in addition, the PI shall not exceed 2.

PSLB 3.2 SELECTED FILL MATERIAL (FILL BLANKET)

Selected fill material shall comply with the provisions of clause 3.2 of SANS 1200 LB.

Add the following to Clause 3.2:

"Where expansive clay is encountered in the trench bottom, the material in the selected fill blanket shall be selected granular material".

PSLB 3.3 BEDDING

The bedding of the rising main shall be in accordance with the drawings.

There are no designated borrow pits, and the Contractor will be expected to make his own arrangements regarding importing bedding and blanket material.

PSLB 5 CONSTRUCTION

PSLB 5.1 GENERAL

PSLB 5.1.4 Compaction

The degree of compaction required will be 93% Mod. AASHTO density (or 100% for sand).

PSLB 5.2 PLACING AND COMPACTING OF RIGID PIPES

PSLB 5.2.1 Class A bedding

Add the following to sentence to Subclause 5.2.1 (d):

"…or a period of 5 days has elapsed after the placing of the concrete in that section, whichever occurs first".

PSLB 5.2.2 Class B bedding

1. The dimension "x" for all rigid and flexible pipes (except for HDPE erf connections) as referred to in drawing LB-1 and LB-2, shall be 100mm.

2. The Dimension "x" for HDPE erf connections shall be 100mm.

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.2 SCHEDULED ITEMS

PSLB 8.2.6 Bedding in Waterlogged Conditions (new item refer to PSDB 5.1.2)

In the event of waterlogged conditions occurring in the bottom of the trench, the Engineer may order the Contractor to place a crushed stone bedding layer (minimum thickness 150 mm) on the trench bottom.

Should the trench bottom conditions remain unstable due to the nature of the soil and the degree of saturation, the Engineer may order the Contractor to install a geotextile on the trench bottom prior to the provision of the stone layer. After placing the stone bedding, the geotextile shall be folded over the stone with a minimum overlap of 300 mm to form an enclosed drain. The specified bedding material shall then be used to bed the pipe.

The Contractor shall only provide and lay the stone bedding layer and geotextile after receipt of the written order to do so from the Engineer.

The tendered rate shall cover the cost of all additional excavation and preparation of the trench bottom to accommodate the layer of stone, the removal of unsuitable material, the supply and placing of a 150 mm thick layer of stone over at least the specified width, the cost of supply of the geotextile, placing and losses as a result of overlaps and over excavated trench widths and all related activities in order to produce a stable platform.

Where the use of a layer of crushed stone in the trench bottom has been authorised by the Engineer, it will be measured by volume calculated according to the length multiplied by the minimum base width and specified thickness.

The cost of dealing with water as specified in SANS 1200 DB, Sub-Clause 5.1.2.1 will be held to have been included in the tendered sums for excavation.

Item		Unit
a)	**Single size 19mm stone**	**m^3**
b)	**Geotextile**	**m^2**

PSLD SANS 1200 LD: SEWERS

PSLD 3 MATERIALS

PSLD 3.1 PIPES, FITTINGS, AND PIPE JOINTS

Unless otherwise scheduled or shown on the drawings the pipes shall be of unplasticised polyvinyl chloride (uPVC) Class 34 heavy duty complying with SANS 791.

PSLD 3.5 MANHOLES, CHAMBERS, ETC.

PSLD 3.5.2 Precast Concrete Sections

Add the following to Sub-Clause 3.5.2:

All sand and aggregate used in concrete for sewer manholes and chambers shall be dolomitic.

PSLD 3.5.7 Step Irons

Step irons in manholes will be required.

PSLD 3.5.8 Manhole Covers and Frames

Notwithstanding the requirements of Sub-Clause 3.4.3 all covers and frames shall be constructed of ductile iron, and shall conform to the requirements of EN 124, Class C250, or D400, as indicated on the Drawings.

Where grid inlets are required these shall be manufactured from ductile iron conforming to the requirements of EN 124, Class C250 or shall be constructed in concrete. A sample of the grid shall be provided to the Engineer for approval.

Once constructed, all covers must be securely seated in the frame and may not wobble, rock or exhibit any instability. Unstable covers will not be accepted and shall be replaced at the Contractor's own cost. Any associated costs, such as the removal, replacement and making good of frames, layerworks, kerbing and surfacing, shall also be borne by the Contractor.

PSLD 5 CONSTRUCTION

PSLD 5.6 MANHOLES

Refer to PSLD 3.5.2 above for the type of material.

Notwithstanding the requirements of Sub-Clause 5.6 manholes constructed of precast concrete rings shall have watertight joints.

Manholes shall be provided with copolymer polypropylene step irons with a 12 mm diameter high tensile steel core ("Calcamite" or equivalent) installed according to the manufacturer's specifications.

PSLD 5.6.7 Cast in-situ concrete manholes

Refer to Municipal Standard Detail Drawings for details.

20 MPa strength concrete shall be used. Aggregate size may be 19 mm or 13 mm to suite Contractor. Dolomitic aggregates are not required.

When the concrete is mixed on site, an approved rotary mixer, suitable in size for a batch containing cement in increments of one sack of 50 kg, shall be used. The Contractor's method of batching of the ingredients shall be to the approval of the Employer's Agent's Representative. Samples of the materials to be used shall be submitted for approval. The proportions of cement, coarse and fine aggregate and water necessary to produce the 20 MPa concrete shall be determined and submitted to the Employer's Agent's Representative together with the results of compressive strength tests, before the Contractor will be allowed to use site mixed concrete in the construction of manholes.

The Contractor shall bear the costs of determining the proportions of the mix and making and testing cubes for this purpose. If the Contractor submits reliable test records of concrete made from the same materials and mix proportions which he proposes to use, then the Employer's Agent may waive all or part of the strength tests required above to verify that the concrete mix design which the Contractor proposes to use is satisfactory.

The Contractor shall carry out his own testing during the construction of the Works to ensure that the concrete being used complies with the Specification. The Employer's Agent's Representative shall carry out such test check testing as he/she requires and the Contractor shall render any assistance necessary in taking of samples and the carrying out of tests.

All concrete being placed shall be vibrated by means of approved vibrators. Curing shall be by means of the application of a natural resin based liquid curing compound complying with ASTM C309-74. When the surface to be cured is to receive further concrete it shall be cured with water only, by sprinkling, spraying or ponding such as to maintain it in a continuously wet condition.

If the concrete is found to be cracked, honeycombed, soft or defective in any way, or if cube test strength results do not comply with the requirements, then the concrete shall be rejected. Rectification shall be by removal of the defective portion and replacement with sound concrete.

If the manhole is constructed in more than one lift the construction joint formed shall in addition to being prepared as specified in sub- clause 5.4.5.4 of SABS 1200 GA, be reinforced with 8 No 12 mm diam. x 300 mm long mild steel dowel bars, cast in to a depth of 150 mm, placed centrally in the joint face and equally spaced about the circumference.

PSLD 5.11 PIPE LAYING WITH HIGH WATER TABLE (NEW CLAUSE)

Where a high water table is encountered and a probability exists of water entering the trench after the pipeline has been laid, the Contractor will be permitted to bed and lay the pipes and backfill sufficiently to prevent flotation, prior to testing.

PSLD 6 TOLERANCES

PSLD 6.6 AS-BUILT INFORMATION

The Contractor shall submit "As-Built" levels, distances between manholes and the grades of pipelines for which he requires payment at the time he submits his monthly payment claim. A sample form is obtainable from the Employer's Agent.

PSLD 7 TESTING

PSLD 7.2.7 Acceptance Criteria

The acceptance of the pipe length or manhole shall depend upon whether it satisfies the criteria set out in SABS 1200 LD clauses 6, 7 and the PS clauses above.

Where pipes other than vitro clay pipes are laid, only tests carried out on the pipelines after completion of the backfilling to ground level (excluding surface restoration) and completion of the construction of manholes to roof height, including benching, will be considered for acceptance purposes.

In the case where vitro clay pipes are being laid, no pipelines are to be covered prior to inspection and approval by the Employer's Agent. Once the pipeline has been laid and bedded in the compacted bedding cradle (to half pipe) between control points, the Employer's Agent must be called out to inspect the installation. The Contractor is to provide the necessary equipment in order for the Employer's Agent to adequately assess that the pipeline has been laid to the specified tolerances. Further, an air test, in accordance with the specifications, is to be conducted and witnessed by the Employer's Agent prior to the placing of the Fill Blanket.

PSLD 8 MEASUREMENT AND PAYMENT

PSLD 8.2 SCHEDULED ITEMS

PSLD 8.2.1 Supply, lay, Joint, Bed and Test Pipeline (Sub-Clause 8.2.1)

add the following :

No deductions will be made for the internal length of manholes and the cost of all invert channels irrespective of diameter shall be included in the rate tendered for this payment item.

The measured quantity of completed pipe length will only be included in the payment certificate when the pipeline has satisfied the test after the completion of the backfill to ground level

PSLD 8.2.2 Extra-over Item 8.2.1 for specials

add the following:

Rodding Eyes

Rodding eyes shall be measured by number complete as shown on the drawing, for each different diameter and type of material.

The tendered rate shall cover the cost of all excavation, disposal of material, supply of fittings and labour to construct the rodding eyes as detailed on the drawings.

PSLD 8.2.3 Manholes

Manholes will be measured and paid in accordance with Sub-Clause 8.2.3.

The tendered rates for the different types of manholes shall cover the cost of the supply and installation of the complete precast concrete or brick manhole, including flexible joints, step irons, concrete landing slabs where applicable, concrete cover slabs, masonry between concrete cover slab and covers and covers and frames, as shown on the drawings. The rate shall also cover the cost of waterproofing the joints between manhole rings in the case of precast manholes.

For the purposes of measurement and payment, the depth of a manhole is defined as the depth from the top of the cover to the lowest invert level of the manhole.

PSLD 8.2.4 Extra-over Item PSLD 8.2.3 for construction of manholes on existing pipelines

The rate tendered shall include full compensation for breaking into the pipeline, cutting pipes, dealing with the existing flow, preventing unacceptable debris entering the drain line and making good.

PSLD 8.2.7 Encasing of Pipes in concrete

Add the following to Sub-Clause 8.2.7

The volume of concrete material will be measured net, excluding the volume occupied by the pipe ducts and 30/19MPa concrete shall be used.

Item	**Unit**
Encasing of pipes in concrete)	**m^3.**

PSLD 8.2.14 Connections into Existing Manhole (New Item)

The unit of measurement for connecting into existing manholes shall be by the number of connections.

The rate tendered shall include full compensation for breaking into the manhole, connecting the pipe, modifying or enhancing the benching, cutting pipes, dealing with the existing flow, preventing unacceptable debris entering the drain line and making good any benching, finish walls, covers and frames.

The item shall distinguish between type of structure, diameter of connecting pipe or size of culvert.

Item	**Unit**
Connections into existing manhole for pipe (diam)	**No.**

PSLD 8.2.15 Internal Backdrop into Manhole (New Clause)

Measurement will be by number for each diameter of backdrop in 0,5 m depth ranges.

The rate shall include breaking into the existing manhole and making good on completion including ensuring that the manhole is watertight, the supply and installation of all pipes and fittings, and the alterations to the benching to suit.

Item	**Unit**
Internal backdrop into manhole	**No.**

PLX TRENCHLESS PIPE INSTALLATION

PARTICULAR SPECIFICATION

PLX 1 SCOPE

This particular specification covers the trenchless installation of pipes and sleeves via directional drilling and micro tunnelling, for the purpose of crossing roads, railways or other obstructions without disturbing the ground surface.

Micro tunnelling is specified for installing a road crossings at the R44 into the De Zalze Estate for the Jamestown Gravity line as well as the putting green and Caledon road in the De Zalze Golf Estate. Directional drilling is specified for crossing the railway and crossing Baden Powell Drive along the Fleurbaix Rising main

PLX 2 INTERPRETATIONS

PLX 3 MATERIALS

PLX 3.1 PIPES

Unless otherwise specified, pipes to be installed by directional drilling/micro tunnelling shall be HDPE in accordance with the relevant specifications of SANS 1200 L as amended by section PSL of the Works Specifications.

PLX 4 PLANT

The drilling plant shall be suitable for guided horizontal directional drilling of horizontal bores to the specified alignments without disruption of the overlying ground surface.

The Contractor shall determine the plant required to suit the specified installation. The plant shall be adequately sized for the specified diameter and length of the installation.

PLX 4.1 MICROTUNNELLING BORING MACHINE (MTMB)

Microtunnelling, where specified, shall be carried out by means of a closed, full-face excavation machine with a hydraulic slurry circuit. The soil to be excavated shall be removed using a cutter head adapted to the expected geology, be it soft soils or hard rock. A crusher inside the excavation chamber shall crumble stones and other obstructions to a conveyable grain size while tunnelling and advancing; this debris is to be removed through the slurry line to a series of settlement tanks where the solids are settled out and the water returned to the system.

The jacking shafts shall be constructed with steel sheetpiled shafts. A hydraulic jacking frame shall be installed to advances the MTBM and trailing jacking pipes forward. The bore alignment shall be controlled by a laser and computer controlled guidance system.

PLX 5 CONSTRUCTION

PLX 5.1 EXCAVATION OF LAUNCH AND RECEPTION PITS

Excavation shall conform to the relevant requirements of SANS 1200 D, DA and DB as applicable. Deep excavations shall be shored.

The Contractor shall be responsible for determining the requirements of the excavations to suit his plant and method of operation.

PLX 5.2 REMOVAL OF DISPLACED MATERIAL

The method of installation shall be such that material displaced by the ducts shall be removed from the bore to prevent lifting of the overlying road surface. This shall be done mechanically, manually, by washing out with drilling fluids or by other approved means.

However, any voids shall be filled with an approved grout or bentonite slurry to eliminate the possibility of settlement of the road surface.

PLX 5.3 PIPE JOINTS

The pipe joints shall be welded in accordance with the relevant specifications of SANS 1200 L as amended by section PSL of the Works Specifications.

PLX 6 TOLERANCES

The acceptable deviations shall be agreed between the Contractor and the Engineer, taking cognisance of the ground conditions.

PLX 7 TESTING

The installed pipe shall be pressure tested in accordance with the relevant specifications in SANS 1200 L.

PLX 8 MEASUREMENT AND PAYMENT

PLX 8.1 SITE ESTABLISHMENT OF DRILLING CONTRACTOR

The item shall cover the costs of establishing and disestablishing the drilling sub-contractor and all necessary equipment on site.

PLX 8.2. SETTING UP AT EACH DRILLING LOCATION

PLX 8.2.1 Move Directional Drilling Plant and Setup

The item shall cover all costs of moving plant, drilling fluid tanks, etc. to each location where directional drilling is required, and setting up.

Item	**Unit**
Move directional drilling plant and setup for each trenchless installation	**Sum/No**

PLX 8.2.2 Levelling and Excavation of Launch and Reception Pits

The item shall cover the costs of preparing and levelling the drill rig platform and excavating launch and reception pits at either end of the bore.

The size of excavation shall be determined by the Contractor to suit his method of operation and the quantity shall be a lump sum, irrespective of the actual volume of excavation.

The rate shall include shoring and dewatering of the excavation.

Items	**Unit**
Levelling and excavation of launch and reception pits	**Sum/No**

PLX 8.3 HORIZONTAL DIRECTIONAL DRILLING

The item shall cover the costs of drilling the bore to the required clearances and alignment to suit the specified pipe.

The rate shall include all costs associated with the directional drilling, including drilling of pilot bore, back-reaming, supply and handling of drilling fluids, supply of water etc.

The quantity measured shall be the length of bore measured along the centreline between the entry and exit points of the trenchless installation.

Item	**Unit**
Horizontal directional drilling	**Sum**

PLX 8.4 MICRO TUNNELLING

The item shall cover the costs of drilling the bore to the required clearances and alignment to suit the specified pipe.

The rate shall include all costs associated with the directional drilling, including drilling of pilot bore, back-reaming, supply and handling of drilling fluids, supply of water etc.

The quantity measured shall be the length of bore measured along the centreline between the entry and exit points of the trenchless installation.

Item	**Unit**
a) Micro-tunnelling	**Prov Sum**
b) Overheads, charges and profit on a) above	**%**

PLX 8.5 PULLING THROUGH OF PIPE

The item shall cover the supply, jointing and pulling through of the pipe.

The rate shall include the supply, handling, welding, pulling through and pressure testing after installation of the pipe.

The quantity shall be the final length of pipe supplied and installed. No payment will be made for waste and off-cuts.

An item will be scheduled for each type and diameter of pipe.

Item	**Unit**
Supply, jointing and pulling through of (diameter and type stated) pipe	**m**

PLMF BASE

PLMF 8 MEASUREMENT AND PAYMENT

PLMF 8.3.3 Construct base with material from commercial source

Add the following to Subclause 8.3.3

"The rate for the base preparation shall further include all other work that is necessary for the construction of segmented paving as specified in SANS 1200 MJ".

PORTION 3: PARTICULAR SPECIFICATIONS FOR MECHANICAL AND ELECTRICAL WORK (DS)-TO BE READ IN CONJUNCTION WITH PORTION 6 OF THIS CONTRACT.

Portion 3 contains project-specific specifications relating to the mechanical and electrical work required under this Contract and should be read in conjunction with Portion 5 of Part 3.6 of this Contract. The mechanical and electrical work shall comply with the provisions of the General Specifications for Mechanical and Electrical work, Particular Specifications set out in this section.

1 INTRODUCTION

1.1 Scope of Work

This specification covers the design, manufacture, supply, delivery, installation, commissioning and maintenance of the mechanical equipment and pipework for the following installations:

- Jamestown 5ML Reservoir and associated pipelines and chambers

The work required also includes the design supply, installation and commissioning of all electrical switchgear, cabling and level control equipment, as well as domestic lighting and power and ventilation in the proposed pump stations.

The Principal Contractor shall take overall responsibility for all Civil, Building, Mechanical and Electrical Work required under this Contract.

2 VALVES

5.1. Gate Valves

Gate valves shall be AVK or equal approved resilient seal gate valves.

Gate valves in sewer lines and pump stations shall be clockwise closing.

5.2. Check Valves

Check valves for wastewater pump stations shall be axially sprung concentric valves with non-slam characteristic,

Check valves for sewer pipes shall be single door swing check valves.

5.3. Air Valves

Air valves shall be Vent-O-Mat or similar approved air valves incorporating an approved anti-shock mechanism.

Air valves for sewage shall be specifically designed for the application (Vent-O-Mat RBX series or similar approved)

3 PIPEWORK AND FITTINGS

3.1 General

The Contractor shall design, supply, deliver and install all the necessary new pipework to connect into the rising mains.

3.2 Delivery Pipe

Each pump shall be equipped with at least the following on the delivery side:

a) A pressure gauge with an isolating ball valve.
b) A check valve
c) An isolating knife-edge gate valve

3.3 Scour Pipe

Sewage pump stations shall be equipped with a 150 mm diameter scour pipe branching off the delivery pipe, equipped with an isolating gate valve and discharging into the sump. The scour outlet shall be close to the sump floor, and directed horizontally and parallel to the wall of the sump.

The scour is to be used periodically to scour the sump and put accumulated settled solids into suspension. It will also facilitate draining the rising main back into the sump when required.

3.4 Specials

All bends shall be long radius bends and branches shall be swept or 45 degree branches. Lobster back bends shall not be used in sewage pump stations.

3.5 Flanges

Flanges shall be to Wrought Steel Flanges as per SANS 1123, Type NP/3, 1000 KPa, Table 10 and drilled appropriately.

3.6 Materials

Pipes and fittings shall be manufactured from Grade 316 Stainless steel.

4 CORROSION PROTECTION

Corrosion protection shall be carried out in accordance with the requirements of the "General Specifications for Mechanical and Electrical Work' and to the following systems:

Pump and Motor –	System 'A'
Stainless Steel Components –	Pickle & Passivate to Clause 3.2.5
3CR12 Steel Components –	Pickle & Passivate to Clause 3.2.6
(Normally Dry) Mild Steel Components –	System 'D' (Hot Dip Galvanising)

5 ELECTRICAL & INSTRUMENTATION WORK

5.1 Electrical Equipment & Cabling

The design, supply, installation and commissioning of all electrical switchgear, cabling and level control equipment will form part of this contract under this contract – REFER TO PORTION 5 OF PART 3.6 OF THIS CONTRACT.

6 DRAWINGS

6.1 Manufacturing Drawings

The Contractor shall inform the Engineer prior to the manufacture of any piece of equipment of the availability of the relevant completed manufacturing drawings for inspection by the Engineer to be made available at the Engineer's office. The Contract will be deemed incomplete until the Contractor has made available these drawings to the Engineer, and they have been checked and approved.

6.2 As-Built Drawings

The Contractor shall provide 'To Scale' as-built General Arrangement Drawings of all the relevant equipment. Such drawings shall be made available on paper and in an electronic format such as AutoCAD DWG or DXF and PDF.

7 PERFORMANCE CHECKING & TESTING

7.1 Works Testing

The Contractor shall provide all labour and consumables necessary for testing.

Neither hydraulic pressure testing nor performance testing of the pumps will be required if the pumps are of a well-known make with over 100 separate installations in South Africa and certified pump curves can be supplied. However if the pumps offered do not conform to the above then either site or workshop performance testing will be required by the supplier.

7.2 Testing Prior to Start Up

a) Check for correct oil in all gearboxes filled to the correct level.
b) Check for all bolts to the correct torque.
c) Check for correct alignment and levelling of all equipment.
d) Refer to the relevant 'Addendum' for all other checks.

7.3 Testing After Start Up

a) Check for correct direction of rotation of motors and gearboxes.
b) Check for correct Amps drawn during operation.

c) Check for correct direction of rotation of all pumps.
d) Check for unusual noises on both gearbox and motor of all equipment. The Engineer shall determine the acceptable noise level by comparison with similar size and type of units already operating on the plant.
e) Check for unusual noises on all pumps.
f) Check for correct operation of all switchgear and instrumentation.
g) Refer to the relevant 'Addendum' for all other checks.

7.4 Checking During Defects Liability Period

a) Check all equipment for correct operation and functioning at 1 month, 5 month and 11 months after plant takeover.
b) Check accuracy of measurement of all meters as detailed above.
c) Refer to the relevant 'Addendum' for all other checks.

8 PAYMENT CONDITIONS

DS 11.1 Eighty (80%) percent of the tendered amount will be payable upon the delivery of the complete prescribed equipment on site.

DS 11.2 An additional payment of 20% of the tendered amount will be payable after complete installation and successful commissioning of the equipment, i.e. after the issuing of the Certificate of Completion.

DS 11.3 The rates shall cover the cost of the provision of all necessary couplings, inspecting, testing equipment and filling the rising main and suction pipe slowly from the sump (lowest point), so that all air is expelled, to carry out the test in accordance with Sub-clause 7.3 of SANS 1200L. Furthermore, the erection and installation of plant and equipment shall be done strictly in accordance with the manufacturer's instructions.

PORTION 4: GENERAL SPECIFICATION FOR CIVIL AND STRUCTURAL

For the purpose of this Contract the following General Specifications for Civil and Structural works shall apply:

PA BUILDING WORK

PA 1 SCOPE

PA 1.1 This section covers the general requirements for building work.
For Preambles refer to "Department of Public Works: Specification of materials and methods to be used - PW371"

PA 2 INTERPRETATION

PA 2.1 APPLICABLE EDITION OF STANDARDS

Each standard specification referred to in this specification shall be deemed to be the latest edition, including all amendments issued by the relevant body, published three calendar months or more before the closing date for receipt of tenders.

PA 2.2 DEFINITIONS AND SYMBOLS

For purposes of this specification, the definitions and symbols given in the National Building Regulations and Building Standards Act, 1977 (referred to further on in this specification as “Building Act”), where applicable, shall apply.

PA 3 MATERIALS

PA 3.1 CEMENT

Cement shall be of the best quality Ordinary Portland Cement conforming with the requirements of SANS 50197-1: 2000.

PA 3.2 SAND

Sand to be used for mortar and plaster shall comply with the requirements of SANS 1090: 2009, unless otherwise agreed to by the Employer’s Agent. The sand shall be hard, dense, durable, uncoated, non-organic, rock particles, ranging in size from coarse to fine particles.

The sand must be free of dust, soft or flaky particles, shale, clay, organic matter, loam or other deleterious substances and shall be of approved origin. The Employer’s Agent shall have the right at any time if he considers the sand to be dirty, to order the Contractor to have the sand washed by approved means at his own expense, and no sand thus ordered to be dealt with will be allowed to be used in the Works until so washed.

PA 3.3 BURNT CLAY BRICKS

All face and general purpose bricks shall be of approved manufacture and must be new, well burnt, of uniform colour, size and shape, with straight sharp arises rectangular and free from defects either in quality or shape, all as more full described in SANS 227: 2007 as specified for face and general purpose bricks which are not lightweight. The bricks shall be uniformly burnt throughout their substance and shall be free from cracks, stones, unground lumps of material, particularly from lumps of free lime, however small.

When struck together the bricks shall give a clear ringing metallic sound. Sample bricks shall be taken at random from each consignment, as required by the Employer’s Agent, or as specified in SANS 227: 2007, and these shall be broken and examined and tested for water absorption by the 24-hour Immersion Test as described in SANS 227: 2007.

Should any of the above defects be apparent or should the weight of the moist brick after the water absorption test exceed the weight of the dried brick by more than 9% (nine percent) for face bricks or by 15% (fifteen percent) for general purpose bricks, the Employer’s Agent shall have the right to reject the complete consignment which must then be replaced by the Contractor at his own expense.
The cost of all tests will be deemed part of the scheduled rates and no additional payment will be made therefor.

The types of brick to be used on the Works shall be as follows:

(a) Exposed work : Forest Blend Coral FBA (approved by the Employer’s Agent), and;
(b) Concealed work : Best quality general purpose bricks or engineering bricks.

Before placing an order for any bricks, samples of the bricks which the Contractor proposes to use shall be submitted to the Employer's Agent for his approval and only bricks which have received the Employer's Agent's approval shall be used on the Works.

PA 3.4 BRICKFORCE

Brickforce for bonding inner and outer skins of brick cavity walls shall be of 2,5mm hard drawn steel wire and shall be installed at every third layer.

PA 3.5 TILES

Tiles shall conform to the requirements of SANS 22: 2005.
The sizes for the tiles are as follows:
i) Shinny white ceramic tiles to internal walls 600 x 300 x 7.5mm thick, and;
ii) Medium grey ceramic tiles to floors, 600 x 600 x 10mm thick.

PA 3.6 DOORS, FRAMES, HANDLES, ETC

PA 3.6.1 Doors
813 by 2032mm high doors shall be made of American White Oak veneer with meranti frames and architraves, painted white with 2 coats of enamel paint.

PA 3.6.2 Frame
813 by 2032mm high meranti door frames shall be used and painted white with 2 coats of enamel paint.

PA 3.6.3 Hinges
Dorma or any approved stainless steel butt hinges size 102 x 75 x 3mm.

PA 3.6.4 Door stops
38mm Ø stainless steel door stop or similar approved by Employer's Agent.

PA 3.6.5 Roller lock with handles and indicator lock
Easy reversible radius latch with handles and indicator lock set to be made from satin stainless steel.

PA 3.7 PAINTING

Paints shall be of the best quality and of approved manufacture. Tints shall be selected during the course of the work, and for this purpose the Contractor, before placing orders for paints, shall submit samples to the Employer's Agent for approval as to quality and tints. All paints shall be brought on to site in unopened tins and no adulteration will be permitted.

