Ugu District Municipality

CONTRACT UGU- 07-1661-2024
UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

CIDB CONTRACTOR GRADING 7CE OR HIGHER

VANGISA PROJECTS
CONSULTING ENGINEERS & PROJECT MANAGERS

COMPILED BY:
Vangisa Projects (Pty) LTD
Ridge Park Office
45 Ridge Road
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ON BEHALF OF:
Ugu District Municipality
96 Marine Drive
Oslo Beach
4240

Tel Nº: +27 39 688 5791
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JUNE 2024

NAME OF TENDERER	
ADDRESS OF TENDERER	
TELEPHONE	
FAX	
TENDER SUM	
TIME FOR COMPLETION	

TENDER CLOSING DATE: 12:00 FRIDAY, 26 JULY 2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

TABLE OF CONTENTS

CONTRACT: UGU-07-1661-2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

PART T1: TENDERING PROCEDURES

TABLE OF CONTENTS

T1.1: Tender Notice and Invitation to Tender

Ugu District Municipality

CIDB CONTRACTOR GRADING
7CE OR HIGHER

CONTRACT: UGU-07-1661-2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

The Ugu District Municipality invites tenders for the upgrade of Harding Sewer Reticulation System & Refurbishment of the Wastewater Treatment Works. It is estimated that tenderers should have a CIDB registration of 7CE or higher. Joint Ventures or potentially emerging enterprises who satisfy the criteria stated in the tender data, are eligible to tender.

The tender will be evaluated on Functionality, Price and Preference. Minimum points of 70% must be obtained for eligibility. Bids scoring less than 70% will not be evaluated further. The following, will form the criteria to be utilised for functionality assessment:

Description	Maximum Allocated Points
Experience of Bidder with respect to similar projects	50
Experience of Key Personnel (Construction Manager/ Site Agent)	10
Experience of Key Personnel (Foreman)	10
Construction Methodology and Preliminary Programme	10
Financial Capacity	10
Machinery/Equipment availability	10
TOTAL MAXIMUM POINTS	**100**

Ugu District Municipality subscribes to the Preferential Procurement Regulations **2022**, pertaining to the Preferential Procurement Policy Framework Act (PPPFA) principles whereby a bidder's submission will be evaluated according to the sum of the award of points in respect of the tender value and **Specific Goals**.

Price and Preference will be used for evaluation. The 80/20 preferential point system will be applicable, with 80 points for price and 20 points for Specific Goals (See table below), in terms of revised Preferential Procurement Regulation in effect from 16 January 2023 Gazette Notice No. 47452 dated 04 November 2022.

Points to be allocated will be on the basis of the following:

	Categories	Weight	80|20	90|10
1	Ownership	50%	10	5
2	Empowerment	20%	4	2
3	Reconstruction & Development Programme	20%	4	2
4	Other (Specify)	10%	2	1
	Total	**100%**	**20**	**10**
#	**Specific Goal(s)**	**Weight**	**80|20 PP**	**90|10 PP**
	Ownership Categories:			
1	**Broad Based Black Economic Empowerment:**			
	BBBEE Level 1	100%	10	5
	BBBEE Level 2	80%	8	4
	BBBEE Level 3 to 8	40%	4	2
	Empowerment			
2	**Sub-Contracting: [Min 5% for >R5 Million] [Max 30% < R30 Million]**			
	1. an EME or QSE which is at least 100% owned by black people;	100%	4	2
	2. an EME or QSE which is at least 51% owned by black people;	50%	2	1
	3. an EME or QSE which is at 25% - 50% owned by black people;	25%	1	0.5
3	**Promotion of Local Business(s) - RDP**			
	1. Enterprise Located within the District Municipality - Rural	100%	4	2
	2. Enterprise Located within the District Municipality - Urban	75%	3	1.5
	3. Enterprise Located within the Province	25%	1	0.5
4	**Other Specific Goals**			
	1. Enterprise 100% owned by Youth/Women/Disabled/ Military Veterans	100%	2	1

The physical address for collection of a limited number of tender documents is Ugu District Municipality Offices at 96 Marine Drive, Oslo Beach, 4240. No documents will be distributed at the tender briefing meeting.

Documents may be collected during working hours as from **Tuesday, 25 June 2024**. A non-refundable tender deposit of R1000.00 payable in cash or by bank guaranteed cheque made out in favour of the Ugu District Municipality is required on collection of the tender documents.

Tender Documents will also be available on the Ugu District Municipality website: www.ugu.gov.za and the e-Tender Portal for free downloading by Tenderers as from **14h00 on Tuesday, 25 June 2024.**
Queries relating to the issue of these documents may be addressed to Mr Sizwe Msani of Vangisa Consulting Engineers & Project Managers, Telephone No.: 031 882 3861, Fax No.086 522 2152: , email: sizwe@vangisap.co.za

A compulsory tender briefing meeting will be conducted by the Engineer on **Thursday, 27 June 2024, meeting at 10h30 at the UGU Municipality Oslo Beach Offices** (coordinates 30° 19' 38.31"S and 30° 19 '54.28"E). Tenderers are to note that the certificate of attendance at the tender briefing will be strictly signed by the designated official on site during the site inspection and at no other place.

Tenders may only be submitted on the tender documentation that is issued. Those bidders that download documents must ensure that they follow the standard CIDB colour coding requirements when compiling their submission.

Completed tender documents complying with the conditions of tender must be sealed and endorsed **"CONTRACT No: UGU-07-1661-2024"** and must be deposited in the official tender box in the foyer of Ugu District Municipality Offices at **Phase 2 Building, 96 Marine Drive, Oslo Beach,** by no later than **12:00 on Friday, 26th July 2024.**

Kindly note the following:

- *The Ugu District Municipality does not bind itself to accept the lowest or any tender.*
- *No employee of the state is permitted to conduct any business whatsoever, either directly or indirectly, with the Ugu District Municipality*

Tenders submitted are to remain valid for 90 days from the closing date for submission of tenders.

Mr VO Mazibuko
Acting Municipal Manager
Ugu District Municipality

T1.2: Tender Data

The Conditions Of Tender are the Standard Conditions of Tender as contained in Annex F of the September The legislated Standard Conditions of Tender as published in Board Notice 62 of 2004 in Government Gazette 2647 of 9 June 2004 and amended by:

1. Board Notice 67 of 2005 in Government Gazette No 27831 of 22 July 2005;
2. Board Notice 99 of 2005 in Government Gazette No 28127 of 14 October 2005;
3. Board Notice 93 of 2006 in Government Gazette No 29138 of 18 August 2006;
4. Board Notice 8 of 2008 in Government Gazette No 30692 of 1 February 2008; and
5. Board Notice 12 of 2009 in Government Gazette No. 31823 of 30 January 2009.
6. Board Notice 86 of 2010 in Government Gazette No. 33239 of May 2010.

are for ease of reference included herein in their entirety. In case of any discrepancies, the gazetted version takes precedence.

The standard conditions of tender are included separately after the Tender Data

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

Clause Number	Description
F.1.1	The Employer is **Ugu District Municipality**
F.1.2	The tender documents issued by the employer comprise: T1.1 Tender Notice and Invitation to Tender T1.2 Tender Data T2.1 List of Returnable Documents T2.2 Returnable Schedules **Part 1: Agreements and Contract Data** C1.1 Form of offer and acceptance C1.2 Contract data C