PA 3.8 PLUMBING, DRAINAGE AND SANITORY WARE

PA 3.8.1 Toilets
White ceramic dual top flush toilet suite or similar approved by Employer's Agent is required. The toilet seat shall be made from plastic: thermoplastic (polypropylene) material.

PA 3.8.2 Basins
Single hole white ceramic wall hung wash-hand basin or similar approved by Employer's Agent.

PA 3.8.3 Taps
Water taps shall be 15mm diameter or similar approved by Employer's Agent. The taps should be made from chrome and bronze range or similar approved by Employer's Agent.

PA 3.8.4 Toilet roll holder
Stainless steel lockable double toilet roll holder or similar approved by Employer's Agent. Substitute products of similar quality and specification may only be used with prior approval by Employer's Agent.

PA 3.9 STORAGE

PA 3.9.1 Cement and Lime
Cement and lime stored on the site shall be kept under cover that provides proper protection against moisture and other factors that may promote deterioration. Cement or lime that has become affected by dampness shall not be used.

PA 3.9.2 Sand

Sands of different nominal sizes shall be stored separately and in such a way that intermixing of different materials and contamination by foreign matter is prevented.

PA 3.9.3 Bricks

Every care must be taken in loading, railing, transporting and unloading bricks to avoid chipping and damage of all sorts. On site the bricks shall be placed on prepared areas free from klinker or ash or sulphate-bearing soils and in separate stacks according to classification.

Facing bricks must receive particular care in this respect and must be carefully packed by hand in courses with a layer of straw or other suitable material between each course and shall also be unloaded by hand and again stacked carefully in the same manner in a convenient position on site until required for use.

PA 3.10 uPVC

All uPVC pipes as scheduled or shown on the drawings shall be in accordance with the requirements of SABS 966 for Class 12 pipe, unless otherwise scheduled.

PA 3.11 SUPPORT BRACKETS

The support brackets shall be manufactured from galvanised mild steel (as detailed) and painted with the recommended heavy duty paint system.

The exact number and size will be determined on site.

Bolts etc securing these brackets to the walls shall be manufactured from grade 316 stainless steel

PA 4 CONSTRUCTION

PA 4.1 BRICKWORK AND MASONRY

Brickwork shall be well and regularly bonded, with no false headers and none but whole bricks except where legitimately required as closers. All bricks must be thoroughly dampened before laying and each brick is to be laid with full joints and pressed into its bed so as to squeeze out superfluous mortar and give a finished joint not exceeding 10mm thick in the case of the face work or 13mm thick in the case of plastered walls or work not exposed to view. All joints, both horizontal and vertical, notwithstanding any trade custom to the contrary, are to be filled solid with mortar for their full width and depth, each course being flushed with mortar, worked well down into all vertical joints before the succeeding course is laid.

Plastered walls shall have the joints raked out to a depth not less than 13mm and not more than 20mm, and subsequently refilled with mortar of the same proportions as the original bedding mortar. Under no circumstances may joints to be so formed as to expose any perforation in the units.

PA 4.2 MORTAR

Unless otherwise described, all brickwork shall be built in 1:6 cement mortar.

Mortar joints to brickwork generally shall be 10mm in thickness with level bedding joints and vertical perpends.

PA 4.3 PLASTER

Plaster shall be of the same proportions as the bedding mortar.

In the case of plaster to concrete work, the surface of the concrete work shall first be hacked sufficiently to afford proper bond and the plaster applied in a thin skimming coat. Where form oil has been used on the shutters the surface is to be thoroughly washed and brushed using an approved detergent.

All brickwork to be plastered shall have the joints raked out as specified in Subclause PA 4.1, brushed off and well wetted before the plaster is applied. The plaster is to be applied in one coat, to a thickness as shown on the drawings but not less than 10mm and not more than 20mm thick. Angles and edges are to be carefully plumbed or levelled as the case may be and corners shall be arris rounded.

Should any plaster show signs of cracking, blowing or other defects at any time before or during the Defects Liability Period, the defective work shall, at the Employer's Agent's discretion, be stripped and replastered by the Contractor at his own cost, the defective areas being cut out to rectangular shape unless otherwise permitted and with edges undercut to the surrounding plaster. If the finished plaster is uneven or shows scratch-markings or other blemishes spread over the whole surface, the Employer's Agent may order the Contractor to render the whole surface with a heavy bodied PVA paint, at the Contractor's own cost.

Plasterwork should in all cases be commenced at the top and proceed downwards and every care must be taken to prevent the staining of face-brickwork and other finished parts of the buildings by plaster droppings, which must not be allowed to harden, but shall be cleaned off continuously as plastering proceeds. Plaster dropping onto floors and into sumps must be removed to the satisfaction of the Employer's Agent. Pipework and equipment, particularly that installed by other contractors, is to be protected by PVC sheeting during plastering.

PA 4.4 GRANOLITHIC FLOOR SCREED

Granolithic floor screed shall consist of one part cement, one part sand and two parts 5mm stone chips and oxide where required, thoroughly mixed as for concrete and placed in a layer not less than 20mm thick, levelled or graded and trowelled to a smooth uniform surface. To ensure proper bond, the concrete surface to be covered shall be clean, roughened by chipping, flushed with water and coated with cement grout just before placing of the granolithic layer. Granolithic screed is to be finished by steel floating with V joints in squares of 1,20m to 1,80m, the joints extending for the full depth of the granolithic screed. Joints are not required in the granolithic screed where it is to be overlaid by tiles or carpeting.

Steps and entrance slabs are to have rounded nosing, reeding and sloping skirting, and at outside doors a sunk and weathered threshold is to be provided.

PA 4.5 TILES

Tile adhesive and tile grout shall be as per recommendation of the supplier for perfect installation of the tiles or as approved by the Employer's Agent.

A flexible adhesive that shall first be approved by the Employer's Agent to be used to allow for the increased movement that will take place from time to time caused by shrinkage and expansion of the concrete slab.

Tiles are to be fixed to plastered walls and concrete slabs with an approved compound and pointed, well gauged as to thickness and size, and true to colour. Arris rounded tiles are to match accurately.

PA 4.6 DOORS AND FRAMES

Doors and frames are to be set up, built into position, bedded and pointed in cement mortar, with any necessary cutting to brickwork, fitting and making good, as the brickwork is built up. In the case of door frames, wrought iron right angled cramps are to be fixed to door frames and built into brickwork at every eighth course.

Where pipes, frames, brackets or other such parts pass through or have to be set into brickwork, the bricks shall be carefully cut and fitted to maintain regularity of courses and uniformity of joints, the shaped bricks being embedded and pointed to conform with the surrounding brickwork. Where such parts have to be set into position after brickwork is built, holes shall be left wherever possible, in preference to cutting out bricks, and the work shall be subsequently made good in the manner described.

PA 4.7 ROLLER LOCK WITH HANDLES AND INDICATOR LOCK

Easy reversible radius latch with handles and indicator lock installed on 170mm by 170mm stainless steel plate in accordance with the Manufacturer's instructions.

PA 4.8 PAINTING – GENERALLY

Paints must be applied strictly in accordance with the Manufacturer's instructions relating to preparation of surfaces, undercoats and application.

No painting on exterior work is to be done in wet weather, or upon surfaces which are not thoroughly dry and all work is to be entirely free from dust before painting is proceeded with. All paint work shall

be properly cleaned and rubbed down between each coat. No coat shall be applied until the Employer's Agent has passed the previous one as dry, hard and satisfactory.

All colours for paintwork and all makes and composition of paint shall first be approved by the Employer's Agent before putting the work in hand.

All paint marks and spots on surfaces on which they are not intended shall be removed to the satisfaction of the Employer's Agent and the work shall not be accepted until this is assiduously carried out. Where required, paintwork shall be finished to a straight line.

Painting must be carried out in co-operation with other Contractors and may be allowed to proceed only at the discretion of the Employer's Agent.

PA 4.8.1 Painting Plastered Walls

All plastered walls are to be sealed and primed. Thereafter the walls are to be given three coats of exterior quality Dulux Dura 100 low sheen PVA paint, or similar approved.

PA 4.8.2 Painting Concrete Surfaces

All concrete surfaces which are to be painted are to be thoroughly brushed and washed with a detergent and cold water. Thereafter the surfaces are to be primed and then painted with two coats of exterior quality Dulux Dura 100 low sheen PVA paint, or similar approved.

The surface preparation of the concrete shall take place after the concrete has cured for at least 28 days. The moisture content of the concrete should be below 4% by weight and shall be measured and the result submitted to the Employer's Agent before commencing with painting. The moisture content at the surface of the concrete may be measured by an electronic instrument called the Protimeter.

Furthermore, the laitance on the surface of the concrete must be removed to ensure a mechanically strong surface to receive the following Dulux paint system or similar approved after the surface has been approved by the Engineer in writing:

Coat	**Product Name**	**Wf Um**
1	Sigmacover CM coating (10% thinned)	± 100
2	Sigmacover CM coating	± 92

It is important to refer to the product sheets to confirm all technical requirements relating to the application of the paint system.

PA 4.9 PLUMBING, DRAINAGE, SANITARY WARE

PA 4.9.1 Toilets

The installation of the toilet pan and cistern shall be done strictly in accordance with the Manufacturer's instructions.

PA 4.9.2 Basins

The installation of the basins to the concrete walls shall be done strictly in accordance with the Manufacturer's instructions.

PA 4.9.3 Toilet roll holder

The installation of the toilet roll holder to the concrete walls shall be done strictly in accordance with the Manufacturer's instructions.

PA 4.9.4 Internal Plumbing

The Contractor shall provide all internal plumbing as scheduled in the buildings. This shall comprise all cold water, hot water and wastewater plumbing and shall include, where necessary, for taking through the wall of the building to connection points or gulleys, as the case may be, outside the building.

All plumbing shall be carried out by registered plumbers in accordance with good practice and local regulations.

PA 4.9.5 Hot Water Geysers or Instant Water Heaters

The hot water geysers or instant water heaters if applicable will be supplied and installed by the contractor under this contract and shall allow for connecting up both the hot and cold supply pipes and for all necessary vent, bleed off vacuum breakers and /or overflow pipes and electrical components required.

PA 4.9.6 External Plumbing

The external reticulation shall comprise a purified water supply which will connect to the internal plumbing and shall include standpipes with hose connection taps placed at convenient points around the pump station.

PA 4.9.7 Drains

The Contractor shall provide all soil and wastewater drains, including for all vent pipes, junctions, bends, access pipes, inspection eyes, gulleys, etc., as necessary, and shall connect up to the sanitary fitments at the buildings.

All drains and sewerage work shall be carried out strictly in accordance with the Drainage Bylaws of the Local Authority and the relevant SANS specifications and will be measured and paid for as scheduled.

PA 4.10 WEATHER

In any period of interruption caused by inclement weather, and at the completion of each day's bricklaying, freshly laid brickwork should be protected.

PA 5 TOLERANCES

PA 5.1 General

Notwithstanding the tolerances given below, the accuracy of building should be such as to enable other building components to be built into the masonry.

PA 6 BASIS OF MEASUREMENT AND PAYMENT

PA 6.1 BRICKWORK AND MASONRY……Unit (m^2)

The brickwork and concrete masonry units are to be paid per square metre as scheduled. Prices shall be inclusive of all plumbing of corners and faces, lining, levelling, forming reveals and openings, cutting where necessary but not specifically scheduled, building to underside of beams, also for building in all air bricks, ties, frames, etc, and shall include for supplying and laying of masonry and mortar, raking joints as specified and for waterproofing outside face of inner skin.

The measurement of the work will be taken nett with window and door openings deducted but no deductions from the measurement will be made for lintels, air bricks, pipes up to and including 150mm diameter or fittings up to 150mm square built into the work. Small openings of area up to 0,05m² will not be deducted.

The cost of all tests specified in Subclause PA 3.4 will be deemed part of the tendered rates and no additional payment will be made therefor.

PA 6.2 BRICKFORCE ……Unit (m)

Brickforce is to be paid per linear metre as scheduled in the BOQ. Prices shall be inclusive of all the necessary work required to complete the construction work as per drawings and specification.

PA 6.3 PLASTER……Unit (m^2)

The price for plaster is to be square metre complete including V jointing. Rates for plaster shall include for all labour and material in preparing surfaces, working to reveals, external and internal angles, mitres, slopes, narrow widths, etc., and ruling with a vee joint where plaster meets concrete work. The work shall comply with Subclause PA 4.3

PA 6.4 TILES……Unit (m^2)

The price for tiles is to include for preparing surfaces, applying the approved bonding compound, laying and finishing the tiles, grouting, point and for thoroughly cleaning on completion and for the supplying of all materials. The work shall comply with Subclause PA 4.5

PA 6.5 DOOR AND FRAMES……Unit (No)

The price shall include all the necessary work required to complete the installation. The work shall comply with Subclause PA 4.6

PA 6.6 EASY REVERSIBLE RADIUS LATCH WITH HANDLE AND INDICATOR LOCK COMPLETE ……..Unit (No)

The price shall include all the necessary work required to complete the installation in accordance with the Manufacturer's instructions. The work shall comply with Subclause PA 4.7.

PA 6.7 PAINTING ……...Unit (m^2)

The price shall include all the necessary work required in accordance with Subclause PA 4.8.

PA 6.8 TOILETS……Unit (No)
The price shall include installation of the toilet pan and cistern shall strictly in accordance with the Manufacturer's instructions complete.

PA 6.9 BASINS……Unit (No)
The price shall include installation of the toilet pan and cistern shall strictly in accordance with the Manufacturer's instructions complete.

PA 6.10 TAPS……Unit (No)
The rate shall include supplying and installation of the taps listed in the BoQ.

PA 6.11 TOILET ROLL HOLDER……Unit (No)
The price shall include installation of the toilet roll holder to the concrete walls complete strictly in accordance with the Manufacturer's instructions.

PA 6.12 WATER PIPES AND FITTINGS……Unit (No)
The rate for all pipe and fittings shall include for the supply, handle, install, test and disinfect where applicable.

Pipes have been measured in linear metres and fittings have been measured per unit number.
Some of these pipes and fittings may have to be installed in a concrete wall or slab, closed into a brick wall or fixed against a wall or floor.

PA 6.13 SEWER PIPES……Unit (No)
The rate for heavy duty solid wall sewer pipes (Class 34) shall include for the supply, handle, install and test of these pipes which will be fixed to concrete wall in a vertical or horizontal position as required. The support brackets are measured elsewhere.

PA 6.14 SUPPORT BRACKETS……Unit (No)
The rate for the support brackets shall include for the manufacture, installation, hot-dip galvanising painting and securing to wall with stainless steel bolts complete.
Support brackets will be paid for per number.

PORTION 5: GENERAL SPECIFICATION FOR MECHANICAL AND ELECTRICAL WORK

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GENERAL SPECIFICATION FOR MECHANICAL AND ELECTRICAL WORK

1 SPECIFIC DUTIES OF CONTRACTOR

1.1 Marking and Delivery to Site

All plant and equipment delivered under this Contract shall be indelibly marked with the contract number and unique tag number in accordance with the project tagging system. All labels and fixings shall be robust and non-corrodible.

Fabricated components shall be provided with punched or welded identification.

All deliveries of equipment shall be accompanied by a delivery note and copy of the Engineer's Surveillance Report releasing the equipment.

1.2 Offloading, Stacking and Liability for Damages

The Contractor shall make arrangements for the offloading, stacking and storage of all plant and equipment delivered under the Contract.

All equipment delivered and held in storage shall be the responsibility of the Contractor who shall provide adequate protection against theft, damage from all adverse weather conditions, fire and other hazards or interference until such time as it is installed and accepted by the Engineer as complete in terms of the Contract.

1.3 Storage

A limited area will be made available for the erection of stores and the storage of plant and equipment delivered prior to the commencement of installation. However, where possible, the Contractor shall programme delivery to meet his installation programme and the Engineer reserves the right to require that the Contractor stores equipment at his own premises until such time that it may be incorporated in the Works.

The Contractor will be required to provide the necessary racks and bins for storage of small items of equipment. All other items of equipment shall be supported off the floor by adequately sized wooden spacers. Where equipment is permitted to be stored in the open by the Engineer, it shall be raised from the ground to prevent damage by water, and sufficient access shall be provided to keep the area free from weeds and general debris. Deterioration of paintwork, surface finishes and perishable commodities shall be prevented by covering the equipment with tarpaulins or other suitable covers.

1.4 Erection, Installation, Adjustment and Operation

The Contractor shall employ on site a suitably qualified full time installation supervisor for the full duration of the construction period who shall be experienced in the type of work executed and whose appointment shall be approved by the Engineer.

Erection and installation of the plant and equipment, instrumentation and cabling shall be carried out by skilled artisans and technicians experienced in the type of work to be executed and who shall be supervised in their activities at all times. The equipment when erected and installed is to be of neat and workmanlike appearance, solidly and evenly supported, plumb, true to line and level to tolerances specified or generally required and approved by the Engineer for the particular type of equipment. The methods used and the equipment employed shall be subject to the approval of the Engineer.

Where mobile craneage is required for the installation of plant and equipment it shall be adequately rated for the duty, due consideration being given to support and wind conditions. The selection of the crane capacity and type shall be approved by the Engineer before the crane is brought on site.

The grouting in of holding down bolts, wireways, conduits, conduit boxes, etc. and the caulking in of pipes where these pass through walls or connect into other civil structures, will be carried out by the Civil Works Contractors in accordance with the instructions and under the supervision of the Contractor under this Contract. All arrangements necessary for carrying out this work shall be made directly between the Contractor under this Contract and the Civil Works Contractor. This work will be carried out at no cost to the Contractor under this Contract but any damage to concrete work which may have been caused by the Contractor under this Contract in carrying out installation and erection will be repaired at his own cost.

Chasing is only permissible where it is impossible to build, or cast-in. No structural concrete, face-brick or finished surface may be chased or cut without the permission of the Engineer and the Civil Works Contractor.

The Contractor shall timeously provide to the Civil Works Contractor dimensions, details and positional information for frames, pipe sleeves, recesses, access ways, servitudes, apertures and openings for equipment to be installed under this Contract.

Separate pipe racks/supports shall be provided for mechanical/piping equipment and for electrical/cabling services.

The excavation of cable and pipe trenches shall be the responsibility of the Contractor under this Contract.

If requested by the Engineer, the Contractor shall submit samples of cables, terminals, labels, trunks and other construction materials, which he proposes to use on the installation for the engineers approval.

All materials and equipment used shall be suitable for the environment and service for which it is to be used. This pertains, inter alia, to corrosion protection, UV stability etc.

If installation commences with any type of material or equipment, then the same type shall be used throughout the contract.

All electrical equipment shall be small enough to be moved through the available doorways, passages, etc, to their final locations.

1.5 Inspections of Erection and Installation

1.5.1 Routine inspections on Site

The Engineer or his representative will routinely examine all plant during delivery to Site and installation. All items showing defects or damage of any description, or items poorly or incorrectly installed shall be laid aside as being not in accordance with the requirements of the Contract.

1.5.2 Final installation inspection

After the Contractor has satisfied himself that erection of the equipment is complete and correct, he shall give notice to the Engineer who will inspect the installation for completeness and correctness, checking all workmanship, materials and equipment for compliance with the specification.

1.6 Commissioning

1.6.1 General Provisions

Commissioning of all equipment shall be performed by the Contractor after the Engineer has approved the correct and complete installation of the equipment.

The Employer's and the Engineer's commissioning engineers or other personnel shall, at their discretion, witness the commissioning procedure and give assistance where required.

Commissioning shall be divided into cold commissioning and hot commissioning and shall, as a minimum and where applicable, entail:

1.6.2 Cold Commissioning

Mechanical and electrical checks:

- correct alignment of all equipment
- installation check of all low voltage electrical equipment and cabling
- testing of earth system
- correct direction of rotation of motors
- correct and smooth operation of all equipment
- water tightness/pressure testing of pipes
- lubrication where required
- calibration of instruments
- accuracy of measurement
- loop checks
- check for correct polarity, phase rotation and balance load between the phases. Verify polarity and phase identification.
- continuity and resistance of earth conductor including all bonding conductors
- continuity of ring circuit
- earth electrode resistance
- insulating resistance
- earth fault loop impedance test
- operation of earth leakage protection devices and circuit breakers

Check of safety devices:

- pressure relief valves
- settings of protection devices and overload relays
- fire extinguishers
- warning signs
- etc

Faults detected during cold commissioning shall be listed on fault sheets. The Contractor shall be responsible for rectification of these faults.

1.6.3 Hot Commissioning

Hot commissioning shall only commence when all faults noted during cold commissioning have been rectified and the Employers Safety Officer has satisfied himself that the plant is safe for hot commissioning.

Hot commissioning shall, as a minimum and where applicable, entail:

Functional checks:

- switch functions
- alarm and monitoring functions
- control loops/PID loops

1.6.4 Performance Tests

- Test individual items of equipment as well as the plant as a whole for performance in accordance with the Specification.

- In all applications of equipment operating in parallel, including duty/standby arrangements, all items of equipment shall be tested equally.

Faults detected during hot commission shall be listed on fault sheets. The Contractor shall be responsible for rectification of these faults.

1.6.5 Tests on Completion

When the Works have been checked and commissioned and the Contractor has satisfied himself of the correctness of operation and functionality in every respect, the Contractor shall inform the Engineer that he is ready to make the Tests on Completion.

Together with his notice to the Engineer of readiness to make the Tests on Completion, the Contractor shall submit a test procedure detailing all the tests in the order in which he proposes to make them. The test procedure shall be approved by the Engineer and shall include the Engineer's minimum requirements for performance tests as detailed in the respective section of the detailed Specification for each plant section. The Engineer shall be entitled to make any additions or alterations to the test procedure, which in his opinion are necessary to adequately judge the functioning and correct operation and performance of the Works. The tests shall be conducted by the Contractor in the presence of the Engineer and the Employer.

Except where otherwise specified, the Employer shall provide free of charge such labour, materials, electricity, fuel, water, stores, apparatus and feedstock as may be reasonably required by the Contractor to carry out the Tests.

The Tests on Completion shall include:

- Functional tests (all switch functions, alarm and monitoring functions and control loops)

- Performance tests (of individual items of equipment and of the plant as a whole), which shall include checking the attainment of the guarantee figures

- Checking of any items outstanding from earlier test/inspections

- A test run, during which the plant shall be run continuously for two weeks. In all applications of equipment operating in parallel, including duty/standby arrangements, all items of equipment shall be run equally.

If the Works or any Section fails to pass the Tests, the Engineer or the Contractor may require such Tests to be repeated on the same terms and conditions. All costs to which the Employer may be put by the repetition of the Tests shall be deducted from the Contract Price.

If the Engineer and the Contractor disagree on the interpretation of the Test results, each shall give a statement of his views to the other within 14 days after such disagreement arises. The statement shall be accompanied by all relevant evidence.

If the Works or any Section fails to pass the Tests on the repetition thereof the Engineer, after due consultation with the Employer and the Contractor, shall be entitled to:

- order one further repetition of the Tests, or
- reject the Works or Section, or
- issue a Taking-Over Certificate, if the Employer so wishes, notwithstanding that the Works are not complete. The Contract Price shall then be reduced by such amount as may be agreed by the Employer and the Contractor, or, failing agreement, as may be determined by arbitration.

1.6.6 Taking Over

Once the plant has passed the Tests on Completion and all faults previously noted have been rectified, excluding minor items which do not affect the use of the plant for the purpose for which it is intended, the taking-over certificate will be issued to the Contractor.

1.6.7 Performance tests subsequent to Taking-Over

Where performance tests are required, which require test conditions not encountered during the Tests on Completion, these shall be performed at a later stage within the Defects Liability Period. This shall not prejudice the taking-over of the plant if all other tests have been passed.

1.7 Operating and Maintenance Manual

1.7.1 Format and Contents

An operating and maintenance manual(s), hereinafter referred to as the manual, shall be prepared separately for each Section of the Contract. The manual shall cover all equipment under this Contract. The Contractor shall be responsible for producing and/or providing all documents required to be included in the Operating and Maintenance Manual. As a minimum, this shall include the documents listed below. The requirements below apply equally to each manual to be prepared.

PART 1 DESCRIPTION OF PLANT

1.1 Description of process and major components

1.2 Record drawings of plant
- piping and instrumentation diagrams
- layout/arrangement drawings
- piping drawings
- electrical & control drawings like wiring diagrams, loop diagrams, etc.

1.3 Schedules of plant and equipment, using a common format giving details of size, model numbers, duty and original supplier of each component item of plant equipment and instrumentation.
- list of mechanical equipment
- list of electrical equipment
- instrumentation list
- process signal list

Drawings and schedules to be included shall be selected by the Engineer from the complete list of all drawings and schedules prepared by the Contractor.

PART 2 OPERATING INSTRUCTIONS

2.1 Description of operation and control of

- overall plant
- plant section I
- plant section 2
- ….. *(as applicable)*

[Note: all procedure description shall include step-by-step instructions for:

- normal start-up
- normal shut-down
- emergency shut-down
- procedures at power failure
- precautions to be taken, notes on safety.

PART 3 MAINTENANCE INFORMATION

This section shall be clearly subdivided for each section of plant and/or item of equipment. Each subdivision shall, as a minimum and where applicable, contain:

- completed technical data sheets;
- full specifications, technical and maintenance data, including design duties, performance curves, assembly drawings, assembly and disassembly instructions for each item of mechanical and electrical plant and equipment, and instrumentation;
- detailed monthly, three-monthly, six-monthly and yearly preventative maintenance instructions;
- a comprehensive lubricating schedule for the plant with full details of recommended lubricants, initial fill lubricants, capacities and lubrication time intervals;
- a comprehensive spares list and separate current price list for each item of equipment and instrumentation complete with referenced drawings and indicating recommended stock spares. Each item shall be adequately identified with manufacturers part numbers and suppliers details to permit reference when ordering;
- fault-finding procedures;
- list of calibration and zero settings;
- list of bearings, contactors and other moving parts.

[This section shall also contain a list of all equipment suppliers with addresses and telephone numbers.]

PART 4 COMMISSIONING DOSSIER AND CERTIFICATES (DATA BOOK)

- Test and inspection certificates
- Calibration certificates
- Safety certificates, including "Certificate of Compliance by an accredited person" Annexure I in terms of the Occupational Health and Safety Act 85/1993, Electrical Installation Regulation 1992
- …. etc.(see above)

[Note: The original signed copies of all certificates shall, after completion of all Tests on Completion, be included in the primary copy of the manual, which shall be issued to the Employer. All other copies of the manual shall have copies of the certificates included in them.]

All information provided in the manual shall be in the English language in a common format. Under no circumstances will photocopies of standard manufacturers manuals or drawings or other information, which is not perfectly legible, be accepted.

On-site Electrical Drawings

A set of final layout and schematic record drawings shall be mounted in a purpose made frame inside a door, or where no doors are fitted, to the front plate of each cabinet. The frame shall be adequately sized to receive the equivalent of one AO size drawing folded to a nominal size of A4.

For main boards, supply schematic drawings in aluminium picture frame with glass and sealed rear backing suitable for mounting against the substation wall.

1.7.2 Procedure and Approval

The Contractor shall prepare a draft of the operating and maintenance manual and submit one copy to the Engineer at least four weeks prior to the commencement of cold commissioning for comment, amendment where necessary and approval. All comments and amendments required by the Employer or the Engineer shall be incorporated into the manual and an updated version presented prior to the commencement of hot commissioning. This shall include any changes arising out of cold commissioning. The updated version shall be used as a reference manual during hot commissioning.

Eight copies of a final update of the manual, incorporating any changes arising out of hot commissioning, shall be presented to the Engineer after completion of hot commissioning; six copies shall be issued to the Employer and the Engineer shall retain two copies. The plant will not be taken over until the manual is finally completed.

1.8 Training and Operations Supervision

The Contractor shall be responsible for the training of the Employers maintenance and operating staff, which shall be completed prior to Taking-Over of the Works by the Employer. As a minimum it shall include:

- Practical training, by regularly involving the Employers staff during installation, inspections and commissioning. It shall include step-by-step instruction of the Employers staff in the operation and maintenance of specific mechanical, electrical and instrumentation equipment. It shall also include the systematic training of the operating staff during the 2-week test run period.

1.9 Defects Liability Period

During the Defects Liability Period the Contractor's engineers responsible for the project shall visit the Site at least three times, say 1, 6 and 12 months respectively after the Commissioning Date. The purpose is to inspect and check all the plant supplied and installed for proper operation and to adjust where necessary, and for the Contractor to satisfy himself that the regular maintenance of the plant is being carded out correctly and in accordance with the written instructions supplied by him. The personnel undertaking these visits shall explicitly not be the staff working under the maintenance contract. An item has been provided for these visits in the Schedule of Quantities for each Section, as appropriate. As the visits for the various sections will normally coincide with each other, a price will be negotiated with the Contractor, based on tendered prices, to cover the cost of the visits for the Contract as awarded.

2 QUALITY MANAGEMENT

2.1 Quality System

The Contractor shall, for the purposes and duration of the Contract, operate and maintain a quality management system complying with the requirements of the ISO 9001:2008. The Quality System shall take the form of a coordinated and formally documented statement and shall include quality management objectives, policies, Organisation, procedures, and work instructions that demonstrate the Contractor's implementation of the requirements of ISO 9001 Standard for Quality Management Systems.

2.2 Quality Plan

The Contractors Project Quality Plan for the Contract shall indicate how the Contractor's Quality System shall apply to the specific requirements of the Contract. It shall clearly indicate, by way of written description, schedules, flow diagrams and procedures, compliance with ISO 9001:2008 and compliance by Sub-contractors to ensure compliance with ISO 9001:2008, as appropriate to the classification of the product or service.

The Project Quality Plan shall identify all documentation concerning implementation of the procedures and will form part of the demonstration of conformance to requirements for the plant materials and equipment to be supplied under this Contract.

The Project Quality Plan shall be subject to the Engineers approval.

The vocabulary used shall comply with the requirements of ISO 9000:2005.

2.3 Component Quality Plans

Component Quality Plans shall be prepared by the Contractor or his Sub-contractor/Supplier for each component or group of components, or item of equipment, or service in accordance with an approved schedule of all plant and equipment and services to be provided under the contract according to the designated category.

Component Quality Plans shall be submitted to the Engineer for approval and insertion of his surveillance requirements before construction, manufacturing or installation may take place. The following surveillance requirements shall generally be provided for and affirmed:

Record (R) : Documentary evidence of the activity scheduled and statistical data in the Quality Plan is to be retained and included in the data book.

Verification (V) : The Engineer or his representative will not necessarily be present during the activity but documentary evidence is to be produced to demonstrate that the requirements of the Component Quality Plan were met. A copy will be required by the Engineer and shall be included in the Data Book.

Witness (W) : The Engineer or his representative requires notification to permit witnessing of that particular stage of manufacture. The Contractor shall notify the Engineer timeously (at least 48 hours notice in writing) with a copy of his surveillance report attached.

Hold (H) : The Contractor and/or his Sub-contractor /Supplier may not proceed to the following operation until the Engineer or his representative has cleared the preceding activities and the initial hold point.

Random (R) : Surveillance by random inspection.

2.4 Categorisation

The following categories shall apply in determining the preparation of Component Quality Plans:

Category	Classification	Component Quality Plan
Critical	A component or permanent assembly, the failure of which is likely to significantly affect the performance of the plant of which it is a part, and/or will cause a detrimental environment impact, and/or is likely to result in hazardous or unsafe conditions for individuals operating, maintaining or being in the vicinity of such component or assembly, and/or requires 24 hours or more to replace assuming immediate availability.	Required on all components or assemblies
Major	A component or permanent assembly, other than critical, the failure of which is likely to materially reduce the ability of the plant, of which it is part, to perform	As determined by the Engineer
Minor	All items other than those designated critical and major	Not required

2.5 Quality Management Audit and Meeting

The Engineer shall carry out periodic assessments of the adherence to the Quality Plan and inspection and surveillance during design, manufacture and supply and may elect to appoint an independent quality assurance representative to act in this capacity. A formal quality assurance meeting will be held at least once a month.

2.6 Corrective Action

Failure to conform to the documented requirements will result in the issue by the Engineer of a CORRECTIVE ACTION REQUEST. Failure to rectify the deficiencies covered by a corrective action request within the period stated will be considered to be default by the Contractor in terms of the General Conditions of Contract.

2.7 Drawings

The Contractor and/or his Sub-contractor/Supplier may not proceed to the following operation until the Engineer has approved drawings as follows:

- General Arrangement Drawings
- General Arrangement drawings require an approved or approved with comments release from the Engineer.
- Design Calculations Design calculations require an approved or approved with comments release from the Engineer.
- Detail Drawings

- Detail drawings require a reviewed status from the Engineer.
- As-Built Drawings

As-Built drawings require a reviewed status from the Engineer.

2.8 Equipment Data Sheets

A data sheet shall be prepared and submitted for approval by the Engineer on each item of plant and equipment and components therefore and all electrical components, and instrumentation, in accordance with a programme approved by the Engineer.

The data sheets shall be referenced by a unique code or tag number as utilised on and identified from the process flow and instrumentation diagram. The submission shall be in a form approved by the Engineer as appropriate to each item and component.

The data sheet shall be in the format as contained in this document and shall provide detailed information on each item and component, which shall include but not be limited to the following:

General: (Heading)	Contract reference number Client reference Plant reference Date Sheet reference
General: (Item)	Tag Number Supplier Manufacturer Type and Size Model Number Drawing or Catalogue reference
Process Data:	Full details of process and duty requirements for each item and medium processed or utilised.
Construction Details :	Full details of materials of construction for each item and component
Operational Data:	Ranges and operation limits.
Control:	Power and signal control (input and output), pneumatic, hydraulic, and other service requirements.

The approved data sheets shall be modified where necessary during commissioning of the plant and a printed copy with approved typeface shall be incorporated into the Operating and Maintenance Manuals.

2.9 Data Book

A data book shall be prepared and submitted on completion of manufacture, installation, testing and commissioning. The master version of the book shall include originals of all product brochures, material certificates, certificates of testing, analyses, laboratory reports, commissioning reports, works test sheets, Q.C.P's and copies of orders generated during the execution of the Contract, as approved by the Engineer.

Copies of the data book shall form part of the Operating and Maintenance Manuals.

2.10 Inspections during Manufacture and Construction

The Engineer shall inspect and approve those stages of manufacture of all equipment necessary to ensure the correct quality of the equipment as prescribed in the approved Project Quality Plan.

The Contractor shall provide facilities for inspection of all items of equipment at the place of manufacture and this requirement shall extend to all Sub-Contractors and suppliers. The equipment may be examined by an Engineers Representative who will have the right to examine and test and satisfy himself regarding the suitability of all materials, components, and fabricating methods and processes, and to test (including radiographic or ultrasonic inspection of welding), whether for strength, pressure or performance, all

components and finished equipment. The Contractor shall provide all facilities for such testing and the contract price shall include for this.

When Plant has passed the tests referred to in this Clause, the Engineer will furnish to the Contractor a certificate or endorse the Contractors test certificate to that effect.

Examination by an Engineer's Representative shall not relieve the Contractor from the responsibility of carrying out himself all tests which may be necessary to ensure the required standard of manufacture or from any of his obligations in terms of the Contract. Copies of the results of all tests carried out by the Contractor in accordance with an approved Quality Plan shall be forwarded in triplicate to the Engineer.

The tests referred to above shall be carried out at the Contractors expense.

The achievement of adequate standards during tests at the place of manufacture, if performed, is only a first requirement. The final criterion will be performance on Site, and any of the equipment, which proves defective due to bad workmanship or material, shall be replaced forthwith by the Contractor at his own cost on the instruction of the Engineer.

3 STANDARD MECHANICAL SPECIFICATIONS

3.1 Pipework And Fittings

3.1.1 Carbon Steel Pipework and Fittings

Carbon steel pipes and fittings, other than steam tubing and screwed and socketed pipes for general application, larger than 150 mm diameter, shall be electric resistance welded complying with the requirements of SANS 719 Grade A or ASTM A106 or API5L Grade A and shall have walls of thickness not less than 6 mm for pipe sizes up to 300 mm diameter inclusive and 8 mm for pipe sizes of 350 mm to 500 mm. Helical seam welded pipe will not be permitted unless specifically approved by the Engineer.

Pipework, other than screwed and socketed of sizes up to and including 150 mm nominal bore, shall comply with the requirements of SANS 62 or ASTM A106 or API5L Grade A for seamless steel pipes. These pipes shall be heavy duty and with a minimum wall thickness of 5 mm.

The use of fabricated carbon steel fittings will only be permitted where approved by the Engineer and where a standard butt weld fitting cannot be accommodated. Where such fittings are permitted they shall be of the closely spaced mitre type to an approved arrangement. Butt weld fittings shall comply with the requirements of BS 1640 or ASTM A234.

Steam piping shall be seamless tubing complying with the requirements of BS 1600 or ASTM A106 and be used in conjunction with butt weld fittings to the latter specification or to BS 1640. The pipe class shall be as stated in the detail Specification.

Welding and visual examination of carbon steel pipework shall be carried out in accordance with BS 4871 Part 1 and BS 2633 or BS 2971 or an equivalent, except where stated in the Detail Specification. Dye penetration examination to BS 6443 shall be undertaken on not less than 10% of all weld connections.

All screwed and socketed pipes and fittings shall comply with the requirements of SANS 62 Heavy class and shall be 'hot dip' galvanised. Unless otherwise specified all screwed and socketed pipes shall not be used for the conveyance of steam gas and compressed air, or liquids containing it.

Plain ends of pipes and fittings shall be covered and protected against damage whilst being transported and stored.

3.1.2 Stainless and Steel Alloy Pipework and Fittings

Stainless steel pipes shall be Grade TP304 L or TP316 L as stated in the Detailed Specification complying with the requirements of ASTM A312 for seamless pipe.

Stainless steel butt weld fittings shall comply with the requirements of ASTM A403 class WPS and be of the same material as the pipes with which they connect. Dimensions shall comply with ANSI B.16.9 and B.16.28.

Flanged fittings for stainless steel and alloy pipes shall be manufactured from butt weld fittings as specified above provided with short straight pipe extensions suitable for insertion in slip on or socket weld flanges.

Unless otherwise stated in the Detailed Specification the material thickness for all stainless steel pipes and fittings shall be equivalent to Schedule 40 for Pipes up to and including 150 mm diameter and Schedule 20 for pipes exceeding 150 mm diameter.

Welding and visual examination of stainless steel pipework shall be carried out in accordance with BS 4871 Part 1 and BS 2633 except where stated in the Detailed Specification. Dye penetration examination to BS 6443 shall be undertaken on not less than 10% of all weld connections.

3.1.3 Cast Iron Pipes and Fittings

All Cast iron pipes and fittings shall comply with the requirements of BS 2035 as amended by BS 4772 and unless otherwise specified shall be of class B quality for straight pipes and class AB quality for fittings or equal grade defined under BS 4772. Materials used in the manufacture shall comply with the requirements of BS 1452 Grey Iron Castings grade 220.

Flanges shall be machined flat and without a raised joint face and drilling dimensions shall comply with the requirements of BS 4504 for the working pressure as specified for each application. Where the working pressure is not specified drilling shall be to Table 10. Spot facing of the rear of flanges shall be carried out to prevent uneven load distribution from bolt heads. Where pipes pass through and will be cast into walls they shall be provided with puddle flanges, which shall form an integral part of the casting. Puddle flanges shall have the same dimensions as the standard flanges but shall be undrilled.

All cast iron pipes and fittings shall be painted in accordance with the requirements stated in the detailed Specification. External surfaces where pipes pass through walls shall be uncoated.

3.1.4 Copper Tubes

Copper tubes shall comply with the requirements of SANS 460. Bends, where permitted by the Engineer, shall be formed with a purpose made bending machine and shall be of constant radius. Fixing shall be of compatible non-corrodible material and affixed to maintain line and level, Joints and bends shall be brass compression fittings complying with the requirements of SANS 1067 Type A.

3.1.5 Flexible Couplings

General-purpose flexible couplings for carbon steel and cast iron piping shall be of the Viking Johnson type or similar approved. Surface treatment shall be to the same system applied to the pipes to be jointed.

Couplings fitted on pipelines where the anticipated operating pressures will exceed 12 bar or may be subject to surge and water hammer shall be fitted with adjustable restraints. Vibration couplings between rotating machinery and its associated pipework shall for low temperature and pressure operation be of the Vibraflex or similar type incorporating an adequately rated body of synthetic rubber. Backing flanges shall be in accordance with the requirements of Clause 3.1.6.

Compensators to accommodate expansion shall be manufactured from the same material as the pipeline in which they are installed, or better and shall accommodate the anticipated maximum operating temperature and be adequately rated to meet the required pressure. Restraints shall be provided to all compensators manufactured from the same material as the body.

All buried couplings shall be completely wrapped with 'Denso' or equal approved mastic impregnated tape after installation.

3.1.6 Flanges

The dimensions and drilling of standard flanges shall comply with the requirements of BS 4504 or SANS 1123 for the working pressure as specified for each application. Where the working pressure is not specified drilling shall be to Table 10, unless otherwise agreed with the Engineer. Flanges shall be machined flat and without a raised joint face. Where pipes pass through and will be built into walls they will be provided with puddle flanges, which shall have the same diameter as the standard flanges but be undrilled.

Flanges for low-pressure applications (less than 10 bar) shall be of the slip on type. Flanges for high-pressure applications (greater than 10 bar) shall be of the socket weld type, unless otherwise agreed with the Engineer.

Flanges shall be manufactured from materials equal to or better than the pipes to which they are connected.

3.1.7 Jointing Materials

Jointing gaskets for flanged joints shall comply with the requirements of BS 4865 and be cut to the full width of the flange. The materials shall be suitable for and compatible with the required pressure and temperature duties, and characteristics of the material conveyed.

3.1.8 Malleable Cast Iron Fittings

Malleable cast iron fittings used in conjunction with screwed and socketted pipes shall comply with the requirements of SANS 509 and be 'hot dip' galvanised.

3.1.9 Unplasticized Polyvinyl Chloride Pipes and Fittings

UPVC pipes and fittings for pressure applications shall comply with the requirements of SANS 966 and shall be of the classes specified for each application. The installation of UPVC pipes except where stated in the Detailed Specification shall comply with SANS 0112.

3.1.10 Polyethylene Pipes and Fittings

High-density polyethylene pipes and fittings shall comply with the requirements of SANS 533 with type and class as specified for each application. Installation of polyethylene pipes shall comply with SANS 0112.

3.2 Various Fabricated Items

3.2.1 Castings

Grey iron castings shall comply with the requirements of BS 1452 with grade as stated in the detail specification. All castings shall be carefully fettled and cleaned by abrasive blasting before machining.

Spheroidal graphite or modular graphite castings shall comply with the requirements of BS 2789 with grade as stated in the detail specification.

3.2.2 Nuts, Bolts and Fasteners

Nuts, bolts and other fasteners for the assembly and installation of fabricated components and standard flanges other than anchor bolts shall be hexagon head type and comply with the requirements of SANS 135 with ISO threads of the coarse pitch series. Fastener material shall always be of equal or better corrosion resistance or coating than the items being fastened.

Washers of similar materials to the bolts shall be provided at each nut and the use of multiple washers will not be accepted. Spring washers together with flat washers shall be fitted to all nuts subject to vibration. Bolts shall project not less than 2 thread pitches and not more than 10 thread pitches from the heads of nuts after tightening. Projections on individual and common flange sets shall be identical.

High tensile bolts shall only be used where essential and shall be coated to the approval of the Engineer.

Jacking bolts up to and including 24 mm diameter and holding down bolts to be built into concrete shall be stainless steel 304 or 316 with threads complying with SANS 135 of the ISO coarse pitch series. Bolts to be installed under water except where stated in the Detailed Specification shall be stainless steel Grade 304 or 316. Bolts for flexible couplings and flanges for underground installation, shall be 'hot dip' galvanised. Jacking bolts of 30 mm diameter and over may be 'hot dip' galvanised, with the approval of the Engineer.

Brackets and other mountings shall preferably be affixed to concrete walls and structures with cast in anchors. Where this is impracticable approved stainless steel 304 or 316 'wedge' anchors will be provided and installed by the Contractor including all drilling. The Contractor shall clearly indicate on his drawings submitted to the Engineer the minimum reinforcement cover required to accommodate these anchors.

Unless otherwise stated in the detailed project specification, all fasteners will be of the following materials:

Immersed conditions or within 200mm of a water surface:	316 Stainless Steel
200mm above water:	'Hot Dip' Galvanised Carbon Steel

3.2.3 Open Steel Flooring

Open steel flooring shall be 'egg crate' type rectangular pattern with closed edges all round and manufactured from mild steel, 3CR12 steel or stainless steel 304L/316L as stated in the detailed Specification with sharp edges and 'burrs' removed with a minimum of 30 mm x 4,5 mm span bars spaced at not more than 80 mm centres and transverse bars at 40 mm centres. Individual panels shall be 'hot dip' galvanised after manufacture where manufactured from mild steel or pickled and passivated in accordance with the procedure set out in Clauses 3.2.5 and 3.2.6 of the Specification when manufactured from 3CR12 steel or stainless steel 304L/316L. Approved clips manufactured from the same materials as the flooring

shall retain the flooring firmly in position under all specified conditions of loading. The maximum permissible deflection of the grating shall not exceed 1:500 of the clear span.

3.2.4 Structural Steelwork and Mild Steel Fabrication

Mild steel structural steelwork shall comply with the requirements of BS 4360 and shall be of grade 43A or alternatively SANS 1431 grade 350WA for use in the manufacture of trusses bridges, ancillary structures, and general mild steel fabrications subject to stresses in excess of 100 MPa.

Structural steelwork shall be constructed, fabricated and erected in accordance with the requirements of SANS 0162 “The Structural use of Steelwork'.

Welding of carbon steels for bridges, ancillary structures and mild steel fabrications shall be carried out in accordance with BS 5135. The Contractor shall include on his manufacturing drawings full details of welding procedures as outlined in Clause 23 of BS 5135. Welders undertaking manual and semi-automatic welding of steel fabrications shall be experienced competent artisans meeting the requirements of BS 4872 Part 1.

In addition to the weld requirements for structural strength on welded connections a sealing weld shall be run the full length of each connection to provide corrosion protection. Where in the opinion of the Engineer seal or continuous welding may create unacceptable distortion an approved method of sealing interstices at connections and between weld runs prior to corrosion protection may be considered.

Visual examination of all welding shall be carried out in accordance with BS 2633. Dye penetration examination to BS 6443 or magnetic particle examination shall be undertaken on not less than 10% of all weld connections.

3.2.5 Stainless Steel and Fabrication for General Applications

Stainless steel for low pressure and temperature applications shall be type 304L or 316L to ASTM A240 or BS 1449 Part 2, as stated in the detailed specification. Where no welding is required Type 304 or 316 may be used. Manufacturers test certificates shall be provided for each batch of stainless steel giving the chemical analysis of each material and each stainless steel item supplied shall be clearly and permanently marked with the grade of stainless steel and cross-referenced to the applicable test certificate.

Welders undertaking manual and semi-automatic welding of stainless steel 304 L and 316 L shall be experienced competent artisans meeting the requirements of BS 4872 Part 1 except where stated in the Detailed Specification.

Visual examination of all welding shall be carried out in accordance with BS 2633. Dye penetration examination to BS 6443 shall be undertaken on not less than 10% of all weld connections.

Welding of stainless steel shall be carried out using welding electrodes most suitable for the material and its application by reference to the manufacturers recommendations. Special precautions shall be taken to ensure that the strength and corrosion resistance of the material is not impaired by prolonged heating of the welds. All welds and adjacent areas shall be cleaned and pickled to remove the area of discolouration with a nitric and hydrofluoric acid formulation as recommended by the material suppliers. After cleaning/pickling all areas shall be thoroughly washed with clean water and repassivated thereafter with a proprietary passivating solution of 10% to 20% nitric acid in aqueous solution as recommended by the material suppliers.

3.2.6 3CR12 Steel and Fabrication for General Applications

Where 3CR12 steel is specified it shall be manufactured by Middelburg Steel & Alloy (Pty) Ltd. Test Certificates and marking shall be as for stainless steel as set out in Clause 0.16. All 3CR12 steel plate and sections shall be supplied 'passivated' and upon completion of fabrication welds and other areas where the passivating layer has been removed or damaged and area contaminated with mild steel or discoloured shall be cleaned and pickled using a nitric and hydrofluoric acid formulation as recommended by the material suppliers. After cleaning/pickling all areas shall be thoroughly washed with clean water and repassivated immediately thereafter with a proprietary passivating solution of 10% to 20% nitric acid in aqueous solution as recommended by the material suppliers.

Welding of 3CR12 steel shall be carried out under controlled conditions using stainless steel 309L welding rods or similar approved and recommended by the material suppliers. All welds shall be continuous and crevice free, Welders undertaking manual and semiautomatic welding of 3CR12 steel shall be experienced competent artisans meeting the requirements of BS 4871 or BS 4872 Part I as appropriate subject to the Engineers approval.

Cutting, forming, welding, cleaning and passivating of 3CR12 steel shall be carried out strictly in accordance with the procedures and guidelines provided by Middleburg Steel and Alloys (Pty) Limited.

3.2.7 Insulation and Lagging

Lagging of steam and hot water pipes shall be with mineral wool or similar approved preformed materials complying with the requirements of BS 3958 Part I of thickness not less than 25 mm. The use of asbestos or lagging containing asbestos is prohibited. Cladding shall be preformed from galvanised steel, aluminium or stainless steel 304/430 sheeting and shall clip together to provide a uniform neat appearance. Flanges and valves shall be similarly lagged with removable boxes to facilitate repair and maintenance.

Lagging for boilers and other vessels shall be the same material as that used for pipes but of minimum thickness 50 mm. Cladding shall be purpose made from galvanised mild steel or aluminium or Grade 304 or 430 stainless steel sheeting with polished surface finish and thickness not less than 1,2 mm as stated in the detail specification.

All openings for pipes, valves and fittings shall be machine cut and finished in a neat and workmanlike manner. Joints shall have a minimum overlap of 10 mm and be fastened with stainless steel self-tapping screws.

Panels for vertical plane surfaces shall utilise preformed panels with profile reinforcement to prevent distortion and provide adequate support.

3.2.8 Handrailing

3.2.8.1 Mild Steel, 3CR12 Steel and Stainless Steel

Handrailing and stanchions are to be constructed from mild steel 'hot dip' galvanised after manufacture, or stainless steel 304L/316L or Aluminium, as stated in the detail Specification.

Mild steel handrailing is to be manufactured from 34 mm nominal outside diameter tubing for the knee and handrails and stanchions of 43 mm nominal outside diameter tubing with 75 mm double balls and wall thickness of not less than 2,5 mm.

Stainless steel handrailing shall be manufactured from 32 mm nominal outside diameter tubing with wall thickness of not less than 1,6 mm for knee and handrails and stanchions of 44,5 mm outside diameter tubing and wall thickness of not less than 1,6 mm.

The top rail on all handrailing is to be 1,0 meter above walkway level and stanchions shall be fitted not more than 1,5 meters apart.

All bends and closures shall be performed to a standard approved by the Engineer. Joints in handrails are to be glued 'slip joint' type on mild steel handrails, using an approved adhesive.

Glued or stainless steel taperpin 'slip joints' may be used on stainless steel handrails. The ferrule length shall be not less than 150 mm. Wherever possible joints shall be made within the stanchion ball.

Baseplates shall be of minimum size 150 x 60 x 10 mm with sheared corners and grooved to permit drainage. Baseplates shall be drilled to accommodate M16 anchor bolts.

Stainless steel handrailing shall be pickled and passivated after manufacture in accordance with the procedures set out under Clause 3.2.5.

3.2.8.2 Aluminium

Aluminium hand and knee railing shall be manufactured from nominal 50 mm diameter structural alloy 6061 tubing to ASTM B210 of wall thickness not less than 2 mm. Stanchions shall be manufactured from the same material with a minimum wall thickness of 3 mm. Connections between hand and knee rails and stanchions shall utilise proprietary aluminium swivel clamps. Joints in hand and knee rails are to be glued slip joints incorporating 48 mm joint tubing.

Baseplates are to be preformed and of minimum size 180 mm x 150 x 10 mm with profiled corners. Baseplates shall provide a spigot connection to stanchions and be drilled to accommodate M12 anchor bolts. Mechanical joints between stanchions and baseplates are to be glued at final assembly and bends and closures are to be to a standard pattern approved by the Engineer.

The aluminium handrail system shall be of the 'AdaptaRail' type as manufactured by Hulett Aluminium Ltd or similar approved type.

All components shall be anodised or painted on completion of manufacture as stated in the detail specification.

3.2.9 Galvanising

Galvanising shall be in accordance with the requirements of SANS 763 (for hot dip zinc coatings) for heavy-duty applications in accordance with Table 2. As the highest quality finish is required careful handling of the items is required both during the galvanising process stacking and transport.

All galvanised material shall be passivated and free from white rust when it is erected.

Fabricated mild steel components shall be galvanised after manufacture.

3.2.10 Glass Reinforced Plastics (GRP)

Manufacture of glass reinforced plastic (GRP) products shall be carried out under carefully controlled conditions. Moulds shall be smooth and free from indentations and burrs, which will affect surface finish. Joints in moulds shall be filled and smooth before applying a suitable mould release liquid. The resins and glass reinforcement shall be selected to be compatible with the environmental conditions and liquids or materials contained, and provide adequate structural strength to resist cracking and decay.

The design of structural members, vessels or tanks shall be in accordance with the requirements of BS4994 : 1987.

The design of laminated GRP for non-structural applications shall comply with the requirements of SANS 141.

The surface of completed components shall be finished with a smooth 'gel' coat so as to effectively seal the complete area.

Where GRP lining of vessels and tanks is required a spark test will be carried out on completion to check for any porosity. Where failures are identified in excess of 5% (five percent) of the total area the lining shall be removed and replaced. Local repair will only be permitted where the failures are confined to less that 5% (five percent) of the total area. Spark tests will be repeated until the lining is found to be free of all porosity.

Manufactured GRP components shall be crated or protected for transport and placed carefully into position to prevent damage. Where holes are drilled during installation the exposed face shall be sealed with resin to prevent ingress of moisture.

3.3 Valves

3.3.1 Gate Valves

3.3.1.1 Waterworks Valves

Valves, which are manually operated, shall be from a manufacturer and to a pattern approved by the Engineer with non-rising spindles and shall comply with the requirements of SANS 664 for working pressures as specified for each application. Valve dimensions shall be to SANS 665. The direction of closing shall be clockwise when viewed from above and shall be clearly marked on the handwheel of each valve. The valve trim shall be Type B - gunmetal trim to SANS 665 except where the application demands that the use of Type C - stainless steel be adopted.

Valve bodies, handwheels and bonnets shall be manufactured from spheroidal graphite iron complying with the requirements of BS 2789 Grade 420/12, free from blow holes and carefully fettled after casting to remove surface imperfections. Spindles shall be manufactured from bronze to BS 1400/2782 Grade PB1/CZ 114 or stainless steel to BS 970 Grade EN 57 or equal approved material according to the duty requirements. Spindle nuts shall be manufactured from bronze and be replaceable. Spindle seals shall be of the nitrite rubber 'O' ring type with bush insert and provided with an external scraper ring. Replacement of the seals shall be possible with the valve under pressure.

Extensions spindles shall be manufactured from 304 stainless steel. Headstocks shall be manufactured from stainless steel 304, 3CR12 steel or cast iron and to a pattern approved by the Engineer.

3.3.1.2 Resilient Seal Valves (RSV)

In addition to the requirements for gate valves above, RSV's shall be provided with the following :

- Grade 304 stainless steel or EN57 steel spindles

- At least two nitrite rubber O-rings in a corrosion resistant housing, plus one nitrile rubber wiper ring to prevent the ingress of dirt.

RSV's for sewage applications shall be of the rising spindle design.

3.3.2 Reflux Valves

Non-return or reflux valves shall be specifically designed for the material and rate of flow which they are required to pass and comply with the requirements of SANS 144 for working pressures as specified for each application with body, cover and gate manufactured from spheroidal graphite iron to BS 2789 Grade 420/12 or cast iron to BS 1452 Grade 220. Valves for use with sewage, effluent or sludge shall be self-cleansing at the base of the gate. The interior shall be smooth and free from any projections. The gate shall swing free in the body and in the fully open position not obstruct the flow. The gate, swing arm and hinge shall be designed to carry full shock loading on closure. Hinge shafts shall be manufactured from stainless steel to BS 970 Grade EN 57 and be carried in adequately designed replaceable self-lubricating bearings. The sealing surfaces shall be replaceable and manufactured from gunmetal, stainless steel 304/316 or approved resilient synthetic material to suit the application. The valves shall seal effectively under all operating conditions in the vertical or horizontal positions and the design shall be such that the gate rests against the seat in the absence of flow or of differential pressure without the aid of springs or external counterweights.

Where external levers and counterweights are specified for closure control, they shall be fitted to the hinge shaft which shall be extended through the valve body and provided with nitrile rubber “O” ring seals which may be replaced with the valve under pressure. The level and counterweight shall be provided with facilities for adjusting the angle and weight positions.

3.3.3 Butterfly Valves

Butterfly valves shall be manufactured in accordance with the requirements of BS 5155 with wafer type or fully flanged body and valve blade trim and components of cast iron, cast steel, stainless steel 304/316 or alternative materials as stated in the detail Specification. Valve shafts and thrust pads for cast iron valves shall be of stainless steel 304 and seating rings of gun-metal or stainless steel 304, or approved synthetic material to suit the application. Valves, except where stated in the detail Specification, shall be resilient seal type with neoprene blade seal suitable for the working pressure, bearing bushes of ‘Vesconite’ or similar approved material and gland seals of neoprene. For manual operation handlever actuation with trigger type locking system for incremental setting from fully open to fully closed shall be provided for valves of 150 mm diameter and smaller. Valves larger than 150 mm shall be fitted with gearboxes. All valves shall be arranged for clockwise closing.

3.3.4 Knife Edge Gate Valves

Knife gate valves shall be of the wafer type and shall be manufactured in accordance with ISO 9002.

All valves shall have rising spindles with the direction of rotation clockwise closing when viewed from above. The body of the Knife Gate Valve shall be fusion bonded epoxy coated and be fitted with a stainless steel gate which will be drop-tight under test and working conditions.

The following features shall be incorporated into the Knife Gate Valve:

- A cast body housing and cover;
- A full bore, unrestricted flow – no valve pocket;
- An internal seal located in the valve body, which will ensure that the blade is guided throughout its travel, providing guaranteed shut-off in both flow directions;
- Internal body contours must ensure that deposits are flushed out;
- The traverse seal arrangement must allow repacking whilst under pressure;
- A built in scraper assemblies to keep the blade clean on both sides during operation, preventing damage to the traverse seal;
- The diameters and profiles of body seals, traverse seals and scraper assemblies shall be identical for all valve sizes;
- A resilient body seal and chamfered blade edge which will ensures leak proof sealing;
- A robust four pillar construction of the valve body;
- Rates for all valves shall include for testing and supply of test certificate.
- The Tenderer shall provide complete specifications and drawings of the Knife-Edge Gate Valves he intends using.

3.3.5 Swing-Check Valves

Swing-Check Valves shall, except where otherwise specified, be double flanged single door swing type and shall be fitted with gun metal seats and bronze hinge and clack pins.

In the case of Swing-Check Valves to be mounted horizontally, the design shall be such that the gate rests against the seat in the absence of flow or of differential pressure, without the aid of springs or external counterweights.

Although swing-check valves are expected to close without the aid of a counterweight, all valves shall be fitted with counterweights.

Limit switches may have to be installed on the swing-check valves should it be necessary to protect the pumps/motor sets in the case of a sudden pressure drop in the delivery pipeline.

Swing-Check Valves shall comply with the requirements of SABS 144 for working pressures as required for each application, but not less than 1 000kPa working pressure.

Rates for all valves shall include for testing and supply of test certificate.

The Tenderer shall provide complete specifications and drawings of the Swing-Check Valves he intends using.

3.3.6 Special Valves

All valves for special operations and conditions shall be carefully selected, accord with the appropriate Specifications and be of materials suitable for the application, and be the best of the kind. Tenderers are required to submit full details of the valves offered and the final selection will be subject to approval by the Engineer. The valves offered shall not be accepted as substitutes for standard valves specified.

3.3.7 Valve Gearboxes

Gearboxes shall not be an integral part of the main valve body but shall be a separate unit mounted to the body for easy removal. All gears shall be machine cut and fully enclosed and the lubrication shall be of the permanent type. Positive stops shall be provided to prevent over opening or over closing of the units and visual indication of the point of travel at all positions in the open/close cycle shall be provided. Torque limiting devices shall be fitted to prevent damage to gears and casings due to over-tightening. Design of valves and gearboxes shall be such that leakage from the valve along the shaft cannot enter the gearbox.

3.4 Valve Actuators

3.4.1 General

Actuators shall be capable of transmitting sufficient torque or load to the shaft of the valve to unseat at the maximum working pressure for which the valve is rated and to operated the valve from the fully open to fully closed state within a reasonable time or as stated in the Detailed Specification. The speed of operation shall be such as to avoid any possibility of water hammer in pipelines.

3.4.2 Electric Actuators

3.4.2.1 Actuator Enclosure

Actuators should be protected to IP67 in accordance with IEC 144. All joints shall be 0-ring protected.

3.4.2.2 Gearing

All torque transmitting housing parts should be out of cast iron. Aluminium die cast is only allowed for covers. The gearing should be totally enclosed and grease-lubricated. Lubricant must be PCE and PCT free. All cover screws, which must be opened for commissioning, or setting must be captive so that they cannot be lost.

3.4.2.3 Performance

The actuator gearing must be self-locking so that the actuator stays in its last position. The self-locking feature must stay active if the actuator is changed into handwheel mode. The actuator must be able to be fitted in all mounting orientations.

3.4.2.4 Motors

The motors shall be 3-phase squirrel cage motors, specially designed for valve application providing high torque and low inertia. The motors should be totally enclosed, housing being one casting, non-ventilated, the insulating class should be F. Motors should be thermally protected by 3 thermostats, embedded in the motor windings, one for each phase. The motors should be time rated 5215 min to IEC 34 at nominal

motor load and at least 33% of maximum valve torque for 15 min. The motor wiring should be connected to the main actuator housing by a plug and socket for easy removal.

3.4.2.5 Handwheel

A geared side-mounted handwheel of suitable size shall be provided for safe and efficient manual operation. The manual control shall be independent of motor drive. The changeover from motor operation to handwheel operation shall be accomplished by a declutching device, which must be without load during the change into the handwheel mode. The changing from handwheel operation into motor operation shall be automatic. The force of the handwheel shall be in accordance with DIN 3210 Sheet 2.

3.4.2.6 Torque Switches

The actuators shall incorporate two, from each other independent, settable torque switches.

3.4.2.7 Limit Switches

The actuators shall be supplied with one limit switch for open-end position and one limit switch for close end positions. The limit switches shall be directly geared to the output shaft of the actuator without any slipping clutch device. The limit switches must function independently of the torque switches. Overtravel of the setpoint, e.g. by hand operation, shall not change the set position. Adding additional switches - for intermediate or end position - must be possible without opening the lubricated main gear case.

3.4.2.8 Switches

Switches must be encapsulated to IP66 to IEC 144, as a separate part to protect them against getting wet during setting work on the actuators and allow setting while power is on. They should be rated at 5 Amps at 250 V AC. Switches should be bounce free. A minimum load of 20 mA at 24 V DC must be operated by a standard switch.

3.4.2.9 Position Indicator

Actuators shall be fitted with an indicator showing valve or penstock opening position. The scale of the position indicator shall be marked open and close and show the actual degree of opening in mid-position of the valves. The installation of a feedback potentiometer or an electronic current feedback must be possible. They must be driven by a gearing selected in a way that at least 83% of the possible travel is used. The feedback drive must be fully assembled by the actuator manufacturer.

3.4.2.10 Heaters

Actuators shall have the possibility to incorporate a self-regulated anti-condensation heater of 15 W rating which shall be energised from the internal control transformer.

3.4.2.11 Output Drive

Output drives should be in accordance with ISO 5210. In case of drive form A to ISO 5210 they should be separate from the main actuator housing in order to remove the complete actuator from the valve, while the valve stem is kept in position by the output drive of the actuator.

3.4.2.12 Control

The controls should be a part of the actuator design, suitably housed to prevent breathing and condensation build-up. All connections between the actuator and the control housing should be made by one plug and socket connection for easy removal of the complete control.

Contactors
The reversing contactors should be electrically and mechanically interlocked, rated appropriate to the motor size and suitable for 60 starts per hour.

3.4.2.13 Local Control

As part of each control should be a local control station with a selector switch for local, off and remote, padlockable in any of these positions. Additional local switches for open, stop and close operations must be available.

3.4.2.14 Control Signals

In remote control mode the actuator shall be controlled by open, close and stop contacts in the control panel. The contacts for this control in the control panel are voltage-free and are energised from the actuator. The inputs of these signals must be separated from the control by optocopplers in the actuator.

3.4.2.15 Indicating Signals

The actuator shall provide for remote indication the following signals by voltage-free contacts rated at 250 V 1 Amp.

a. open end position
b. close end position
c. LOCAL/OFF/REMOTE switch in Local
d. LOCAL/OFF/REMOTE switch in Remote
e. Collective fault signal containing power failure, wrong phasing, motor thermostat topped, control voltage failure and torque switch operation in intermediate position of the valve.

Within the control LED's should be provided for indicating of torque switch operation in intermediate position of the valve or any electrical malfunction.

3.4.2.16 Programming

Within the control it should be possible to program the function of the end position switching i.e. torque switch or limit switch dependent. It must also be programmable for both opening and closing direction independent of each other whether the actuator runs after getting a control signal by self-retaining contacts into the end position or runs only as long the control signal is coming.

3.4.2.17 Internal Wiring

All internal connections within the integral control and between the different boards should be made by plug and socket connections except for motorpower cables. All plug and sockets should have different sizes so that they cannot be mixed up.

3.4.2.18 External Wiring

The external wiring connection should be done by one plug and socket for all control and motor wires. All terminations shall be clearly marked. Provisions should be made for three cable entries, one for the motor cable, one for the control cable and one for possible feedback signals.

3.4.3 Pneumatic Actuators

Pneumatic actuators shall be diaphragm or piston operated single or double acting direct or yoke operated units as required in the Detailed Specification and designed to operate on wet air with traces of oil. Where stated in the Detailed Specification, a spring return shall be provided for closure under normal operation and in the event of air supply failure. Similarly hand operation using a handwheel shall be provided where specified to permit operation when the air supply has failed. The valves shall operate incrementally and maintain the position selected under all conditions and shall accommodate the maximum unseating torque or load of the valve plus provision for 100% overload. All components of the actuators shall be manufactured from robust non-corrodible materials. Pistons and tie rods shall be manufactured from stainless steel 304/316. Pistons shall be manufactured from acetyl resin and be provided with nitrile rubber seals. Actuator bodies/barrels shall be manufactured from anodized aluminium or epoxy powder coated carbon steel. Air supply lines to each actuator shall be fitted with isolating valves, strainers, automatic condensate traps and flushing connections.

Solenoid, spool, poppet, pilot and other control valves shall be constructed from die cast aluminium, glass filled polyamide or similar robust material with non-corrodible internal components, encapsulated coils and IP65 electrical enclosures where applicable.

3.4.4 Hydraulic Actuators

Hydraulic actuators shall be of the rotary or direct action piston type suitable for the mode of operation of the valve. In the event of failure of the actuator or hydraulic power pack the valve shall return to the closed position. Manual operation shall be provided as for the electric actuator above. All components shall be suitable for continuous operation under corrosive exposed conditions. Liners and other components in contact with the hydraulic fluid shall be hard chrome or other similar material suitable for the environment. The hydraulic pump and power pack shall be adequately rated for the specified altitude and temperature, and shall be designed to accommodate the maximum unseating torque or load of the valve plus 50%. Where actuators are required for positioning they shall be provided with robust hydraulic valves and components, which will permit smooth operation and controlled location throughout the operating range.

4 STANDARD ELECTRICAL SPECIFICATIONS

4.1 Motors

4.1.1 General Purpose Motors

All motors shall be suitable for continuous operation on a 4-wire 3-phase 380/220 volt 50 Hertz alternating current supply. Altitude and ambient temperatures are given under the General or Detailed Specification. Full load speed shall not be in excess of 1500 rpm except where stated in the detailed specification.

The rated power of all motors shall not be less that 10% in excess of the maximum calculated power that could be drawn by the equipment within its operating range. Allowance shall be made variation in any voltage of ± 6% of the nominal value, and a frequency variation of ± 2,5%.

After the full load temperature has been attained, any motor shall operate, without sustaining any damage, for up to 10 minutes at only two-thirds (⅔) of nominal rated voltage and nominal frequency. Should this not be possible, under-voltage protection devices shall be provided with motor starters.

Motors shall be provided with cast iron frames and shall comply with the requirements of the following standards:

Single phase motors: SANS 1189
Three phase motors: SANS 948

All three phase motors shall be of the squirrel cage induction type. Motors shall be capable of operating under specified ambient conditions with a 95% relative humidity. Insulation materials shall comply with the requirements of BS 2757 and be of Class F quality, and shall be rated for a Class B temperature rise.

Enclosures for indoor use shall be in accordance with BS 4999 to IP 54 protection and be totally enclosed fan cooled. Enclosure for outdoor use or in any area where spray, washdown or other water may impinge on the motor shall be totally enclosed fan cooled to BS 4999 and IP 55 protection.

All motors shall be suitable for “star delta” and “direct on line” starting and unless otherwise stated in the Detailed Specification shall be suitably rated for 15 starts per hour. The maximum starting current under locked rotor conditions with the specified voltage applied to the motor terminals shall not exceed 6 times normal full load current for direct on line starting and 2,5 times normal full load current for star delta starting.

Anti-condensation heaters shall be provided on all external motors or as stated in the Detailed Specification. Heaters will be switched on automatically when the motor is not running. Motors of 22 kW and larger shall be equipped with an over-temperature sensor embedded in the stator windings (one per phase). Each sensor shall be wired to the terminal box at the side of the motor.

Bearings shall be roller or ball type and preferably be sealed although forced lubrication bearings will be considered on large motors.

Motor terminal boxes shall be large enough to gland and terminate a 10 mm², 4 core cable or a 4 core cable rated at 2,0 times (1,5 times for motors over 45 kW) the motor full load current, whichever is larger. Cable entry will normally be from below, however, terminal boxes shall be rotatable and positioned on the side of the motor, which offers easy access thereto. Separate terminal boxes shall be provided for anti-condensation heater connections and thermistor connection. All terminal boxes shall be provided with stud type terminals and nuts for electrical connection to supply cables. Cables shall be connected to the terminals using suitably sized and rated crimped lugs attached using an approved crimping tool.

4.1.2 Submersible Motors

Submersible motors shall comply generally with the requirements of the Specification except that they will not be equipped with heaters. All motors and ancillary equipment shall be suitable for continuous full load operation at liquid depth submergence of 20,0 m. The motors shall be contained in an air filled watertight chamber and motor heat shall be dissipated directly from the stator housing to the surrounding liquid/air. The motor housings and heat dissipation shall be designed to accommodate partial submergence at low liquid depth. All motor windings shall comply generally with the requirements of the specification and shall be vacuum pressure impregnated to achieve complete varnish penetration. The windings shall be suitable for operation at temperature up to 160 deg. C.

The motor cable entry and sealing shall be incorporated in the removable motor cover and shall be purpose designed to prevent loads imposed by the cable strains, moisture migration along individual

conductors and through the cable gland. The gland shall incorporate both mechanical and epoxy seals. The motor cable shall be one piece to the junction box outside the station.

The motors shall be provided with automatic reset over temperature sensors and humidity switches wired in series and humidity sensors in the oil filled chamber between the motor and pump or mixer housing.

4.1.3 Works Testing

All three phase motors shall be tested in accordance with the requirements of SANS 948-1978 – Appendix E before dispatch from the manufacturer's works. Two copies of the test results and certificates shall be submitted to the Engineer before delivery to site. The cost of the test shall be borne by the Contractor.

4.2 Low Voltage Electrical Main Boards, Motor Control Centres and Distribution Boards

4.2.1 Construction

Low voltage switchboards, distribution boards and motor control centres shall be constructed to the requirements of BS 4070 around a rolled steel angle section or heavy gauge pressed steel section welded frame. On completion of manufacture corrosion protection shall be carried out in accordance with the requirements of Specification F. The boards shall be readily extendible in both directions.

Panels doors and covers shall be manufactured from mild steel sheet where the boards are to be located indoors and 3CR12 sheet for outdoor location except as otherwise stated in the detailed Specification, or when located within 2 km of the coast where 3CR12 steel shall also be used indoors. The sheet thickness shall not be less than 2,0 mm, mild steel or 1,6 mm 3CR12 steel and shall be framed, pressed or folded to provide rigid support for the mounting of equipment or to prevent distortion. All joints shall be neatly seam welded and holes shall be neatly and accurately formed. On completion of manufacture of the panels, doors and covers, corrosion protection shall be carried out in accordance with the requirements of Specification F and to System G.

Panels, covers and doors shall be fitted square to, or within the main frame with cadmium plated screws fixed to drilled and tapped holes in the main frame. Chromium plated domed nuts shall be used where bolts are exposed on the front side of the board to secure panels. Self-tapping screws will not be permitted.

Floor mounted boards shall be provided with recessed plinths, from 150 mm deep hot dipped galvanised heavy-duty mild steel channel and shall be firmly affixed to the floor.

Door hinges shall be of the heavy-duty type, which cannot be removed when the doors are closed.

Wall mounted panels shall be fixed to a galvanised steel stand or frame allowing a clearance between the back of the panel and the wall of at least 30 mm.

4.2.2 Enclosures

Boards and cubicles for indoor location shall be dust and vermin proof to IP54 and all doors and covers shall be sealed with a gasket of closed cell foamed synthetic rubber or similar material of thickness not less than 5 mm.

Boards and cubicles for outdoor location shall be vermin, dust and weatherproof to IP 55 enclosure and shall be provided with a rain cover.

4.2.3 Arrangement of Equipment

Equipment for switchboards and distribution boards, shall be chassis mounted flush behind a removable front cover. Where meters or visual indicating instruments are mounted behind the covers clear Perspex or armour plated glass windows shall be provided.

All incomers, bus section switches, metering, starters, main feeders, small power suppliers, common motor controls and marshalling cubicles shall be located in separate compartments.

Instruments, indicating lamps, control and other similar equipment shall be flush mounted on the face of the door of the motor control centres. All wiring connections and other equipment shall be mounted inside the board.

Cable terminations shall be provided for using gland plates manufactured from 3CRI2 steel of thickness not less than 2 mm. The gland plate shall be predrilled to suit the cable and gland sizes and be removable in sections. Cable entry shall be from the bottom only.

4.2.4 Busbars

Busbars and droppers shall be manufactured from high conductivity copper bar and comply with the requirements of SANS 784 and BS 159. The arrangement shall comply with the requirement of BS 158. Construction shall provide full-fault protection to class 3 equipment of BS 4070, and as provided in the detailed Specification.

The busbars shall be insulated throughout their length with heat or air shrink phase identification tape.

Clearance and creepage distances shall not be less than those stated in Table 4 of BS 4070.

The busbar rating shall be 25% greater than the full load rating of the incoming switch and the current density shall not exceed 1,6 amp/mm². Neutral bars shall have the same cross section as phase bars. The busbar size shall remain the same throughout the length of the board.

4.2.5 Earth Bar

All metal parts other than those forming part of an electrical circuit shall be connected to a copper earth bar, which shall run the full length of the switchboard, distribution board and/or motor control centre. The earth bar shall be a 25 mm x 4 mm bare copper bar.

4.2.6 Lightning Arresters

Lightning arresters shall be provided for each phase on the boards and shall comply with the requirements of SANS 171. The arresters shall be directly earthed to the main earth bar by a copper strap.

4.2.7 Wiring

All internal wiring to the boards shall be neatly arranged and utilise PVC insulation stranded copper conductors adequately rated.

The insulation colour on alternating current circuit wiring shall correspond with the phase colour code. Control circuit wiring shall be coloured grey.

Cables connected to busbars are to have their ends fitted with tinned copper cable lugs crimped to the cable and bolted to the busbar with bolts nuts and washers of the full size required by the lug. Only one connection per bolt will be permitted.

Conductors shall be bound together in neat horizontal or vertical rows not exceeding ten conductors, or in uPVC slotted trunking. All wiring shall be neatly grouped or laced and marked at all termination points with numbers according with the wiring diagrams. Where power cable crosses instrument cable, the crossing shall be at 90°.

Suitably rated clip on terminals mounted on a terminal rail shall be provided for the connection of external power and control wiring. Power and control terminals shall be kept separate. The terminals shall be provided with bolt fixing and arc shields and be of sufficient size to accommodate the cable terminating lugs with adequate clearance between live and earth connections. Rigid barriers shall be provided between terminals. A maximum of 2 wires shall be connected to one side of a terminal.

4.2.8 Labels and Equipment Rating Plates

All circuits shall be provided with engraved labels and colour coded phase strips. Switches, motor starters and cubicles shall be provided with white sandwich traffolyte engraved labels with 6 mm black lettering. Main labels shall have 15 mm letters.

Equipment located in the boards shall be clearly marked identifying function and circuit controlled. Control leads shall be marked at both ends with an approved marking ferrule.

Rating and diagram plates shall provide the data specified in the relevant standard specification together with a diagram of the internal connections. The plates shall be mounted in a readily viewable position.

All engraved labels and plates shall be robustly constructed from discolouration resistant material and be securely affixed. Labels on switches, motor starters and cubicles shall be self adhesive and affixed by two stainless steel tapped screws.

4.2.9 Air Circuit Breakers

Air circuit breakers shall be adequately rated for the switching and fault capacity of the system and be of the three pole fully withdrawable metal clad type. The breakers shall be fitted with both an adjustable thermal overload and adjustable magnetic short circuit protective devices, which shall be direct acting. Interlocking shall be provided to ensure that there can be no access to live terminals other than when the breaker is fully isolated. Provision shall be made to padlock the breaker in the 'OFF' position. The circuit breaker shall be fitted with a mechanically operated 'ON/OFF' position indicator.

4.2.10 Moulded Case Circuit Breakers

Moulded case circuit breakers shall comply with the requirements of SANS 156 and be suitable for the required duty. Mechanically coupled single pole breakers will not be accepted for multiple applications.

4.2.11 Switches

Un-fused single, double and triple pole switches shall comply with the requirements of SANS 152 and be capable of breaking the full load.

Voltmeter selector switches shall be of the rotary pole type arranged to read voltages between phases and phase to neutral. Ammeter switches shall be similarly constructed and provided with an 'OFF' and three metering positions.

4.2.12 Combination Fuse Switches

Fuse switch units shall be adequately rated triple pole type with neutral link complying with the requirements of BS 3185. The switches shall be of the chassis, double air break, quick make and break type with smooth mechanism and accommodate HRC fuse links. All fixed contacts shall be shrouded.

An 'ON/OFF' position indicator shall be provided and operated mechanically by a lever and the moving contacts.

The switches shall be provided with an interlock to prevent the cubicle cover from being opened with the switch in the closed position and operation of the switch with the cover open except where the interlock is purposely overridden. Provision shall be made to padlock the switches in the 'OFF' position.

4.2.13 High Rupturing Capacity Fuses and Holders

High rupturing capacity fuses (HRC fuses) shall comply with the requirements of SANS 172. HRC fuse holders shall comply with the requirements of SANS 173.

Fuse holders shall be provided with an inspection hole for fault indication.

4.2.14 Current Transformers

Current transformers shall be of the air insulated type complying with the requirements of BS 3938 and shall be rigidly secured with the axis of the coil in a vertical plane. Current transformers shall be adequately rated to operate the required metering equipment.

4.2.15 Isolators

All isolators shall be adequately rated and be of the 'load-break/fault-make' type. The operating lever shall form part of the cubicle door and be so arranged that the isolator cannot be closed without the door being closed and the door cannot be opened without switching the isolator off. Provision shall be made to padlock the isolator-operating lever in the 'OFF' position.

4.2.16 Contactors

Contactors shall comply with the requirements of SANS 1092, category AC 3 or AC 4 as appropriate or equivalent specification and shall be of the electro-magnetically operated air break type with capacity adequate for 'direct on line' or 'star delta' starting. The control voltage shall be 220 V. Contactors shall be designed to permit replacement of coils and contacts without dismantling the unit.

Each contactor shall be provided with auxiliary contacts suitable for remote and automatic operation. Where the number of auxiliary contacts is greater than can be accommodated an auxiliary relay or additional contactor shall be provided.

The contactors shall be suitable for intermittent duty at a rating of 15 operations per hour for direct on line operation and be capable of operating continuously at 125% of the full load circuit current.

4.2.17 Thermal Overload Relays

Motor control contactors shall be provided with overload relays which shall be of the thermal ambient temperature compensated indirectly heated type with an element in each phase and anti single phase protection on 3 phase motors. Hand reset contacts shall be provided. The relays shall conform to IEC 292-2 and VDE 0660.

4.2.18 Control Supply

Control supply transformers shall be provided where required to meet the specified control voltage. The transformers shall be of the double wound type and be adequately rated to supply the contactor load, control circuits, indicator lamps and other related equipment. Primary and secondary fuses shall be provided to each transformer.

4.2.19 Ammeters

Ammeters shall comply with the requirements of BS 89 and accuracy class 2,5 and be of the flush mounted quadratic scale moving iron type with 96 mm square face. On smaller panels 76 mm square ammeters will be considered subject to the Engineer's approval.

The ammeter full-scale reading shall correspond with the rated primary current of its associated current transformer.

Ammeters shall be fitted with a face mounted zero adjustment screw.

Ammeters for motor applications shall be provided with a suppressed overcurrent and a red line indicating motor full load current. The red line shall be neatly painted at the manufacturer's works.

4.2.20 Voltmeters

Voltmeters shall comply with the requirements of BS 89 and accuracy class 2,5 and be of the flush mounted quadratic scale suppressed zero type with 96 mm square face. On smaller panels 76 mm square voltmeters will be considered subject to the Engineer’s approval.

The voltmeter full-scale reading shall extend to at least 115% of the nominal system voltage.

4.2.21 Running Hour Meters

Running hour meters shall be of the flush mounted type, without manual reset facility and shall read 99999,99 hours before resetting to zero.

4.2.22 Indicating Lamps

Indicating lamps shall be 2,6w minimum rating front replacement type suitable for mounting. Lamp lenses shall be coloured and not painted, with the following designation.

Breaker/contact closed – Red
Breaker/contact open – Green

Pilot lights shall have an IP 65 degree of protection and be manufactured to BS4794.

4.2.23 Time Switches

Time switches shall be of the 7-day, 24-hour type with a 9-hour minimum spring or battery reserve. Each time switch shall be capable of being switched on and off at 15 min. intervals throughout the 24 hour cycle.

4.2.24 Control Push Buttons

All motor starter cubicles shall be provided with separate red 'STOP' and green 'START' buttons. Start push buttons shall have normally open contacts and stop either normally open or closed as required. Weatherproof UV stabilised shrouds shall be provided on external panels. Push buttons shall be manufactured to BS 4794 and provided with an IP 65 degree of protection.

4.2.25 Timers

Timers shall be of the electronic plug-in type with 16 selectable time ranges from 0,05 seconds to 100 hours with a repeat accuracy of ± 0,3%.

4.2.26 Earth Leakage Protection Units

Earth leakage protection shall be provided where required in the detailed Specification on motor and motor control plug and power circuits with the following rating:

Motors up to 55KW and 3-phase socket outlets	:	250 mA instantaneous type
Motors larger than 55KW	:	375 mA IDMT type
Single-phase 320v socket outlet:		30 mA instantaneous type.

The earth leakage units protecting motors shall have flag indication and shall be hand resetable without opening the panel door. Earth leakage units are to have a N/C and N/O auxiliary contact.

4.2.27 Capacitors

Capacitors shall be connected between the contactor and overload in motor starter circuits where called for in the detailed specification. They shall be sealed electrolytic type rated for 600v and operational up to 2000 m altitude and shall be fitted with discharge resistors. Six terminal capacitors shall be provided for star/delta starters.

Capacitors shall be rated to improve the full load power factor to greater than 0,95 lagging. The capacitor kVA shall not exceed 90% of the motor no load kVA.

4.2.28 Variable Speed Drives

4.2.28.1 General

Solid-state 3-phase variable frequency drives shall be used where motor speed is varied. The frequency changer shall be suitable for stepless variation from 100% to 0% speed without loss of torque.

The drives shall be suitable for internal panel mounting.

Any parts, which may be dangerous to touch after disconnection of the mains, shall be fitted with a suitable barrier and warning label.

The drive units shall be suitable for multiple motor operations via contactors in the variable speed circuit.

The MCC cubicles containing these drives shall have the facility to select either the DOL or AC-VSO mode.

4.2.28.2 Power Supply and Control Voltages

The drives shall be suitable for operation on unfiltered 3-phase 380 Volt ± 10%, 5O Hz AC mains.

Mains spikes of 1 000 V peak (to neutral) are not to cause damage.

The drive shall not draw power from the mains at less than a COS PHI cos ϕ of 0.8.

Remote speed control shall be from an externally supplied source.

Local speed control shall be from a calibrated, panel mounted potentiometer.

4.2.28.3 Provisions

All variable speed drives offered shall incorporate the following minimum features:-

a) Separate SETTING (preset maximum and minimum) and CONTROL (0-100%) speed ranges.

b) Separate SETTING sand CONTROL torque ranges.

c) Capability of driving a load with COS PHI from 0.7 to 1.

d) Capability of sustaining at least 5 START/STOP or REVERSING switches per minute.

e) Radio noise suppression to VDE 0875.

f) Operation in conditions between 10°C and 60°C and non-condensing 95% humidity.

g) Tripping via series connected interwinding motor thermistors.

h) Slip correction adjustment for constant motor speed operation on load.

i) Acceleration period on start-up adjustment for correct starting torque.

j) Stall protection with integral latching and reset circuitry, including visual indication of the conditions shall be allowed for. Automatic reset on clearance is not acceptable.

4.2.29 Works Testing

Tests shall be carried out on all motor control boards at the works after assembly as follows:

i) The insulation resistance to earth of all power and secondary circuits shall be measured by means of a 500 volt insulated resistance tester and results recorded. The insulation resistance shall not be less than 50 megaohms.

ii) Power frequency high voltage tests shall be carried out in accordance with BS 5486 on the main and secondary circuits. The test voltage between phase to earth and between phases shall be 2000 volts for one minute.

iii) Primary current injection tests shall be undertaken on all power circuits to check operation of tripping devices and accuracy of voltmeters and of ammeters connected to CT's. The tripping time at twice rated current of thermal overload elements shall be tested and recorded.

iv) Operational tests on all switchgear, instruments and control circuits.

Test certificates shall be submitted in triplicate in respect of all works tests. Seven days notice shall be given of all tests so that they may be witnessed by the Engineer.

4.2.30 Packing

All equipment shall be carefully packed to prevent damage during transport from mechanical stresses or corrosion.

4.2.31 Spares

All spares ordered shall be packed in wooden crates marked with a list of contents. The spares shall be produced for inspection and handed over on site at the time of the Acceptance Tests.

4.3 Cables and Earthing

4.3.1 Low Voltage Cables

All power indicating and control cables shall be of the round multicore stranded copper wire type, PVC insulated with steel wire armouring and served overall with a PVC sheath. The cables shall be manufactured and tested in accordance with SANS 150 for general service and be 600/1000 volt grade. All cables shall be suitably rated and the voltage drop on any circuit shall not exceed 2 ½ %.

Instrumentation cable shall suit the application but shall normally be constructed from multiple twisted pairs of insulated stranded copper wire, PVC insulated with an overall aluminium metal shield, extruded PVC inner jacket served with steel wire armouring with an extruded PVC outer jacket. The nominal conductor resistance shall not exceed 3,5 ohms per 100 m at 20 Deg C.

Cables shall be secured to cable ladders with 'K' clamps and to trays using stainless steel 'bandit' strapping. Where there are three or less cables or instrument cables other ties may be employed subject to the approval of the Engineer.

4.3.2 Low Voltage Cable Glands and Terminations

All steel wire armoured cables shall be glanded by means of mechanical glands complying with the requirements of SANS 1213 and terminated using approved mechanically crimped lugs and an approved crimping tool.

All glands shall be provided with neoprene shrouds.

Where glands are not screwed directly into tapped entries on the gland plate they shall be secured by a robust locknut, which shall provide an adequate earth connection.

ECC type armoured cables shall be provided with glands that permit the copper armour wires to be taken through the gland. In such case the copper wires shall be crimped into a copper lug and connected to the equipment earth bar.

4.3.3 Low Voltage Cable Joints

LV cable joints shall be "Scotch Cast" or similar type approved by the Engineer, installed using approved mechanically crimped ferrules and approved crimping tools. All armour wire must be used in the joint for earth continuity and no reduction in the number of wire armour strands is permitted.

LV joints will normally not be permitted. The Engineers prior approval is required before any joints are made.

4.3.4 Cable Trays and Ladders

Heavy-duty cable ladders shall be constructed from sheet steel of thickness not less than 2,0 mm with shoulders not less than 75 mm and rungs spaced at intervals of not greater than 300 mm. The radius at bends and junctions shall be not less than 450 mm.

Light duty cable ladders may only be used with the approval of the Engineer and shall be manufactured from sheet steel folded channel of minimum size 40 mm X 10 mm and with a minimum thickness of 1,6 mm. Rungs shall be spaced at intervals of not more than 300 mm. The radius at bends and junctions shall be not less than 300 mm.

Heavy-duty cable trays shall be manufactured from perforated steel sheet of thickness not less than 2,5 mm and with shoulders not less than 75 mm.

Light duty cable trays may only be used with the approval of the Engineer and shall be manufactured from perforated sheet steel of minimum thickness 1,6 mm and shoulders at least 20 mm.

Cable trays shall be supported on purpose-made traying arms.

Cable ladders shall be supported at not greater than 1,0 m centres and at changes in direction and intersections.

Mild steel cable trays and ladders shall be 'hot-dip' galvanised on completion of manufacture to the requirements of the specification.

uPVC or 3CR12 steel cable ladders and trays shall be used where highly corrosive conditions prevail. The ladder and trays shall be of a design and manufactured from materials, which are approved by the Engineer.

4.3.5 Conduit

Conduit for internal use shall be 'hot dip' galvanised throughout complying with the requirements of SANS 162 or SANS 1007. Where approved by the Engineer uPVC conduit complying with the requirements of SANS 950 may be utilised.

Conduit for external use and corrosive conditions shall comply with the requirements of SANS 162 or SANS 1007 and be 'hot-dip' galvanised to the requirements of SANS 763 or where approved by the Engineer uPVC complying with the requirements of SANS 950.

Conduit boxes and cover plates shall comply with the requirements of SANS 162, SANS 1084 or SANS 1085 as applicable.

4.3.6 Earthing

All electrical equipment shall be earthed back to the motor control board using a spare conductor in the supply cable or a separate insulated green conductor. When separate conductors are used they shall be not less than half of the area of the phase conductor with a minimum of 6 mm² and a maximum of 70 mm².

All motor control boards shall be earthed back to the Supply Distribution Transformer using 70 mm² bare copper conductor.

4.3.7 Cable and Terminal Identification

All cables shall be identified on the outer serving directly adjacent to the termination glands at both ends with K type markers or equivalent.

Power cable conductor connective shall be provided with coloured phase identification sleeves as follows :

Core No	1	2	3	4
Phase Colour	Red	White	Blue	Black
LV Transformer Terminal Marking (SANS 78/1979)	a	b	o	n
Switchgear Terminal (Facing front of board)	Left	Centre	Right	
Position of LV Busbar	Upper	Centre	Lower	

4.4 Light fittings and Auxiliary Equipment

4.4.1 Luminaires

External luminaires shall be provided with bodies manufactured from die cast anodized aluminium or glass reinforced polyester, or polycarbonate and lenses of polycarbonate or heat resistant glass. The unit shall be sealed with neoprene gaskets and the enclosure shall be protected to IP 65.

Interior fluorescent luminaires shall comply with the requirements of SANS 1119, and be provided with a back plate extending the full length of the luminaire and rigid lens diffuser and louvers, manufactured from flame retardant acrylic or polycarbonate. Access to control gear and wiring shall be possible without removing the luminaire. Ballasts shall comply with the requirements of SANS 890 and be switch started. Starters shall comply with BS 3772. Lamps shall comply with SANS 104.

Luminaires for use in hazardous locations shall comply with the requirements of SANS 0108 with class and division according to location.

4.4.2 Light Switches and Socket Outlets

Wall switches shall be 16A rating complying with the requirements of SANS 163. Switches shall be flush or surface mounting to suit the conduit routing.

Socket outlets shall comply with the requirements of SANS 164 or SANS 1239 as applicable, shall be 16A rating, switched with safety shutters on phase and neutral contacts.

Three phase socket outlets shall be rated at 25A and be weatherproof to IP 65 enclosure with plug removed and inserted.

4.4.3 Weatherproof Stop Lock Stations

Shall be metal housed red push buttons with a contact block containing 2 normally closed contacts. The enclosure and pushbutton shall have an IP 65 degree of protection and shall be equipped with a corrosion resistant lock off device capable of accommodating 5 x 8 mm shackle padlocks.

4.4.4 Float Switches

Float switches shall be approved non floating polypropylene bulb type mercury switches suitable for operation in a liquid S.G. of 0,95 - 1,10 and a temperature of 0-50 degrees C. The contacts shall be rated at 10 Amps 220v AC. The float switches shall be supported and positioned to avoid kinking the cable with sufficient cable to allow for adjustment during commissioning.

4.4.5 Pressure and Temperature Switches

Pressure and temperature switches shall be manufactured to IEC standards to suit the system fluid type and pressure and temperature conditions. Separately adjustable set points and plan will be provided. The unit shall be housed in an IP55 enclosure with sufficient space for glanding a 1,5 mm² PVC SWA PVC cable.

4.4.6 Building Services Distribution Boards

Distribution Boards shall be constructed in accordance with the requirements of SANS 1180 and shall be equipped with moulded case circuit breakers and isolators to SANS 156 as listed in the detailed specifications. Earth leakage circuit breakers shall be manufactured to SANS 767 and large arrestors manufactured to SANS 171 shall be provided on each phase.

Time switches shall have 12 hour spring reserves.

Space shall be allowed for at least 20% additional equipment with blanking plates provided over unused ways.

The distribution boards shall be clearly marked with

(a) All statutory labels in both English and Afrikaans.
(b) A main label with 10 mm black letters on a white traffolite label.
(c) All incoming and outgoing ways shall be dearly marked to indicate which circuit is controlled and the numbering system used shall be the same as that used on the drawings.

4.5 Installation

4.5.1 Statutory Requirements

The safe conduct of the works shall be a primary consideration and the entire works shall be carried out in accordance with all applicable statutory regulations and requirements, detailed in Clause A. 13 of the Specification.

4.5.2 Erection

The Contractor shall be responsible and shall include in his price for all cutting and patching needed for electrical work in new or existing structures.

No cutting or welding of beams, columns or structural surface shall be permitted without the prior approval of the Engineer. All damage to finished or unfinished surfaces shall be made good to the satisfaction of the Engineer.

The Contractor shall drill with masonry drills all holes in floors or walls for electrical panel holding down bolts, cable racking and instrumentation brackets.

All equipment shall be located in the positions indicated on the drawings and confirmed with the Engineer before installation. Stainless steel packing shims shall be provided where necessary to compensate for any irregularities in the floors or walls so that after erection, motor control boards, distribution boards, control desks, cable racks, instruments and other electrical equipment stand truly level with faces vertical. The Contractor shall grout in bolts where necessary.

All equipment, bus ducts, cable trays, conduit and cables shall be installed in a workmanlike manner to present a neat appearance and to function property to the approval of the Engineer.

Exposed systems and equipment shall be neatly installed and grouped to present a neat appearance, without interference with other services.

The Contractor shall leave space clear and install work to accommodate future materials and/or equipment as indicated and to accommodate equipment and/or material supplied by other trades, verify all equipment sizes in relation to the space allowed and check all clearances, install conduit, cable tray and bus duct runs to maintain headroom and clearances and conserve space in galleries, mechanical rooms and ceiling spaces.

Equipment and apparatus requiring maintenance, adjustment or eventual replacement shall be installed with due allowance therefore, in terms of space and accessibility.

Where cable trays are sharing a mechanical pipe rack, the Contractor shall provide suitable supports.

4.5.3 Equipment Identification and Warning Signs

All statutory warning signs shall be provided.

Engraved 'traffolite" nameplates with black letters on a white background shall be provided and secured to all equipment as identified under the detailed equipment sections, and the engraving shall be approved by the Engineer. All control stations and field mounted equipment shall be suitable identified with equipment designations using engraved 6 mm lettered traffolite nameplates. Adhesive-backed punched ("Dymo") labels shall not be acceptable.

All cables shall be tagged at both ends, at junction boxes, and cable tray transitions and identified by equipment designations or other approved code, using permanently printed or PVC cable markers. Conductors of any multi-conductor cables shall similarly be identified and shall also have the individual cores identified at each end using ferrule numbers.

After installation is completed, each bus duct, main feeder cable and/or conduit service shall be identified, by an approved indelible stencil or tag with its approved designation, at the following locations:-

1. Behind each access door.
2. At each change of direction and junction box.
3. Every 15 m in straight runs of exposed conduit and bus ducts, and on both sides of sleeves or cable tray transitions.
4. Above each floor or platform for exposed vertical conduits and bus ducts, preferably 1 500 mm above the floor or platform.

The identification shall describe system voltage and service – e.g. “380 volt power to MCC #1” or "Control Cables to MCP", etc.

The Contractor shall confirm that manufacturer's nameplates are affixed to each item of equipment showing the size, name of the equipment, serial number and all information usually provided, including voltage, frequency, number of phases, kW rating, etc., and the name and address of the manufacturer.

All stamped, etched or engraved lettering on plates shall be perfectly legible. The main isolator on each MCC or distribution board shall be clearly labelled in English and Afrikaans.

4.5.4 Earthing System

A complete co-ordinate earthing system shall be provided for all electric and instrumentation equipment and building structural steel. The main earth bus shall comprise 70 mm² stranded bare copper as indicated in the particular specification.

All transformer neutrals and distribution system neutral connections shall be solidly earthed. The earth bus provided in switchboards and motor control centres shall be metallically connected. All metallic cables sheaths shall be securely bonded to the earth bus, and a separate earth conductor shall be provided in conduit systems where necessary and shall be used for equipment earthing. Lightning arrestors shall have a separate conductor.

Earth connections underground and to structural steel shall be made by means of a fusion weld indicated or as approved by the Engineer.

The main earth system shall comprise an adequate number of 19 mm diameter x 2 000 mm long earth rods, mat, structure, equipment, and connections. The resistance to earth shall not exceed 2 ohms. Inspection boxes with covers and disconnect links for testing shall be provided. The earth system shall be tested using a 4 point tester and the result submitted for approval.

A lightning protection system shall also be provided where specified in accordance with the requirements of the SANS Code of Practice for the protection of structure against lightning SANS 03-1985.

4.5.5 Trial Usage of Electrical Systems

The Employer has the right to the trial usage of electrical and instrumentation systems or parts thereof for the purpose of testing under load the new installation and learning the operational procedures.

The trial usage shall be continued for a length of time as deemed reasonable by the Engineer and all related costs shall be included in the Contract.

The operations shall be carried out only with the express knowledge and under supervision of the responsible trade who shall not waive any responsibility because of trial usage.

Whilst trial usage will be kept to a minimum, it shall not be construed as acceptance by the Engineer.

4.5.6 Completion and Testing

The Contractor shall pay particular attention to the following :-

1. Upon completion of all work, equipment shall be cleaned thoroughly by vacuum, the exterior surfaces cleaned, waxed and polished, all electrical connections checked and tightened, lighting fixtures cleaned and lenses washed, all lamps, fuses or other material showing any deterioration replaced, all to the satisfaction of the Engineer.

2. All spare parts or maintenance tools, specified or normally furnished by manufacturers, shall be itemized and given to the Engineer prior to the acceptance of the work.

3. Earth continuity and resistance tests shall be carried out and the readings reviewed by the Engineer.

4. Before any equipment is energized, a 1000 V insulation resistance (Megger) test shall be applied to the complete power distribution system using equipment approved by the Engineer.

   The value shall not be less than ten megaohm and, in any event, shall be acceptable to the Electrical Inspection Authority.

5. Single-phase loads shall be distributed equally among the phases of the three-phase system, and load balance tests shall be made by the Contractor when all equipment is in full operation. The load-current imbalance shall not exceed 5%.

6. Voltage drop tests under full load shall be carried out on critical feeders, as directed by the Engineer.

7. The Contractor shall perform any additional testing as required by the Engineer to confirm that electrical, instrumentation and control equipment installed under this Contract is operating satisfactorily and in accordance with the intent of these Specifications. This shall include for the provision of factory-trained field service specialists, when necessary, to fully test and commission special electrical systems to the satisfaction of the Engineer, and include the supply and use of test equipment as necessary to carry out acceptance tests.

8. The Contractor shall pay particular attention to correct phasing of all three-phase systems and check that all motors are properly connected for correct rotation. Note that no mechanical equipment shall be operated without specific approval of the sub-trade involved.

The Contractor shall co-operate with the equipment supplier(s) in carrying out all tests on the instrumentation and control systems to ensure that all operations and documentation is as specified and completely satisfactory to the Engineer.

5 STANDARD INSTRUMENTATION SPECIFICATIONS

5.1 Standards

The materials, equipment and installation shall be in accordance with good instrument engineering practice and to accepted national and international standards.

The instrumentation installation shall comply with the requirements of the General Electrical Specification and the I.S.A. Codes of Practice and ANSI/ISA-S5.1 Instrumentation Symbols and Identification.

All equipment and materials shall be suitable for extended reliable and efficient operation and use in the environment in which it will operate.

5.2 Drawings

Instrument loop drawings shall be provided for each instrument. These drawings shall be complete and contain all wire and terminal numbers as well as notes on cable types, shielding and earthing requirements. All equipment shall be identified with type numbers and manufacturers details. Cable schedules, cable route drawings, marshalling cubicle layouts and equipment lists shall also be provided.

5.3 Instruments

5.3.1 Temperature Instruments

Connections may be made on the top or side of horizontal pipelines, but on very hot surfaces, side connections are preferred.

Particular attention shall be taken to ensure that the wells are not installed in dead zones or in pockets of still processed material. Wells on vessels shall be clear of rotating paddles and internal vessel components. On furnaces, heaters, etc., thermal wells shall not be located at points where false readings may result due to direct convection or radiation.

Thermal well connections shall be located vertically or angled downwards to the vertical line 45 degrees and shall be of the 'solid drilled' type.

Thermal wells shall not penetrate into any process pipe containing sludges or slurries.

Temperature elements installed in wells shall reach the bottom of the well and where fast response is required, filled with a good heat conducting material. Alternatively duplex mineral insulated elements should be used without wells.

Adequate clearance and cable shall be provided for withdrawing thermocouple or other temperature elements. Sufficient slack cable shall be provided to remove the temperature element without disconnecting the cable.

Thermocouple wire shall be wired from the hot junction leads back to the point of reference; e.g. at the computer interface card, recorder, controller, or digital indicator.

The thermocouple type shall be consistent from start to finish. If the system calls for J-type thermocouples, then the probe, connectors, extension leads and indicator shall all be for type-J calibration.

Switches may be used which are manufactured with silver or gold plated contacts provided that (1) the switch is designed to be isothermal, and (2) thermocouple wire is used from the common output to the reference junction.

The output of a thermocouple shall not be split between two readout devices, e.g. a recorder and a controller. Where two devices are required dual ungrounded thermocouples shall be used.

Thermocouple wire shall be routed on separate trays, at least 1 metre away from any power circuit.

Immersion-type thermocouples shall be installed at a depth of at least 10-20 times the sheath outer diameter to reduce conduction losses.

The negative leg of a thermocouple shall always be colour coded red in accordance with ANSI standards.

Thermocouple types and resistance temperature detectors shall be suitable for measuring the range of temperature required.

5.3.2 Pressure Instruments

Pressure gauges shall normally be installed on top of horizontal lines. All horizontal pipeline pressure transmitter tapping points shall be located on top of the pipe for steam and on the side for liquid, slurries and sludges.

Pressure gauge connections on pumps shall be on the pump side of block valve. In these applications, the gauges shall be suitably protected against the effects of vibrations and delivery pulsations.

Pressure gauge connections associated with particular control valves shall be located near those valves for operator readability and valve adjustment.

Suitable precautions shall be taken to ensure that hot fluid does not enter pressure gauges by the use of pressure transmitters, chemical seals, syphons or pigtails. Lagging shall be provided where necessary.

All pressure gauges/transducers shall be glycerine filled and provided with isolating diaphragms, when installed in slurry or sludge lines or any other application where the material being measured could affect the operation of the gauge or transducer. In such applications a flushing point with cock shall be provided between the pipe and the diaphragm.

Pressure transducer parts shall be manufactured from type 316 stainless steel and the enclosure totally hermetically sealed. The output shall be 4-20 mA.

Pressure switches shall be of the snap action type, with change over contact to suit the application rated at 10 Amp 220v. The pressure switch enclosure shall have an IP 65 degree of protection.

5.3.3 Flow Instruments

Orifice plates and carriers shall be located so that they are easily accessible and removable, using flexible spacer couplings.

Flow instruments shall not be located in pipe containing multi-phase fluids.

Primary flow element straight pipe length requirements shall comply with the manufacturers recommendations and accepted engineering practice.

No other instruments, fittings, or thermocouple wells, shall be installed within the minimum straight length requirements of the primary flow element. Primary flow elements shall be installed in horizontal pipes but may be installed in vertical pipes where:

a) There is upward flow for liquids (including slurries and sludges).

b) There is downward flow for gases/vapours.

In no case may orifice tappings be located at the bottom of a pipe.

Sufficient space shall be allowed for connecting flow instruments to primary flow elements to enable ease of installation.

Rotameters shall be installed truly vertical with the inlet at the bottom. Any hand control valves specified for flow regulation shall be located upstream of the rotameter, with adequate clearance being provided for removal and cleaning of the tube. Isolating valves shall be provided on dirty fluids. Rotameters, orifice plate magnetic and positive displacement meters shall be installed in a section of pipe that is always full of fluid.

The required number of clear upstream and downstream pipe diameters shall be maintained.

Care shall be taken in the fixing and alignment of ultrasonic flow detector elements to comply with all the manufacturer's requirements.

Flow instruments working on change of level shall comply with the requirements under 5.3.4 - Level Instruments.

Flow switches shall be carefully selected to suit fluid type and adjusted for pipeline velocity and diameter. Terminal boxes shall be suitable for glanding and terminating a steel wire armour cable and shall have an IP 65 degree of protection.

5.3.4 Level Instruments

The mid-point of external level transmitters/controllers shall be at least the 50% level range in the vessel.

The centre line of external level switches shall be coincident with the high or low level switch positions as stated on the drawings. Care shall be taken to ensure that floats do not foul flange nozzles or any other internal vessel components.

Mobrey type float switches shall be used in enclosed vessels.

Glass level gauges shall be mechanically protected with adequate clearances for removal and cleaning of the gauge glass. Drain and vent valves shall also be provided.

Ultrasonic level transducers shall be mounted with rubber gaskets, and shall not be installed where the signal path is interrupted by incoming material or the sides of the container. The blocking to measuring distance ratio shall comply with the manufacturer's recommendations.

Temperature compensation should be provided.

Adequate clearance shall be allowed for removal of long level probes such as capacitance probes, which shall be mounted clear of internal vessel components.

Paddle switches shall be installed vertically downward into a process vessel. Adequate clearance and lifting facilities shall be provided for removal, adjustment and connection. All units shall be located in positions least likely to suffer damage during operation and mechanical maintenance procedures.

5.3.5 Vibration Instruments

Vibration monitoring equipment shall be suitable for direct horizontal or vertical mounting on the component to be monitored and be provided with sensitivity adjustment to permit selection of the required control range for each duty, and accommodate increased velocities due to bearing or component wear. The transducer is to be of the acceleration type.

5.3.6 Control Valves

All control valves shall be installed so that they are readily accessible for maintenance. Adequate clearance shall be provided with large valves to allow for lifting gear. Control valves shall be located downstream of flow elements. Sufficient clearance shall be provided above and below control valves so that the plug and valve actuator may be removed with the valve body in place.

Control valves shall be installed, where possible, near the operating equipment that must be observed when operating on local manual control. The measuring device or local indicator shall be located near the control valve.

Globe control valves shall, where possible, be mounted in horizontal lines with the valve stem vertical. Rotary control valves shall be mounted with the spindle horizontal.

Bypass valves, where required, shall be of the same size as the control valve.

All valves shall be installed in the correct direction of flow as indicated on the valve. Particular care shall be taken with valve attachments such as current to pressure converters, solenoid valves and air sets.

All valve installations shall be designed to ensure that the valve can be removed from service without dismantling any other pipe work.

5.4 Equipment and Materials

5.4.1 Isolating Valves

All instruments shall be provided with isolation valves. All isolation drain or vent valves shall be half inch NPT 316 stainless steel ball valves unless otherwise specified.

Instrument air supply isolation valves shall be quarter inch or half inch NPT 316 stainless steel ball valves unless otherwise specified.

5.4.2 Tubing and Piping

All instrument tubing, piping and fittings shall be of metric dimensions. All process impulse tubing shall be 316 stainless steel, 12 mm OD x 1,2 mm wall thickness, fully annealed and suitable for compression pipe fittings.

Instrument air signal tubing shall be 10 mm OD "Dekabon" 1300, suitable for brass compression fittings.

Metal tubing shall be handled carefully and shall only be cut and bent using the correct tube cutter and bender. All tubing shall be blown clear of all filings and other debris before final connections are made. Prior to termination, tube ends shall be inspected for true roundness and being free of score marks. Compression fittings shall be assembled and tightened as specified by the manufacturer.

All tubing and piping shall be rated for the application and shall never be of a lower specification than the process fluid pipe which the tube or pipe is connected into. Tubing shall be straightened using a correctly sized roller tool.

All instrument piping and tubing shall conform to the relevant standards and shall be run in a neat orderly manner. Lines shall be grouped wherever practical with adequate supports and strapping. Compression fitting terminations on tray shall have standard raised offsets. PTFE tape shall be used for screwed fittings. PTFE tape however shall not be permitted for sealing compression fittings.

Where main impulse line isolation valves are not easily accessible or runs are greater than 3 metres, separate isolation valves shall be installed at the instruments.

Air supply piping shall be supplied as specified and installed in accordance with the pipe and instrument drawings.

Unions or break couplings shall be installed in lines, which require removal, which would otherwise interfere with handling, or removal of plant equipment. Screwed piping and fittings shall comply with applicable piping schedules. Screw joints shall have clean machine cut threads and shall be made with PTFE tape. NPT and BSP connections shall not be mixed.

Isolation valves shall be accessible for operation from grade or operating platforms unless otherwise approved. The tubing shall not interfere with access to valves or equipment nor shall it obstruct passage ways. Headroom clearance of 2 meters shall be maintained.

When complete, all pipe and tube installations shall be blown through and pressure tested with instrument air. Care shall be taken to isolate and vent low pressure instruments to avoid damage to measuring elements.

5.4.3 Cables and Cable Racking

All instrument cable shall be manufactured according to SANS 150 standards. The quantities and types of cable supplied will be as required by the plant being offered by the Contractor. All Cables shall be screened where necessary and armoured or installed in conduit.

Cable shall be fixed to trays and identified using the methods detailed in the Electrical Specification. Instrument signal cables shall be segregated from electrical power cables by a minimum of 300 mm and shall cross the latter at 90°.

Thermocouple extension wires shall not be fitted with crimped lugs. A small pigtail shall be formed at open screw type terminals. Wires shall extend through and cross each other at screw clamp type terminal blocks.

All cable shield (drainwires) shall be earthed only at the instrument rack or panel end of the cable, except for earthed thermocouples, which shall be earthed in the connecting head. The shield at the local instrument shall be cut off and neatly taped or covered with heat shrink tube. The shield shall continue via isolated terminals through the marshalling or junction boxes to the instrument rack or panel.

All instruments shall be wired up in accordance with the loop drawings. Each wire shall be marked with a wire number.

Adequate care shall be taken when pulling wire or cables through conduit to ensure that there is no damage to the insulation.

Conduit shall be heavy duty PVC type, with a minimum diameter of 25 mm. Instrument cable trays shall be supplied and installed as detailed in the Electrical Specification.

5.4.4 Junction Boxes and Marshalling Cubicle

"Pratley" type junction boxes with "Klippon" or "Phoenix & Wieland" terminals shall be provided as required. Cables shall be secured at terminal boxes using mechanical or compression glands manufactured to SANS 1213.

Marshalling cubicles shall be supplied complete with terminals and field interface equipment where applicable. "Klippon" terminals shall be provided for all connections.

All marshalling cubicle internal wiring and connections shall comply with the Electrical Specification Standards.

5.5 Lightning Protection

Lightning protection on both signal and power cables shall be provided for all field mounted instruments using "Blitzductor" lightning protection terminals.

5.6 Installation

All field instruments, primary elements and tapping points shall be mounted so that they are easily accessible to maintenance personnel without the requirement of any temporary platform.

All instrument supports and mounting brackets shall be fabricated using heavy duty material (minimum 2 mm) to enable proper operation of the instrument. Instruments and associated equipment shall be installed strictly in accordance with the manufacturer's recommendations.

Instruments other than vibration instruments shall not be mounted on, or attached to, equipment or structures subject to excessive vibration.

Instruments with local indication shall be situated with their faces in the direction of the normal operating position.

Temperature and pressure shall be measured on the same side of the orifice plate generally downstream.

Primary flow and pressure elements for gases shall be located to enable instruments to take installed in an accessible position above the primary element to ensure that the instruments are self draining. Where there are liquid or condensable gases, the instrument shall be installed below the primary element to ensure gas free impulse lines.

Instruments shall not be mounted on or near to process lines or duct work or other equipment subject to high temperatures unless specifically designed for such measurements.

Instruments shall be mounted so as to avoid locations subject to leaks and spills. Where unavoidable suitable shielded, or sloped roof protective enclosures shall be provided.

All instruments shall be located as close as possible to the primary process connection, consistent with instrument accessibility, maintenance and mounting requirements.

Pressure actuated instruments shall be installed with diaphragm seals where specified. Special care shall be taken during the storing and installation to prevent any damage to diaphragms or capillaries. Capillary tubing for filled instrument system instruments shall be protected by strapping the tubing to angle iron. Excess tubing shall be neatly coiled and secured at the process end with a minimum bending radius of not less than 200 mm.

All line connections to instruments shall also be properly supported to prevent strain on the connections.

Workmanship shall be of a high standard with all brackets and supports manufactured from 3CR 12 steel or stainless steel leaving no sharp edges and pickled and passivated in accordance with the Specification.

5.7 Loop Testing Commissioning

All instruments shall be bench calibration checked prior to installation, in accordance with the latest specification sheet and manufacturers recommendations. The results shall be submitted to the Engineer.

Any faults found with any instrument that cannot be readily repaired on site shall be returned to the manufacturer. All instruments shall be function tested for correct operation.

All digital and analogue field inputs and outputs to and from the control room shall be operated to ensure correct action of interlocks, alarms, relays, lamps, solenoids, and indicators.

Transmitters shall be function tested (not calibrated), or where this is not possible, tested using a transmitter simulator at the transmitter terminal, or millivolt/decade box source for thermocouple/RTD's.

Transmitted signals shall be checked to ensure the correct signal is indicated on the relevant indicators and on the control room computer VDU screen.

Alarms and trips in each loop shall be checked to ensure that they operate with the transmitted signal at their correct setting, giving the correct action and interlocking requirements where applicable.

Where control functions exist, control action (dependent upon control valve fail safe action), valve tags and any limits shall be checked and set. The controller gain shall initially be set to one, (100% PB) and integral time set to 20 seconds, (If derivative is included this can be set off initially), using the transmitted signal and the set point adjustment. Open loop controllability checks shall be made on both sides of the set point.

Control valves shall be stroked from the control room (where applicable) and any valve accessories shall be checked together with the I/P converter.

The Engineer shall be advised when instrument loops are being checked/tested so that these may be witnessed. All checking and testing shall be documented and such documentation included with the maintenance manuals.

All isolation valves shall be left shut unless otherwise instructed by the Engineer. All power circuits shall be left live, after a loop has been checked.

Where any loop has been tested and the loop subsequently removed then it shall be retested when the instrument is replaced.

When each loop is required to be put into commission it shall be commissioned in the correct sequence. The control loops shall be put on auto when required and tuned for optimum performance, which shall require various load changes up to maximum to ensure overall load controllability and non-interaction with other control loops or systems.

The plant load shall be taken down to see the minimum possible load on fully automatic control. The instrument commissioning shall proceed in close co-operation with the Engineer and plant operating personnel. All instrument settings and readings together with outputs shall be logged for future record and setting of ratio loops etc.

The Contractor shall not work on any loop or system, which has been handed over, or plant section, which may be in operation, without prior approval of the operations personnel.

All process alarms and trips will be physically taken where practicable to their switch points to ensure that they do in fact give the correct information and perform the required safety action.

6 CORROSION PROTECTION

6.1 Scope

This specification covers the requirements for furnishing labour, tools, equipment and all services necessary to provide the application of protective coatings both at Contractor's Works and on site in accordance with the Specifications contained in the Document.

This specification indicates by description the quality of surface preparation and the quality and type of coatings desired. Any substitutions shall be subject to the Engineers written approval.

6.2 Applicable Document

Codes of Practice:

SANS 064	Preparation of Steel Surfaces for Coating
SANS ISO 12944	Corrosion Protection of Structural Steelwork, Part 2 Project Specification, Part 3 Guidance for Design, and Part 4 Typical Schedule of Quantities
SANS 0124	Design, fabrication and inspection of articles for hot-dip galvanising

SANS 0140 Identification of Colour Marking Parts I & II

SANS ISO 8501-1 Swedish Code of Practice, Pictorial Surface Preparation Standards

SANS ISO 8502-3 Part III Assessment of Dust on Steel Surfaces Prepared for Painting

SANS ISO 8502-4 Part IV Guidance for Estimation of the Probability of Condensation prior to Paint Application

SANS ISO 8503-2 Method of Grading of Surface Profile of Abrasive Blast Cleaned Steel

Specifications :

SANS ISO 2063 Thermally Sprayed Coatings

SANS 1217 Pipe Coatings

SANS 1200 HC Corrosion Protection of Structural Steelwork

SANS 1091 National Colour Standards

SANS 681 Undercoats for Paint

SANS 934 Hot Dip (Galvanised) Zinc Coatings on Steel Sheet and Strip

SANS 763 Hot Dip (Galvanised) Zinc Coatings

SANS ISO 1461 Hot Dip (Galvanised) Zinc Coatings

SAR CSS 183/13.15

Test Methods :

SANS ISO 2808 Dry Film Thickness

SANS 769 Cleanliness of Blast Cleaned Steel Surfaces for Painting

SANS 770 Test for Soluble Salts

SANS ISO 8502-1&2 Test for Soluble Salts

SANS ISO 8502-3 Assessment of Dust on Steel Surfaces prepared for Painting

SANS ISO 8502-4 Guidance for Estimation of the Probability of Condensation prior to Paint Application

SANS ISO 8503-1 Profile of Blast Cleaned Surface

6.3 Interpretations

6.3.1 Support Specifications

Where this specification is required for a Contract the following shall inter alia, form part of the Contract Document:
Drawings, Tender and Contract documents.

6.3.2 Definition

The “Engineer” means the person, firm or company appointed by the Employer to act as Engineer for the purposes of the contract.

"Approval" means written approval by the Engineer.

A “Qualified Applicator” shall be defined as a workman who has been regularly and recently engaged in the application of Protective Coatings or other systems.

The “Contractor” shall be defined as any person appointed by the Engineer to undertake the manufacture, supply or erection of any items, structures or works in connection with the Project.

6.3.3 General

Drawings, Tender and Contract Documents shall form part of the Specification. Requirements of the specification shall be strictly observed. Deviations shall only be allowed by written instructions from the Engineer.

Where conflict arises between this specification and the standards quoted, the requirements of this specification shall prevail.

Where conflict arises between this specification and the drawings, the requirements of the drawings shall prevail.

6.4 Materials

6.4.1 Coating Raw Materials

The correct materials shall be provided as designated in the specification.

Different brands or manufactured materials shall not be mixed in any coating system unless authorised in writing by the Engineer.

The Contractor should note that some of the specified coating material may not be stock items and therefore sufficient time must be allowed for procurement.

6.4.2 Delivery and Storage of Raw Materials

The Contractor shall be responsible for the delivery, unloading and storage of the necessary materials to permit progress of his work in accordance with the Construction Programme.

The Engineer will designate the location where paints may be stored and mixed on site.

All materials shall be stored under cover and clear of the ground.

The store shall be organised such that materials are used on a 'first in - first out' basis.

6.5 Construction

6.5.1 Requirements

The Contractor shall provide all the facilities necessary in order to ensure satisfactory preparation, number and thickness of coats. All workmen shall at all times be under the constant supervision of a supervisor who is, in the opinion of the Engineer, competent to carry out the task assigned to him.

The Engineer shall be given access to inspect the surface preparation and the application of any or all of the coats, to ensure that these have been applied in accordance with the specifications. No steelwork, pipework or items of plant and equipment shall be delivered to site until inspection has been carried out and a release certificate issued, where required by the Project.

It shall be the Contractor's responsibility to ensure that :

Inspection is called for and the necessary notice be given,
Clearance Certificates, when required are obtained prior to delivery of goods
All equipment (esp. gearboxes) openings and shafts are suitably protected by means of wrapping or covering before blast-cleaning or spray painting to prevent ingress of foreign matter into the equipment, and
All equipment, motors, main plant, light fittings, etc., are suitably protected by means of wrapping or covering before blast-cleaning or spray painting of any steelwork after the installation of the aforesaid equipment.

6.5.2 Safety Precautions

The Contractor shall ensure that sufficient fire extinguishers are located in all areas of storage, mixing and application of coating materials. Smoking shall not be permitted by persons engaged in handling, mixing or applying coating.

Masking materials shall be provided by the Contractor in sufficient quantities to avoid fouling contiguous surfaces.

On viewing the area to be painted, the Contractor shall discuss with the Engineer all safety precautions necessary in that particular area and the provision of suitable ventilation. The provision of special

equipment shall be negotiated between the Contractor and the Engineer, but the cost of such equipment will be provided for in the Contractor's rates for work

Where necessary and also when directed by the Engineer or Safety Officer, the Contractor shall provide workmen with masks. Suitable air filters shall be fitted in the mask air feed lines.

Oily or solvent-soaked rags shall be kept in closed containers and in minimum quantity. Any spillage of coatings or other volatiles shall be wiped up immediately.

The Contractor shall be fully responsible for the enforcement of all essential safety precautions.

The Contractor shall provide and erect his own scaffolds and rigging as may be required. All scaffolds and rigging shall meet the safety requirements of the Machinery and Occupational Safety Act.

Airlines used for spray painting and abrasive blasting, shall be fitted with suitable approved oil and moisture traps.

All air receivers, moisture traps and pressurised equipment used for abrasive blasting or spray painting, shall comply with the statutory regulations.

6.5.3 Workmanship Guarantee

The Contractor shall be fully responsible for the quality of all work done. He shall guarantee the application of all coatings and shall completely remove the applied coating, and re-coat, at his own cost, any areas where the coating is found to have failed within twelve (12) months of application.

6.5.4 Coating Application

No coating shall be applied if the temperature of the steelwork is less than 3 deg C above DEW POINT or outside the range 10 - 40 deg C, unless otherwise specified in the project specification and agreed to by the paint manufacturer. Painting shall not be permitted in foggy or damp weather or where relative humidity exceeds 85%.

All materials shall be evenly applied to form a smooth continuous, unbroken coating, free from sags, runs and other paint film defects.

All ingredients in any container shall be thoroughly mixed by mechanical means or using a flat bladed spatula before use, and shall be agitated often enough during application to keep pigments in suspension.

The type of thinner and quantities used shall comply with the manufacturer's recommendations. Dilution shall not exceed 5% by volume without the written authority of the Engineer. The use of thinners to extend the pot life of two pack materials is not permitted.

Damaged paint areas shall be cleaned, 'feathered back' rust spots removed and spot priming carried out such that the patch painting extends 25 mm beyond the damaged areas. Spot priming shall consist of all coats previously applied.

All edges, corners, bolt holes and cut ends, which are to be painted, shall receive the specified paint. Welds and site modifications shall be stripped or otherwise treated to ensure full coverage.

On concealed surfaces or back-to-back angles, polyurethane sponges may be used for the coating application. These areas are to be completely coated.

Special attention shall be given to crevices and edges to ensure complete coverage and paint thicknesses.

Brushes and rollers shall be of a quality and style that will enable proper application of the coatings.

Spray equipment used shall be suitable for high quality work, shall be capable of properly atomising the material, and shall be equipped with suitable pressure regulators and gauges. The air caps, needles and nozzles shall be those recommended by the manufacturer of the coating being sprayed. Coatings shall be applied in uniform layers.

All steelwork being either primed at the shops and delivered to site for storage or being cleaned and primed on site prior to erection shall be laid on suitable trestles, timber sleepers or other suitable material to ensure that it is at least 100 mm above ground level.

Each coat of paint in any paint system shall be of a distinctly different colour. Coat colour is to conform in all instances to that specified.

Pipes cast into walls must be coated with epoxy on the exterior surface up to the end of the special or 0.5 m each side of the wall, cast in and tape overwrapped to the face of the concrete.

Pipes cast into encasement must be epoxy coated on the exterior surface 0.5 m each side of the end of the encasement, cast in and tape overwrapped to the face of concrete.

6.6 Surface Preparation for Steel

6.6.1 General

The condition of the substrate prior to painting shall be as specified for each separate coating system.

No painting shall be applied over any surface containing traces of grit, dust, grease, oil, etc., loose rust, or millscale or welding scale or corrosion products of any kind.

All surfaces to be coated shall be free of moisture. Unless otherwise stated, paint shall be applied over dry surfaces. Oil, soluble salts and corrosive airborne contaminants shall be thoroughly washed from the surface prior to painting. Suitable cleaning or de-greasing fluids are to be used for cleaning surfaces to be painted and specified approved materials in the Schedule of Suppliers are to be utilised.

In the case of site painting, intercoat washing will be carried out when instructed by the Engineer. Such intercoat washing will be required where contamination has taken place and will be carried out using potable water, detergent and bristle brushes. Cleaned surfaces shall be dried and immediately painted.

All new steel shall have millscale removal by abrasive blastcleaning.

All cleaned steel shall be handled only by personnel wearing gloves.

6.6.2 Degreasing

The surface shall be scrubbed with a solution of suitable water-based detergent/degreaser using a bristle brush. Avoid entrapment of cleaning agent in recesses or other retention areas. Rinse surface thoroughly with clean potable water to remove all residues. Allow the whole surface to dry thoroughly before application of the coating system.

6.6.3 Cleaning to “Water Break Free” Surface

The surface shall be cleaned with the degreasing procedure using non-metallic abrasive pads until a ‘water break free’ surface is obtained. If necessary, the procedure shall be repeated until a ‘water break free’ surface is achieved.

6.6.4 Wash Primer Application

The surface shall be cleaned to ‘water break free’ cleanliness. A single thin coat of wash primer, mixed and applied in accordance with the manufacturer’s instructions shall be applied. The DFT shall be 8 to 13µm.
Note: The wash primer is an adhesion promoter and is not to replace the primer specified in the paint system.

6.6.5 Abrasion to Matt Finish

The surface shall be thoroughly sanded with fine abrasive paper to achieve a uniform matt finish.

6.6.6 Abrasion or Sweep-Blast Cleaning

The surface shall be lightly abraded by one of the following methods:
On small areas: by the use of abrasive paper not coarser than 120 grade, or by using non-metallic abrasive pads.
On large areas: by ‘sweep blast cleaning’, using a nozzle pressure not greater than 300kPa and extra very fine abrasive (particle size not exceeding 1,0mm). Removal of zinc by blast cleaning shall not exceed 10% of original thickness.

6.6.7 Abrasive Blast Cleaning

Note :
Prior to blastcleaning, the Contractor shall prepare two steel panels to the standard specified using the same blasting media as will be used for the completion of the contract. These panels shall be sealed to prevent oxidisation and shall be used for the standard of acceptance for the duration of the works. One panel shall be retained by the Engineer for reference purposes.

The standard of the blastcleaning shall be in accordance with the Swedish Code of Practice SIS 055900.

All welds shall be free of slag, slag inclusions and pinholes.

Adjacent areas shall be free of weld spatter. The Fabrication Contractor shall be responsible for removing such spatter by grinding or chipping.

All oil and grease deposits shall be removed prior to blastcleaning by the use of approved degreasing agents. In this regard special attention shall be paid to drillings, bolt holes, etc.

Abrasive blasting shall be carried out using equipment suitably designed for this purpose and operated by experienced personnel.

Where possible the blastcleaning shall be carried out in a controlled blastcleaning shop. Where blast cleaning is carried out on site or in open conditions, no blastcleaning shall take place during inclement weather conditions. The Engineer shall designate an area where blastcleaning may be carried out on site.

All air used for blastcleaning shall be free of oil.

Abrasives for blastcleaning shall comply with the requirements of SANS 064.

In all cases, after blastcleaning the surfaces shall be blown clean of all blast media and dust, unless otherwise specified. Surfaces shall not become contaminated with oil, grease, rust or other deposits before coating.

The anchor pattern profile limits created by blastcleaning shall be :

SPECIFIED MEAN	PROFILE (Micrometres)	PROFILE (Micrometres)
30	25	35
60	45	75
100	75	125

All blast cleaned surfaces with the exception of lap joints and areas left back for site welding, shall be coated with the primer coat within a period of four (4) hours after completion of blastcleaned. Under no circumstances shall blastcleaned surfaces be left un-coated overnight.

The various grades of blastcleaning required are detailed in the individual specifications relating to the particular sections of the plant.

Note:
Blastcleaned steel that does not comply with the specification shall be re-blasted to conform to this standard at no additional charge.

6.6.8 Non-Metallic Blast Cleaning

Abrasive grit blast surface in accordance with ISO Standard 8501-01 to give angular profile. A non-metallic abrasive such as iron slag, copper slag, platinum slag, aluminium oxide or garnet shall be used.
The use of sand, steel shot, steel grit or cast iron grit is not allowed. The blasting system shall be once-through and recycling of abrasive is not allowed.

Table 1 Blast Cleaning Acceptance Criteria

PROPERTY	ABOVE WATER	IMMERSED SURFACES
Cleanliness to ISO 8501 Part 1	Sa2½	Sa3
Residual dust and debris (SANS method SM 769)	0.5%	0.3%
Oil and grease (ultra-violet light and/or visual inspection)	Nil	NIL
Perspiration (wet chemical test for chlorides) includes: -Silver nitrate test on swab extracts using distilled water -Specific ion electrode for chlorides -Bressler test	Nil	NIL
Surface Profile: (SANS Method SM 772 or SM 774) minimum maximum	 25µ 60µ	 25µ 60µ
Water soluble iron salts (Weber Reilly test) maximum at any one point	500mg/m²	100mg/m²
Water soluble iron salts (Weber Reilly test) average of any 250cm²	100mg/m²	10mg/m²

Table 2 Maximum Time Interval between Blast Cleaning and Coating

AMBIENT RELATIVE HUMIDITY	MAXIMUM TIME (hours)
Below 50%	6
50% - 85%	4
Over 85%	Coating not permitted Reblast and coat when RH below 85%

6.6.9 Wire brushing

Prior to wire brushing, all welds shall be free of slag, slag inclusions and pinholes.

Adjacent areas shall be free of weld spatter and such spatter shall be removed by grinding by the fabricator.

All oil and grease deposits shall be removed prior to wire brushing by the use of approved degreasing agents. In this regard, special attention shall be paid to drillings, bolt holes, etc.

Following the degreasing, as described above, all surfaces of steelwork and plant under this category shall be scraped and wire-brushed to remove all loose rust, scale and deleterious matter.

The Contractor may utilise hand wire brushing provided the required standard of finish is achieved. Where necessary, mechanical brushing and needle gun descaling shall be used. Care must be taken not to burnish the steel.

The surfaces shall finally be blown clean, using dry, oil-free compressed air to remove dust and loose matter. The finish shall be in accordance with the Swedish Code of Practice SIS 055900 Grade St 3 unless otherwise specified.

6.6.10 Phosphate Coating

Carbon steel surfaces shall be treated with chemical solutions containing metal phosphates and phosphoric acid, to produce a thin, inert and adherent corrosion-inhibiting layer to serve as a sound base for subsequent coating. The phosphating procedure shall be approved by the Engineer.

6.7 Execution

6.7.1 Hot Dip Galvanising (HDG)

In all cases where hot dip galvanising is called for in this specification, both the fabrication of items for galvanising, as well as the galvanising procedures shall comply with the requirements of SANS 763 or SANS 934 as applicable, and the relevant tables for article category contained therein. The relevant code of practice for HDG is SANS 0214.

Where it is required that galvanised materials be painted, the surfaces shall first be thoroughly abraded with 'Scotchbrite' pads and a galvanised iron pre-cleaner or a light sandblast, followed by adequate rinsing with fresh water.

The criteria for adequate surface preparation shall be a 'clean water break' at the final rinse, and a dull, matt appearance.

6.7.2 Tape Wrapping

All material shall be of the specified quality and all work shall be done in a thorough and practical manner using good pipeline construction skills. The entire operation of cleaning, application, repair and testing shall be performed by applicators who are skilled in the application of the specified materials. Equipment for cleaning and applying the coating and wrapping system shall be adequately designed and be in such condition to permit the applicators to follow the procedure and obtain the results prescribed herein.

Coating and wrapping materials shall be stored in a dry place and protected from the elements. Coating and wrapping materials shall not be applied when ambient temperature is below 10 deg C.

Field applied coating and wrapping operations shall not be performed when rain, moisture, frost, dust or other adverse weather conditions exist.

Cleaned pipe shall be primed the same day and prior to any recontamination of the pipe. Any flash rusting, surface oxidation, or other foreign agents shall be removed by reprocessing through the necessary cleaning steps noted herein.

The primer shall be applied in a uniformly thin film, free of runs and sags covering the entire surface of the pipe. The flow of primer shall be regulated so that the pipe surface is entirely covered and is dry to the "tacky to touch" stage at the point of tape wrapping application. Uncoated, flooded, or areas primed over improperly cleaned pipe, shall be cleaned to the satisfaction of the Engineer and recoated.

Straight runs of pipe shall have the tape spirally wrapped with a manual or power driven wrapping machine. The tape shall overlap the preceding spiral a minimum of 25 mm. The inner and outer tape layers shall be applied in one operation in such a manner that the overlaps of the layers do not coincide.

The tape shall be kept under constant tension to assure a uniform, tightly adhered coating, free of wrinkles, puckers, voids and bubbles. Care shall be taken to assure that the overlap is maintained. The end lap of each new roll shall overlap the end of the preceding roll. The end lap shall be hand applied without tension and its spiral angle shall parallel the previously applied spiral without twists or distortion.

Backfill adjacent to the coated and wrapped pipe shall be free of scrap, sticks, rocks or other hard debris, which would tend to damage the coating.

6.7.2.1 PVC Backed Rubberised Bitumen Mastic Taves (Outer Layer)

Wire brush all surfaces to remove loose material, grit, dust, etc. The weld area shall be free of all slag, weld spatter and burnt coating.

Weld areas shall be primed with applicable pipe primer.

Apply tape in spiral fashion maintaining a 50% overlap. Care shall be taken to prevent air pockets and wrinkles. The tapes must be tensioned sufficiently to cause slight exudation of the bitumen mastic layer at the laps, but not stretched.

6.7.2.2 Flanges and Couplings

All buried flanges and Coupling shall be thoroughly cleaned and primed with the appropriate primer.

Following the primer, the contours of the flanges and couplings shall be packed out using the appropriate mastic.

The mastic shall be wrapped with the appropriate tape to fully encapsulate the mastic.

In the case of the Denso system, an adhesive PVC outer wrap shall be applied over the Denso Tape.

6.8 Summary of System Applications

SYSTEM	DESCRIPTION	PRIMER	UNDERCOAT	TOPCOAT
A	Epoxy/Polyurethane for Structural Steelwork	Epoxy MIO	Epoxy Mastic	Recoatable Urethane
B	High Build Epoxy for immersed Steelwork	Epoxy	Epoxy	Epoxy
C	Polyurethane Elastomer for abrasive conditions	P.U.	-	Urethane Elastomer

D	Hot dip galvanising for Structural Steelwork	HDG	-	-
E	Coated hot dip galvanising for colour Coating	HDG	Epoxy Primer	Recoatable Urethane
F	Alkyd for indoor non-harsh environment	Zinc Phosphate	Universal Undercoat	HG Alkyd Enamel
G	Ethyl Silicate Inorganic Zinc and Polyurathane enamel for weather and chemical resistance	Ethyl Silicate Inorganic Zinc	Modified Acrylic Copolymer	Polyurathane Enamel
H	Water based epoxy for floors, walls	Impregnation Sealer	WB Epoxy	WB Epoxy
I	Modified Silicone for surface temperatures up to 500ºC	Modified Silicone	Modified Silicone	Modified Silicone
J	Silicone Acrylic for surface temperatures up to 200ºC	Silicone Acrylic	Silicone Acrylic	Silicone Acrylic
K	Anodizing for aluminium handrails	-	-	-
L	Plastic tape wrapping for buried Pipelines	1) Tape-Primer 2) Welds-Polyvinyl Butyral	-	-

The application of these systems is specified under their system title on the following pages.

SYSTEM A

DESCRIPTION:		Epoxy/Polyurethane for Structural Steelwork in atmosphere, splash zone. (pH 5,0 to 8,0)	
SYSTEM SPECIFICATION:		MIO Epoxy Resin based Primer, Amine cured Epoxy Undercoat (with Unlimited Overcoating Time), Twinpack Polyurethane Enamel.	
SURFACE PREPARATION:		SANS 064 Abrasive blast clean to Grade SA 2,5 Blast Profile : 25 - 35 (30) µm. Refer to Clause 6.6.2	
		DFT (µm) Mean SANS TM 141	
PRIMER COAT: One coat MIO Epoxy		50 – 100	75
INTERMEDIATE COAT: One coat Amine cured Epoxy		80 – 200	140
TOP COAT: One coat twin pack recoatable Polyurethane Enamel		25 – 35	30
	TOTAL	155 – 335	245

Note :

1. All repairs to transit or installation damage shall be made good to Engineer's approval.
2. Patch priming to damaged areas should be carried out using Epoxy MIO and then overcoated with the wet paint supplied by the coating manufacturer for repairs.
3. Polyurethane coating is to be the colours specified.
4. Adhere strictly to overcoating times. Refer to data sheets.
5. Top Coat to be applied on Site.

SYSTEM B

DESCRIPTION:	For steelwork immersed in water, H_2S and acid.		
SYSTEM SPECIFICATION:	Two components Polyamide Epoxy Coating.		
SURFACE PREPARATION:	SANS 064 Abrasive blastclean to Grade SA 2,5 Blast profile: 30 - 50 (40) µm. Refer to Clause 6.6.2.		
		DFT (µm) Mean SANS TM 141	
PRIMER COAT: One coat of two component Epoxy Coating		80 – 120	100
INTERMEDIATE COAT: One coat of two components Epoxy Coating		80 – 120	100
TOP COAT: One coat of two component Epoxy Coating		80 – 120	100
	TOTAL	240 – 360	300

Note:

1. Pinhole detection must be carried out prior to service.
2. For colour coding use twinpack polyurethane. Preferably in bands due to possible extended overcoating times.
3. Coats must be of different colours (i.e. pale red oxide/dark red oxide).
4. Repair procedure: Abrade damaged areas back to bare metal and patch prime the area with the primer as above. Feather back at least 25 mm over existing sound paint and apply Repair Coating to specified thickness.

SYSTEM C

DESCRIPTION:	For abrasive or harsh conditions.	
SPECIFICATION:	Polyurethane Primer, Polyurethane Elastomer	
SURFACE PREPARATION:	SANS 064 Abrasive blast clean to Grade SA 3 Blast profile: 60 - 100 (80) µm.	
	DFT (µm) SANS TM 141	Mean
PRIMER COAT: Polyurethane Primer	35	35
INTERMEDIATE COAT: Not Applicable		
TOP COAT: One coat of Polyurethane Elastomer	2 – 4 mm	3 mm

Note:
1. Apply in accordance with manufacturer's instructions.
2. Pinhole detection must be carried out prior to service.
3. Repair procedure: Abrade back to bare metal, repair by patch priming using the patch repair kit supplied by the manufacturer.

SYSTEM D

DESCRIPTION:	For gratings and other steelwork in exposed air and quiescent wet conditions.
SYSTEM SPECIFICATION:	Hot Dip Galvanising.
SURFACE PREPARATION:	Refer to Clause 6.7.1

Note:
1. Repair procedure: Abrade back to bare metal. Apply zinc coating by zinc metal spray to a DFT of 150 micrometers. (Large-scale zinc delamination is unacceptable).

SYSTEM E

DESCRIPTION:	For Colour coding of Structural Steelwork in atmosphere, splash zone and acid to pH 5,0.
SYSTEM SPECIFICATION:	Hot Dip Galvanising, Epoxy Primer, Recoatable Polyurethane.
SURFACE PREPARATION:	Refer to Clause 6.7.1

	DFT (µm) SANS TM 141	Mean
PRIMER COAT: Hot Dip Galvanising		
INTERMEDIATE COAT: Epoxy Primer	40 – 80	60
TOP COAT: One coat Twin Pack Recoatable Polyurethane Enamel	25 – 35	30
TOTAL	65 – 115	90

Note:
1. Repair procedure: Lightly abrade back to bare metal. Apply one coat of zinc rich epoxy primer followed by the system given above.

SYSTEM F

DESCRIPTION:	For coating of equipment not subject to high U.V. radiation, submerged conditions, or any other sort of harsh environment. e.g. equipment situated in a dry enclosure or room	
SYSTEM SPECIFICATION:		
a) uncoated surfaces	Zinc Phosphate Primer, Universal Undercoat. 2 coats High Gloss Alkyd Enamel.	
b) coated surfaces	2 coats High Gloss Alkyd Enamel.	
SURFACE PREPARATION:	To be free of rust, scale, oil, dust, water, lightly abrade.	
	DFT (µm) SANS TM 141	Mean
PRIMER COAT:	60	60
INTERMEDIATE COAT:	35	35
TOP COAT:	35 each	35 each
TOTAL	165	165

Note:
1. Apply in accordance with manufacturer's instructions.
2. Colour to colour code requirements.

SYSTEM G

DESCRIPTION:	For coating of equipment such as fuel and some chemical storage tanks, steelwork exposed to severe atmospheric conditions, coastal conditions.	
SYSTEM SPECIFICATION:	Ethyl silicate inorganic zinc, zinc phosphate based modified acrylic copolymer or approved alternative as a tie coat, polyurethane enamel.	
SURFACE PREPARATION:	SANS 064 abrasive blast clean to grade SA 2,5 Blast profile: 30 – 50 (40) mm Refer to Clause 6.6.2	
	DFT (µm) SANS TM 141	Mean
PRIMER COAT: One coat ethyl silicate inorganic zinc	600 – 100	80
INTERMEDIATE COAT: One coat zinc phosphate based modified acrylic copolymer or approved alternative	50 – 100	70
TOP COAT: Two coats polyurethane enamel	30 – 40 each	35
TOTAL	690 - 280	220

Note:
1. Follow manufacturer's instructions regarding intermediate coat adhesion.

SYSTEM H

DESCRIPTION:	For all floors (except in acidic environment)
SYSTEM SPECIFICATION:	Impregnation Sealer, Water Based Epoxy.
PRIMER COAT:	Impregnation Solvent Free Sealer
INTERMEDIATE COAT:	Solvent Free Epoxy
TOP COAT:	Solvent Free Epoxy

Note:
1. Apply according to manufacturer's specifications.
2. Prepare surface according to manufacturer's specifications.
3. To render non-slip add silica sand or quartz to topcoat.
4. Colour as specified (as available).
5. Repair procedure: Abrade back to substrate, feather back 25 mm either side of damage and apply system in sequence as above.

SYSTEM I

DESCRIPTION:	For surfaces reaching up to 500ºC temperature.	
SYSTEM SPECIFICATION:	Modified Silicone	
SURFACE PREPARATION:	SANS 064 abrasive blast clean to grade SA2,5. Blast Profile: 25 - 35 (30) µm Refer to Clause 6.6.2	
	DFT (µm) SANS TM 141	Mean
PRIMER COAT: 1 coat Modified Silicone	40 - 50	45
INTERMEDIATE COAT:	40 - 50	45
TOP COAT:	40 - 50	45
TOTAL	120 - 150	135

Note:
1. A five-coat system may be applied to 125µm minimum.
2. Apply to manufacturer’s specification.

SYSTEM J

DESCRIPTION:	For surfaces reaching up to 200ºC temperature.	
SYSTEM SPECIFICATION:	Silicone Acrylic	
SURFACE PREPARATION:	SANS 064 abrasive blast clean to grade SA2,5. Blast Profile: 25 - 35 (30) µm Refer to Clause 6.6.2	
	DFT (µm) SANS TM 141	Mean
PRIMER COAT: 1 coat Silicone Acrylic	40 - 50	45
INTERMEDIATE COAT:	40 - 50	45
TOP COAT:	40 - 50	45
TOTAL	120 - 150	135

Note:
1. A two-coat system may be applied to 120 µm minimum.
2. Apply to manufacturer's specification.

SYSTEM K

DESCRIPTION:	For Aluminium handrails exposed to H_2S and lime.
SYSTEM SPECIFICATION:	Anodizing
PROTECTIVE SYSTEM:	Anodize according to SANS 999 Grade AA25.

SYSTEM L

DESCRIPTION:	For buried pipelines.
SYSTEM SPECIFICATION:	Tape Wrapping Systems. Refer to Clause 6.7.2.

Note:
1. Prime the pipe with general tape primer.
2. Weld areas are to be primed with Polyvinyl Butyral

6.9 Tolerances

At least 90% of all thicknesses measured shall comply with the minimum requirements of the specification. No more than 10% of all readings shall be less than 90% of the minimum thickness specified.

DFT in excess of the prescribed maximum shall not necessarily constitute a reason for rejection if the paint film is sound, however, owing to delayed solvent release, blistering could occur under immersion or cold humid (condensation) conditions. Concession for acceptance of values exceeding the maximum specified must be obtained in writing from the Engineer. The Engineer may instruct the Contractor to remove the coating system and re-apply to the correct thickness at no cost to the Client.

6.10 Testing

6.10.1 Quality Assurance Provisions

The Contractor and the Inspection Authority (where applicable) shall maintain full and accurate RECORDS of the work carried out.

6.10.2 Inspection and Phase Clearance

Each phase of the corrosion prevention works may be inspected by the Engineer. However, the responsibility for acceptability of each phase of the work shall remain with the Contractor. If a Contractor accepts the works from another Contractor, he shall in so doing assume responsibility for the works. The onus is on the Contractor to bring defects, which would render the works unsuitable for the operation to be carried out by the Contractor.

Such acceptance of responsibility shall occur at least in the following hand over operations:

Fabrication Contractor/Coating Contractor

Shop Coating Contractors/Site Coating Contractor

6.10.2.1 Inspection of Fabrication Quality

The fabrication quality shall be checked prior to acceptance of the fabrication for coating in terms of rounded edges, smooth weld profiles, chambered corners, freedom from weld spatter and any other relevant items.

6.10.2.2 Inspection of Surface Preparation

The Engineer may make inspections during the cleaning operations and he will also inspect and approve the surface preparation prior to the application of the coating system.

6.10.2.3 Inspection of Film Thickness

The Engineer will check, at his discretion, the dry film thickness of each coat and of the total coating system as specified. If in his opinion insufficient coating thickness has been achieved, the Contractor will be instructed to apply further coats at his own expense.

Thickness testing shall be carried out using a suitable electronic non-destructive thickness-testing instrument. In the case of dispute the Permascope MK ES8, MIOB or Elcometer 256 fully electronic instrument shall be the unit of final determination.

The Engineer will maintain constant checks to ensure that application of materials is according to manufacturer's instructions and according to tile paint standard as specified.

6.10.2.4 Inspection and Testing Holiday Detection

Prior to despatch from the works, the entire hiring and wrapping on each pipe shall be tested by the Contractor to, the Engineer's satisfaction with an approved Holiday Detector fitted with a copper or brass bristle brush detector of suitable form.

They shall exhibit no holidays when tested with an effective voltage of 20 kV at a nominal pulse frequency of not less than 30 Hz.

Prior to lowering each pipe into the trench, the bottom half of the wrapping of the pipe shall be again checked at 20 kV whilst the pipe is in suspension.

The top half of the wrapping shall be checked immediately before backfilling and if instructed by the Engineer, again during actual backfilling operations.

6.10.2.5 Inspection by High Spark Testing

Where a kilovolt meter is not available the voltage may be checked by measuring the length of the spark between the brass brush probe and the earth leads. The method of voltage setting is permitted by BS 3003 Part I and the voltage is calculated as under :

1 mm length of spark	=	1 700 volts
3 mm length of spark	=	5 100 volts
5 mm length of spark	=	8 500 volts
10 mm length of spark	=	17 000 volts
12 mm length of spark	=	20 400 volts

Having set the voltage correctly, select the correct size and type of Brass Brush, assemble the lead, H.T. Cable and connect to the set.

Fix the earth lead firmly to the substrate of the work piece (or conductor mat in the case of concrete units). Switch on and check the operation of the machine by short-circuiting probes to earth wire.

6.10.2.6 Standard Test Voltage - Materials in Normal Use

The specification will normally state the voltage to be used. If the voltage is not specified the following voltages should be used. These settings will ensure correct detection of "Faults to Earth", but will ensure that damage to the linings by high voltage arcing cannot take place.

The Contractor must be informed of the voltage, which will be used during the testing, and his agreement obtained.

6.10.2.7 Final Inspection

The Employer may subject completed paintwork, coating and lining to specialist inspection, the findings of such inspection being binding on the Contractor. The cost of a successful inspection will be borne by the employer and failure will be to the Contractor's cost.

7 COLOUR CODING

All aboveground steelwork, piping, specials, valves etc. are to be colour coded at the final coat as per the following tables.

(Colour Banding in accordance with SANS Code of Practice 0140 Part 3.)

Table 3 Colour Coding of Pipework on Employer's Wastewater Treatment Works

CONTENTS OF PIPELINE	COLOUR CODING INDICATOR		
	BASIC COLOUR	SINGLE BAND	SECOND BAND
Water, Non-drinkable	Brilliant green		
Air saturated effluent		Turquoise blue	Dark violet
Hydraulic power		Salmon pink	
Ploy-electrolyte		Light grey	
Raw sewage		Middle brown	
Settled sewage		Mid grey	
Thickener overflow from :			
Primary sludge		Crimson	
Activated sludge		Canary yellow	
Digested sludge		Maroon	
DAF liquors		Canary yellow	Turquoise blue
Filtrate		Ultramarine	
Washwater		Black	
Scum water		Dark violet	Crimson
Treated effluent		Dark violet	
Dewatering liquors		Black	Ultramarine
Acids : Ferric chloride	Jacaranda	Crimson	
Ferric sulphate		Arctic blue	
Alkalis : Lime slurry	Dove grey	Dark violet	
Gases (other than air, liquefied or gaseous Sludge gas	Light stone	Jacaranda	
Sludges : Anaerobically digested	Royal blue	Maroon	
Anaerobically digested : Thickened		Maroon	Light grey
Lime treated		Dark violet	
Primary		Crimson	
Primary thickened		Crimson	Light grey
Digester supernatant liquor		Salmon pink	
Activated : mixed liquor		Canary yellow	
Activated : gravity thickened		Canary yellow	Dark violet
Activated : return sludge		Canary yellow	Middle brown
Activated : DAF overflow/flood		Canary yellow	Turquoise blue
Activated : primary		Canary yellow	Crimson
Activated : digested		Canary yellow	Maroon

Note : This Table supplements SANS 0140-3:1992.

Table 4 Colour Coding of Electrical Equipment and Mechanical Plant

ITEM	COLOUR	REMARKS
Electrical panels (external)	Light orange	NOSA
Electrical panels (external)		
Emergency power only	Signal red	
Electrical panels (internal)	White	
Coupling guards and motor guards	Golden yellow	SANS 0140 : 2
Motor cowls	Light orange	Historical
Electric motors, pumps and compressors	Deep pastel green	
Gearboxes	Navy light grey	NOSA; See also “small gearboxes”
Blowers		
Baseplates	Deep pastel green	NOSA
Cranes	Olive drab	
Valve bodies	Golden yellow	
Valve handwheels Small gearboxes	To be same colour as prime mover	See SANS 0140-3, Clause 4.2

C3.7 Health and Safety Specifications

PROJECT HEALTH AND SAFETY SPECIFICATION

The attached Project Health and Safety Specification Compiled by Safe Working Practice is a requirement of the Construction Regulations 2014 and is deemed to be an integral and binding part of this Contract.

The Contractor shall comply with all relevant requirements of the Project Health and Safety Specifications and the cost of so doing shall be measured and paid as specified in PSA 8.3.5 and PSA 8.4.6.

C3.8 Construction Environmental Management Programme

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME

The attached Construction Environmental Management Programme (CEMPr) Compiled by Resource Management Services is a requirement of the Environmental Authorisation and is deemed to be an integral and binding part of this Contract.

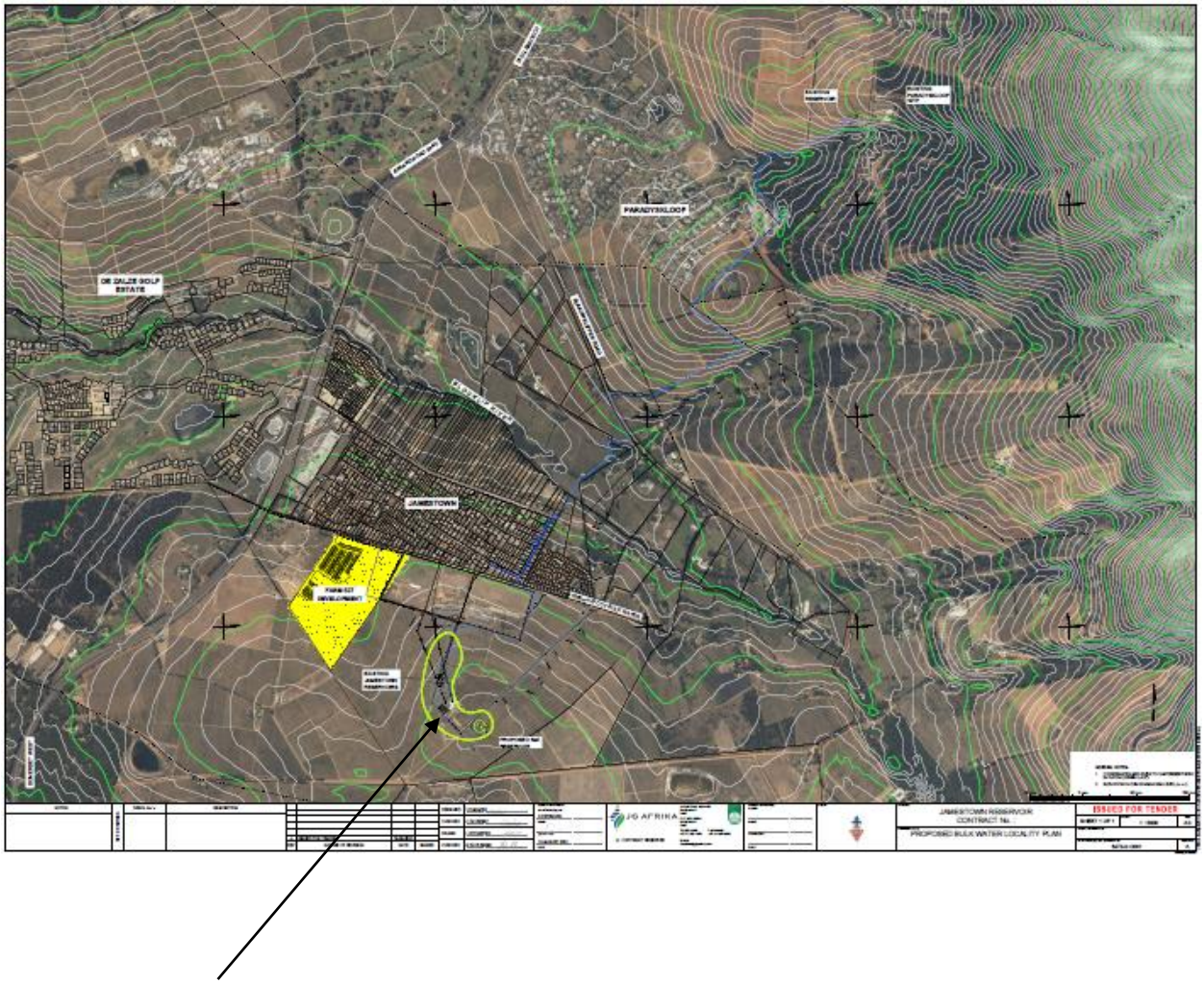
The Contractor shall comply with all relevant requirements of the Construction Environmental Management Programme and the cost of so doing shall be measured and paid as specified in PSA 8.3.6 and PSA 8.4.7.

C3.10 Annexures

CONTENTS

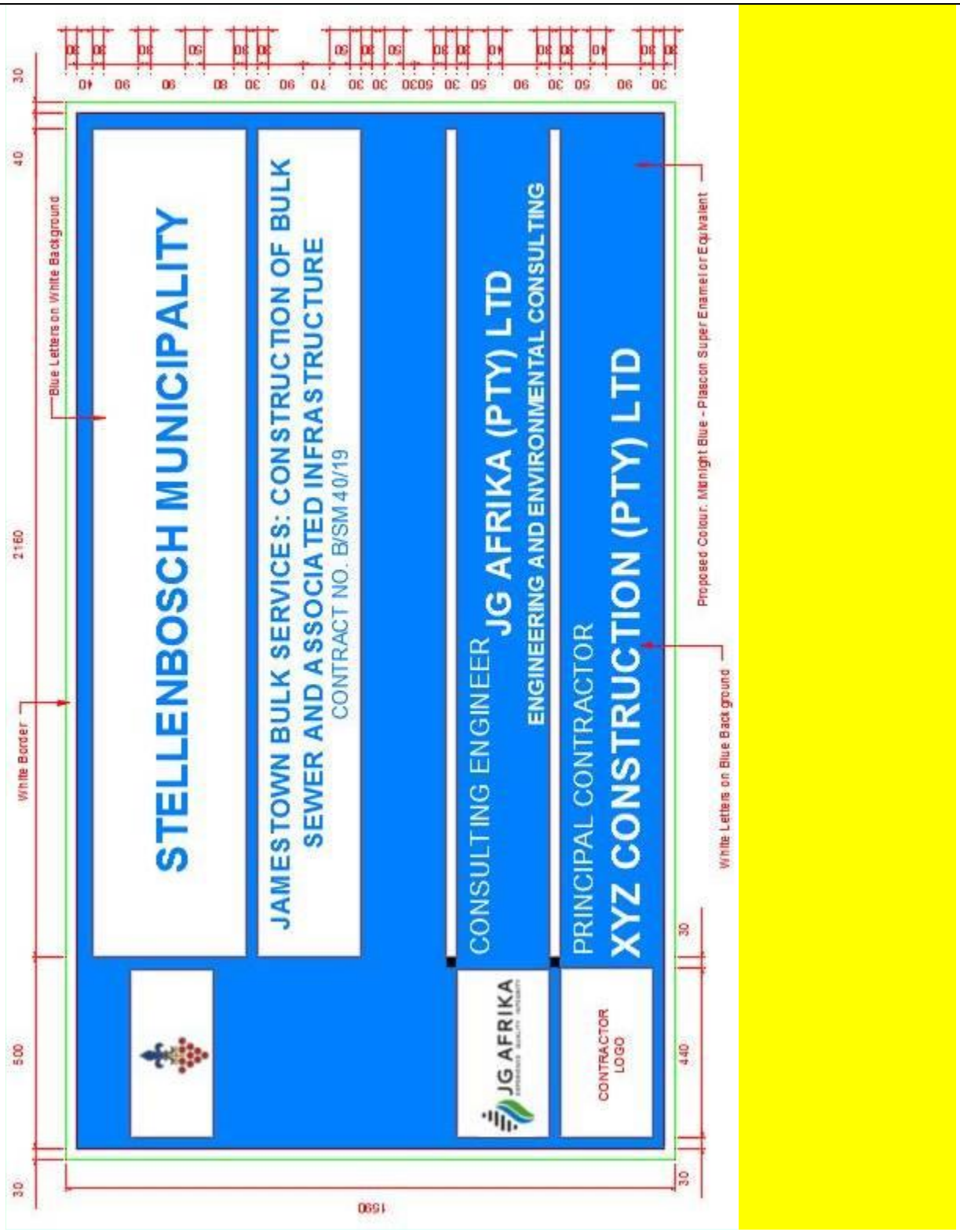
ANNEXURE 1: SITE LOCALITY PLAN

ANNEXURE 2: CONTRACT NAMEBOARD



STELLENBOSCH MUNICIPALITY
CONTRACT NO. B/SM 30/23
JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

ANNEXURE 1: SITE LOCALITY PLAN – AS DWG 5473-0-C001



STELLENBOSCH MUNICIPALITY
CONTRACT NO. B/SM 30/23
JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

ANNEXURE 2: CONTRACT NAMEBOARD – LATEST TO BE PROVIDED

Part C4: Site Information

Pages

C4.1 General Site information 323

C4.2 Geotechnical Report ..... 324 +

C4.1 General Site Information

1. SITE LOCATION AND ACCESS

1.1. Location of The Site

The works are to be executed on a number of different sites in the Stellenbosch area (see Annexure 1: Site Locality Plan in Section C3.10).

Site conditions are described in detail in Section C4: Site Information

1.2. Access

Various existing gravel farm roads provide access to the reservoir site and pipe routes.

2. GENERAL DECRIPTION

The site is located on the edge of the existing Jamestown suburb and spans vineyards and undeveloped rural bush.

The site slopes gently from east to west, towards the R44. There are some minor drainage channels which are likely to be dry in summer.

3. CLIMATE

The site falls within the South Western Cape which experiences moderate climate with winter rainfall and possible high temperatures in summer.

Temperature typically ranges between 5°C and 35°C although higher and lower extremes are possible.
Relative humidity, 20-30% in summer to 100% in winter.

4. GEOTECHNICAL

A geotechnical investigation was undertaken. The report is attached hereto.

5. DISCLAIMER

The site information is provided in good faith for the Contractor's convenience as an indication of the conditions likely to be encountered. The Employer offers no guarantees regarding the information and the provision of such information shall not be regarded as in any way limiting or detracting from the Contractor's responsibilities in terms of the Contract.

STELLENBOSCH MUNICIPALITY

CONTRACT NO. B/SM 30/23

JAMESTOWN 5ML RESERVOIR: CONSTRUCTION OF BULK WATER AND ASSOCIATED INFRASTRUCTURE

C4.2 Geotechnical Report

The attached geotechnical report was done in 2015 and covers the supply pipe route from Paradyskloof WTW up to the reservoir site.

CORE GEOTECHNICAL CONSULTANTS
Engineering Geology and Geohydrology

23 November 2015

Jeffares & Green (Pty) Ltd.
P.O. Box 38561
Pinelands
Cape Town
7430

2. ATTENTION: Mr. F. Rouillard

Dear Francois

3. PROJECT 82-13: PARADYSKLOOF TO JAMESTOWN WATER SUPPLY PIPELINE – GEOTECHNICAL DESK STUDY

1. Introduction and terms of reference

At the request of Mr. F. Rouillard of Jeffares & Green (Pty) Ltd., we have carried out a desk study geotechnical site investigation for the proposed new Paradyskloof to Jamestown Water Supply Pipeline, near Stellenbosch.

The objectives of this investigation may be summarized as follows:-

a) Conduct a desk study to determine site geotechnical conditions, including expected soil profile and groundwater occurrences within the zone of influence of the new Paradyskloof to Jamestown Water Supply Pipeline and its associated structures.

b) Provide preliminary recommendations for the design of foundations and lateral support for the new reservoir, pump stations and relevant design and construction aspects for the new water Supply Pipeline.

2. Site description

The site extends along the proposed route of the new Paradyskloof to Jamestown Water Supply Pipeline and includes the infrastructure associated with this new pipeline. These new bulk service installations include the following:

- A new 5 million litre reservoir on the farm, Stellenrust, near Jamestown.
- A new 355 mm pipeline from Paradyskloof Water Treatment Plant to the new Jamestown Reservoir.
- A new pump station adjacent to the new Jamestown Reservoir.
- The pipeline will also include a pipe bridge crossing the Paradyskloof River and directional drilling for pipeline crossings beneath the Blouklip River and the Blaauwklippen Road.

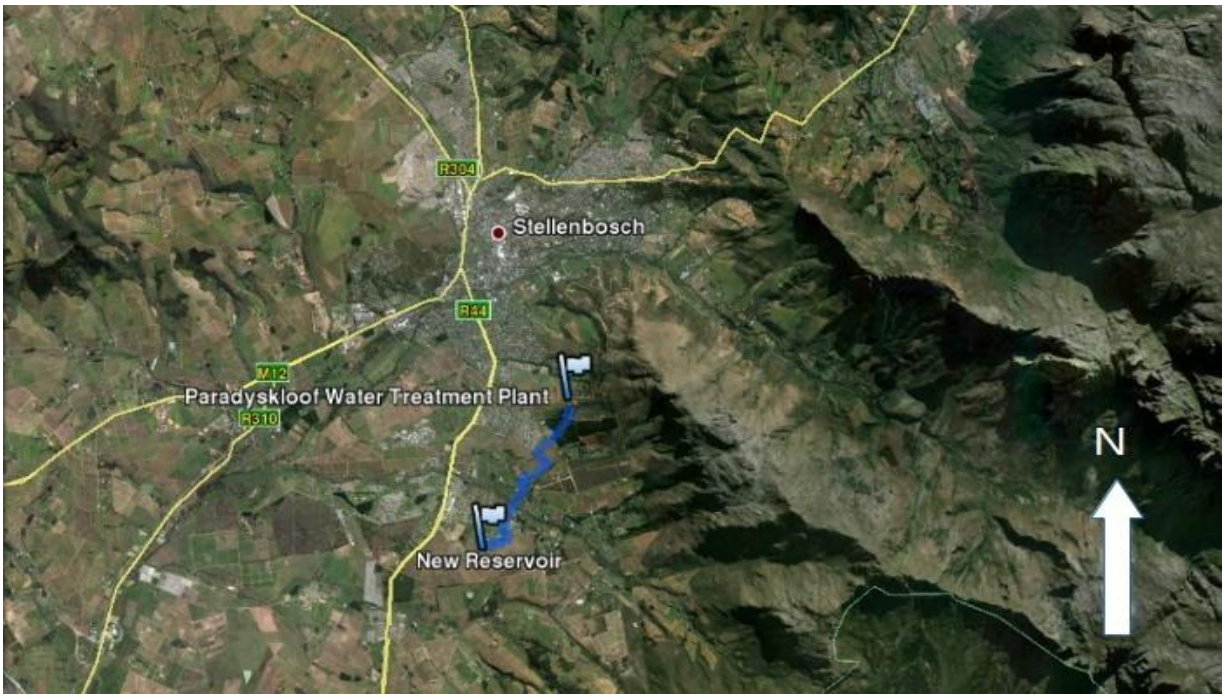
In terms of topography, the pipeline will run from the new reservoir, situated on the top of a hill forming part of the Stellenrust farm, down-slope to the north, through Jamestown and into the valley (the lowest lying elevation of the pipeline route) located just south of the Blaauwklippen Road. Within the valley the pipeline will cross over the Paradyskloof River and below the Blouklip River. From the valley the pipeline will then rise up and cross beneath Blaauwklippen Road and

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CC no. CK96/62430/23 **VAT no:** 4180186159 Core Geotechnical Consultants CC
Members: JRC Yates – MSc.(Eng.Geol.),DIC,BSc(Geol.),MSAIEG,Pr.Sci.Nat., RL Yates – Dip. Coaching & Communication (SACAP), CEA

through farmlands of the Paradyskloof area, before crossing the Paradyskloof Road and heading up to the top of the hill where the Paradyskloof Water Treatment Plant is located.

The locality of the area can be seen in Figure 2.1, while the proposed routes of the new water pipelines can be seen in Figure 2.2



4. Figure 2.1. Locality of the proposed water pipeline.

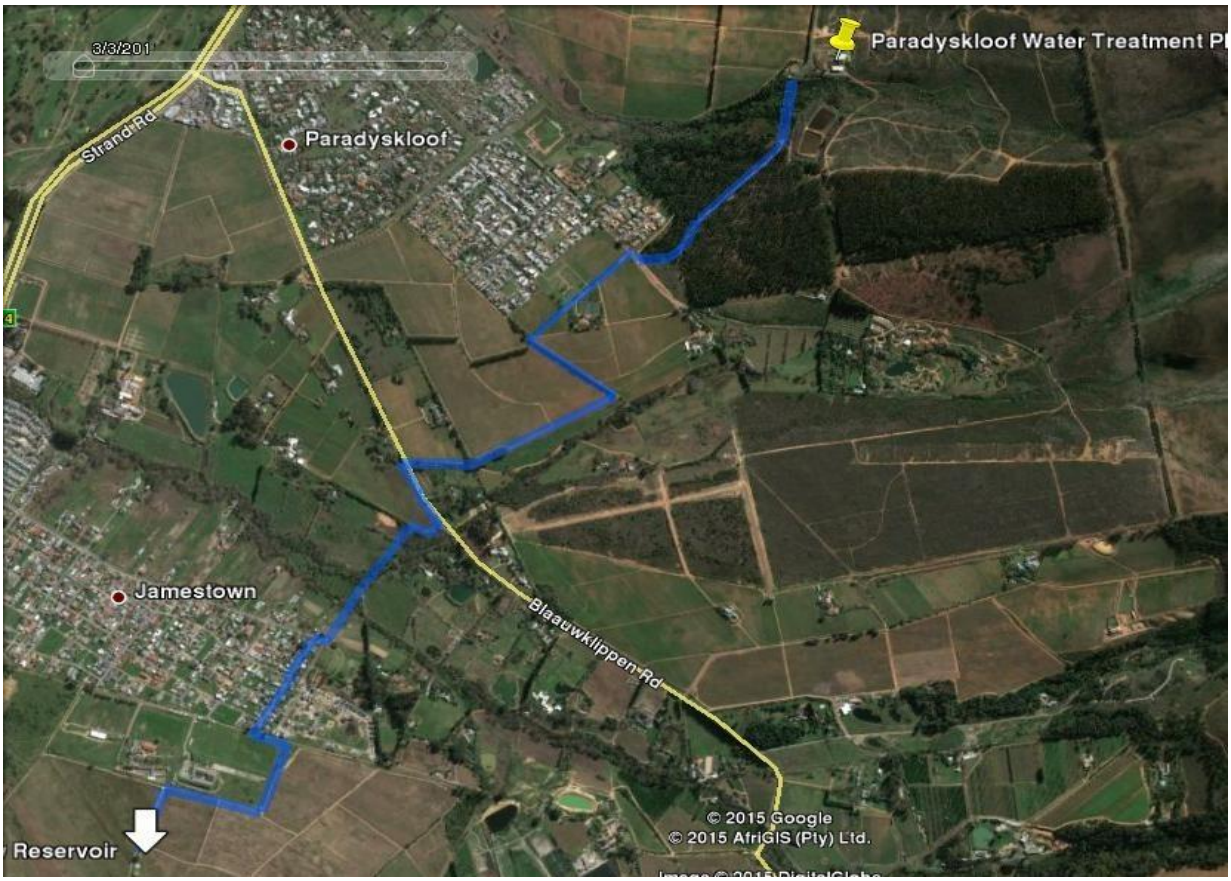


Figure 2.2. Image showing the route of the proposed water pipeline

3. Nature of the investigation

A desk study evaluation of existing geological and geotechnical information, with reference to the site, was conducted to assess the likely geotechnical characteristics of the soils along the pipeline route. The following information was used in this study:-

- Google Earth Remote Imagery
- 1:250 000 Geological series map, Cape Town, 3318.
- Plan and longitudinal sections of the pipeline route overview, provided by Jeffares & Green.
- Brink, ABA (1981). Engineering Geology of Southern Africa Vol. 2. Building Publications
- Brink, ABA (1985). Engineering Geology of Southern Africa Vol. 4. Building Publications
- Phase 1 & 2 Geotechnical Report on the Jamestown Housing Project for BSP Consulting Engineers, prepared by Core Geotechnical Consultants.

A walkover survey of the pipeline route and its immediate surrounds was also also conducted to inspect any soil profile exposures and to confirm the initial findings of the desk study exercise.

4. Site geology and geohydrology

Regionally, the geology of the area consists of weathered coarse porphyritic granite of the Helderberg Pluton, part of the Cape Granite Suite, which intruded into older Malmesbury Group sediments, namely the Tygerberg Formation. The Tygerberg Formation rocks consist of phyllites, greywackes and quartzitic sandstones. These rocks have undergone various degrees of weathering and the resultant residual soils vary in thickness across the area. Both the Helderberg granites and the Tygerberg Formation sediments are expected to be encountered along defined sections of the pipeline route.

Unconsolidated sandy deposits of Quaternary to Recent age, consisting of alluvially and colluvially transported material, are often found to overlie the weathered rock and residual soils, especially alongside the rivers and within valley areas. In some areas the transported soils have been reworked and undergone pedogenesis to form hardpan ferricrete horizons (also known as "koffieklip"), which are also typical of this area.

In terms of the expected geology and the associated geotechnical considerations, the proposed route of the pipeline can be divided into four distinct areas, namely Sections A to D inclusive. These identified sections are shown on the attached site plan (Figure 3) and are discussed in more detail in the following sections

4.1 <u>Section A:</u>

This section runs from the proposed new 5 million litre reservoir at Stellenrust Farm, at the top of the hill, down towards the valley. Surface soils essentially comprise gravelly silty sands and silty sands, underlain in places by a gravelly clayey sandy ferricrete horizon. These colluvially transported and pedogenic soils are expected to vary in total thickness from 0.5 m to more than 2.0 m in certain areas. Sandstone boulders and cobbles may be encountered within the lower lying areas.

The transported soils are underlain by residual granites comprising clayey sandy silts, which are expected to extend to depths in excess of 3.5 m below present ground level.

It is possible for a shallow perched water table to develop at the upper contact of the very low-permeability ferricrete or residual granite soils. However, due to the sloping nature of this section (sloping down towards the north), it is unlikely for perched ground water to develop significantly, and stormwater will tend to drain towards the lower lying valley in the north. There is a risk of soils erosion within this area during heavy rains.

4.2 Section B:

This section of the pipeline runs perpendicularly to and across the direction of the valley floor and includes the lowest lying elevations along the proposed pipeline route. It crosses the natural drainage lines and both the Paradyskloof and Blouklip Rivers running along the valley floor. Soils of this area are characterized by deeper, alluvial sandy, silty and clayey soils. Subrounded sandstone boulders and cobbles are also expected within the alluvial profile. Alluvial soils are expected to vary in thickness from 1.0 m to greater than 2.5 m deep in places. Similarly to Section A, these soils are expected to be underlain by residual granite soils, but with a much deeper weathering profile.

A shallow perched water table is expected within 1.0m-1.5m of surface within these flatter lying areas. Marshy and flooded areas may also develop adjacent to the drainage lines and rivers that flow along the valley floor.

4.3 Section C:

Over this section, the pipeline rises up from the valley floor as it trends towards the north. In terms of geology, Section C will probably be similar to Section B, but due to the sloping nature of this section, it is unlikely that the alluvial soil horizon will be deeper than 1.5m. Pedogenic ferricretes may also be encountered within this area. The alluvial soils may be underlain by either residual granite soils or by residual shale soils / highly weathered shale rock of the Tygerberg Formation.

It is possible for a perched water table to develop within 1.5m of ground surface at the lower contact of the alluvium during wet winter periods. Due to the sloping nature of this section, sloping down from the north towards the south, it is however more likely that water will tend to drain towards the natural drainage line (Blouklip River) located just south of this section. This does carry a risk of soil erosion.

4.4 Section D:

This final section of the pipeline continues to rise in elevation as it proceeds northwards, culminating at the Paradyskloof Water Treatment Plant located at the top of a small hill. The upper geology from surface is expected to be similar to Section A, with gravelly silty, clayey and sandy colluvium at surface with variable sized and amounts of scattered sandstone boulders, cobbles and gravel. The colluvium is expected to be underlain by discontinuous lenses of pedogenic ferricrete horizons of variable thickness. The colluvium and ferricrete is expected to have a total thickness of between 0.5m to 1.5m.

As seen in the regional geology (see site plan - Figure 3), the transported colluvium in this area is underlain by weathered rock of the Tygerberg Formation, consisting of mostly phyllite, shale and possibly quartzitic sandstone. The degree of weathering of these rocks will vary but a "residual zone" consisting of sandy silts and clays of at at least 1.0m thick, is expected.

It is possibly for a shallow perched water table to develop at the upper contact of the residual soils, but as in Section A & C, due to the sloping nature of the topography in this area, it is more likely that surface water and groundwater will drain downslope towards the south. There is also a risk of soil erosion in this area.

5. Geotechnical evaluation

The following geotechnical aspects of the site are pertinent to the proposed development: -

a) The gravelly, clayey and sandy transported colluvial soils likely to be found at surface in Section A & D are expected to be moderately to highly compressible, with relatively low strength within the upper 0.5m-1.5m, depending on the thickness of this horizon. Some form of recompaction would improve strength and compressibility characteristics where required.

b) The gravelly and sandy alluvial soils occurring at surface in Section B are expected to be highly compressible with low strength to depths of up to 2.0m. These soils are unsuitable for founding in their current state. These soils occur mostly within the preferential drainage lines (Paradyskloof River and Blouklip River) of the valley floor and a high water table is expected in places resulting in saturation of these soils. The alluvial soils in Section C are expected to have a high to moderate compressibility and low strength within the upper 1.5m. A course sandstone boulder and cobble fraction may also be present within the alluvium in certain areas, probably with an associated improved strength.

c) The underlying weathered residual granite soils (Section A & B) are expected to be moderately compressible, with moderate strength . These soils are clayey and relatively fine-grained and with moderate plasticity. Plasticity Index (PI) values in the range 15-25, can be expected. These soils can typically be considered to be potentially moderately expansive due to this plasticity, at least in the upper 0.5 m of the residual profile. These soils will typically form a competent load-bearing founding horizon, provided appropriate design precautions are taken to cater for possible minor heave movements.

d) The weathered shale (Section C & D) is expected to have a moderate compressibility within the upper 0.5-1.0m, with consistency improving with increasing depth. A low to moderate plasticity, with Plasticity Index (PI) values in the range 8-15, is expected. These soils most probably have a low potential for heave.

e) In terms of material properties, the sandy and gravelly transported soils (colluvial and alluvial) are granular and of low plasticity. Post-compaction strength can be expected to be low to moderate and will be improved by the presence of the more gravelly pedogenic soils (Section A, C & D). These soils should form a construction material of general fill and selected layer quality (G7-G9). The presence of sandstone boulders and cobbles may make excavation and recompaction difficult and would either require selecting out of coarse fraction material, or crushing. Both the underlying more plastic and fine-grained residual granite soils and residual shale soils are expected to form poor construction materials, with low recompacted strength and poor workability.

f) The nature of the sandy and gravelly soils at surface in sloping parts of the site, indicates that they may be susceptible to erosion by water, even though they are of low plasticity.

g) No particular excavation problems are anticipated within the colluvial and alluvial soils. The residual granite and shale tend to have a deep weathering profile and no difficulties in excavation are anticipated to depths of at least 3.5m below surface. Excavation within the drainage lines within the valley floor (Section B) could well be difficult, due to the saturated nature of the loose sandy soils and their tendency to "run" or liquefy when disturbed.

h) Previous testing in the area indicated the transported soils (colluvial and alluvial) are slightly acidic (pH 5.2), but exhibit low conductivity (13-14mS/m). The residual shale is expected to have a low conductivity and be fairly neutral in terms of pH (6-8). The residual granite soils also exhibit low conductivity (7-15mS/m), but are somewhat more acidic (pH 3.70). Deleterious effects on buried services are thus possible, particularly where the water table is shallow. Corrosion protection to pipelines may thus be required. Sound and dense concrete should be used in foundations, possibly with a sacrificial cover to steel reinforcing, in view of the acidic nature of the granitic soils.

6. Recommendations for design and construction

6.1 Excavation classification with respect to services

Excavation in all transported soils, as well as in residual soils, to a depth of at least 3.5m, should classify as "soft excavation" in terms of the SABS 1200 D Earthworks Specification. With depth, completely weathered, very soft rock shale and granite (where applicable) may be encountered.

Excavation within these soils should classify as "intermediate excavation" to a depth of 4-5m. In practice, these materials can be excavated and worked using conventional earthmoving equipment, with larger plant such as tracked excavators equipped with rock-buckets, possibly required for excavations deeper than 3.5m. It is unlikely that any hard rock, requiring blasting, will be encountered.

Excavations deeper than 1.5m will require shoring or battering of side-walls to at least 45° to the horizontal, for safety reasons. No particular excavation difficulties are thus foreseen, except within and adjacent to drainage line areas within the valley, where strong seepage and ingress of water into excavations can be expected. Sidewalls can be expected to slump to a stable angle of approximately 30° to the horizontal, in these wet conditions. Where necessary, raveling of battered slopes due to water ingress could possibly be controlled using sandbagging. It should be possible to control seepage inflows during earthworks, and within excavations, with conventional pumping from sumps. For strong inflows, one may need to consider well-pointing to limit groundwater inflows, if deep trenching is required.

6.2 Material usage

As indicated above, the sandy and gravelly transported soils (colluvial and alluvial) are probably granular and of low plasticity. Post-compaction strength can be expected to be low to moderate and will be improved by the presence of the more gravelly pedogenic soils (Section A, C & D). These soils should form a construction material of general fill and selected layer quality (G7-G9).

The possible presence of sandstone boulders and cobbles may make excavation and recompaction difficult and would either require selecting out of coarse fraction material (or crushing) if this material is to be used as backfill material .

Both the underlying more plastic and fine-grained residual granite soils and residual shale soils are expected to form poor construction materials, with low recompacted strength and poor workability. These soils should preferably not be used as general backfill to trenches.

It appears to be unlikely that material conforming to the SANS specifications for pipe bedding will be located on site. The implication is that pipe bedding material would need to be imported.

6.3 Foundation recommendations and solutions

i) New reservoir and adjacent pumpstation

- According to the plans the new 5 million litre reservoir as well as a new adjacent boster pump station will be constructed at the Stellenrust farm.
- The new reservoir will be found on a level cut terrace excavated between 1.6m (downslope side) to 3.1m (upslope side) below current ground level. Founding soils are thus expected to be stiff to very stiff residual granites.
- Excavation sidewalls for both the reservoir and the pumpstation will require battering to at most 35° to the horizontal within the colluvium, and to at most 45° to the horizontal within the residual granite, to provide temporary lateral support to the excavation. Due to its location at the top of a hill, it is unlikely that de watering of excavations will be required in this area. If encountered, it should be possible to control seepage inflows during earthworks, and within excavations, with conventional pumping from sumps.
- Bearing capacity of the medium dense colluvium is estimated to be, at most, 120kPa. For the stiff to very stiff residual granites, maximum allowable bearing capacity is estimated at around 200kPa. These preliminary design parameters would however need to be confirmed with detailed site investigation.

- The reservoir could be founded on a steel-reinforced concrete ring beams, or alternatively on a stiffened concrete raft foundation.
- If possible, it is recommended that the entire pump station be founded within the moderately compressible residual granite soils. Otherrwise recompaction of the upper colluvial soils would be required for sections of the pump station founded within these soils.
- The structures would need to be designed for moderate heave movements within the residual granite soils and possibly minor settlement, depending on final loads.
- It is recommended that an additional investigation, involving test pitting, DPL (dynamic probe light)/ DPSH (dynamic probe super heavy) testing and laboratory testing be conducted for these structures.

ii) New Pipe bridge crossing the Paradyskloof River

- Plans show that the new pipeline will cross the Paradyskloof River on a pipe bridge.
- Soils in this area (Section B) are expected to be deep (>2.0m), highly compressible alluvial soils
- Due to its locality adjacent to the river, a shallow water table is expected. Alluvial soils will most likely be saturated and recompaction of these soils will be difficult. Excavations will most likely also experience strong seepage.
- One possible founding option for the pipe bridge would be to use bases and columns, founded on deeper less compressible alluvium. Excavations for bases will most likely require shoring and de-watering due to the saturated cohesionless soils expected. Alternatively, one could possibly found using ring caissons, sunk to founding depth using standard caisson construction methods. De-watering would probably be carried out from inside the caisson, with material excavated using a grab bucket or via hand excavation. Once the caissons reach final level, a plug of concrete is placed or tremied in and the caisson can then be de-watered. Otherwise one could consider installing relatively low capacity piles.
- It is not clear at this stage what the potential is for scour of foundations during river flood events. If the risk of scour exists, this aspect will have to be addressed.
- It is recommended that an additional investigation involving test pitting, DPL probe and DPSH deep probe testing be conducted to confirm soil and groundwater conditions and to facilitate design of foundations.

iii) <u>Horizontal directional drilling (HDD)</u>

- In order for the pipeline to cross beneath both the Blouklip River and the Blaauwklippen Road, it is intended to use directional drilling.
- Depending on whether the drilling method to be used has a soils removal process, a certain minimum depth of cover may well be required to prevent surface heaving. The ratio of depth of cover to pipe diameter may vary from 5:1 to 10:1
- A minimum drilling depth of 1.5m below road level is recommended to avoid any existing services on the Blaauwklippen Road site).
- Drilling through the alluvium may encounter sandstone boulders and cobbles. This may influence drilling trajectory and drilling cost.

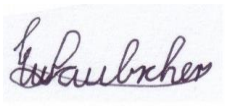
- A certain clearance area is needed on either side of the road to achieve the correct entry and exit angle, which may require additional earthworks in the form of jacking/drilling and receiving pits.
- Drilling mud such as bentonite may be required to stabilize the boreholes in the saturated sandy soils especially at the Blouklip River site.

We trust that this report meets your present requirement and would be pleased to discuss any aspects with you.

Kind regards



5. JOHN YATES



EUGENE LAUBSCHER

encl. Site plan

Key

Nt — **Tygerberg Formation-** Phyllite/greywacke/quartzitic sandstone

N-CK — **Cape Granite Suite-** Porphyritic granite of the Helderberg Pluton

Qqg — **Transported(colluvium)-** gravelly clay sandy soils

Transported(alluvium)- Clayey/sand/silty soils

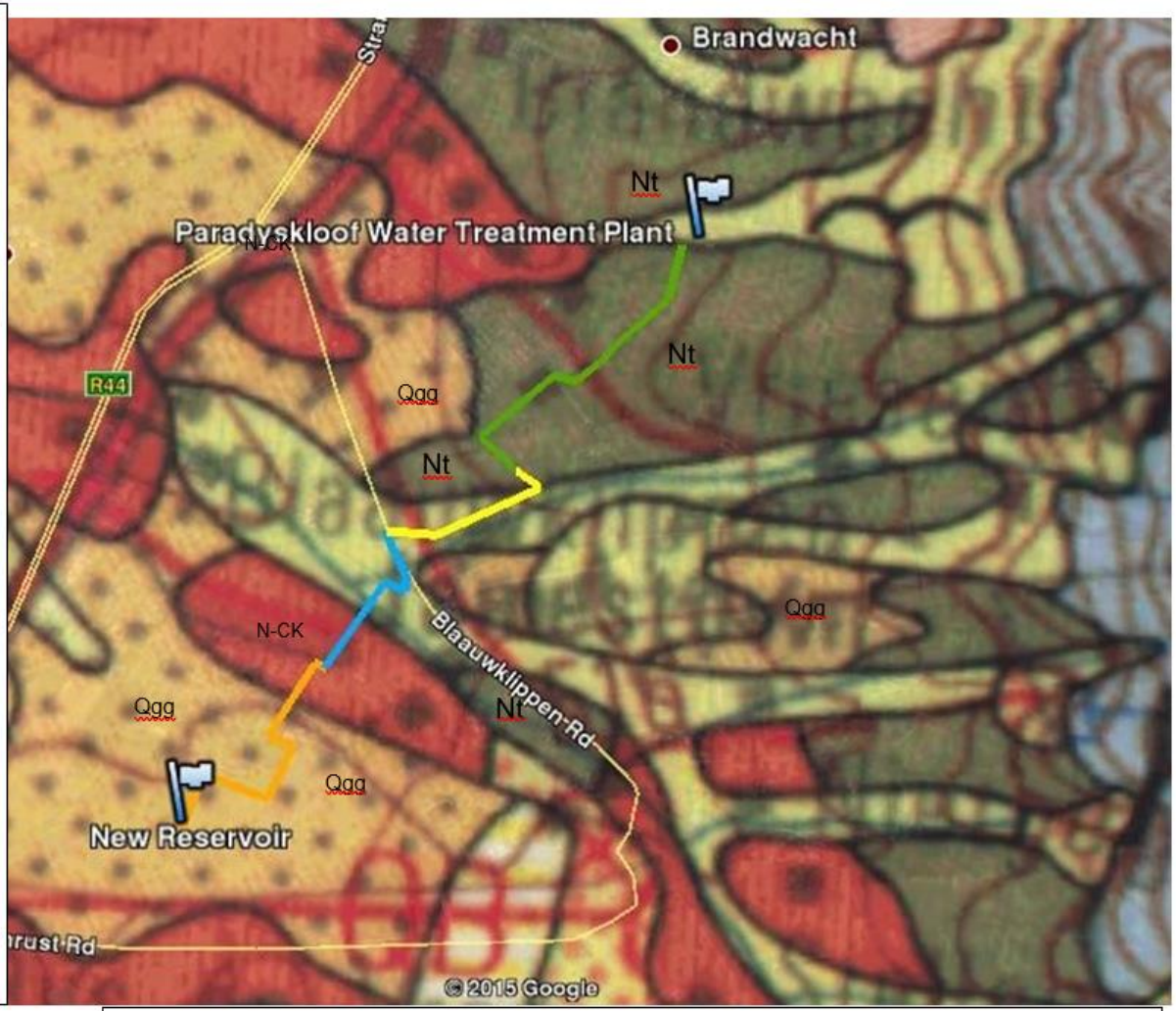
Subdivided sections of proposed water pipeline:

SECTION A

SECTION B

SECTION C

SECTION D



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CLIENT: Jeffares & Green (Pty) Ltd									
PROJECT: Jamestown Bulk Services-Rising water main.									
TITLE: Site plan showing regional geology along the proposed pipeline route									
DATE:	19-11-2015	**SCALE:**	NTS	**TRACED BY:**	EL	**FIG.NO.**	3	**JOB NO.**	82-13

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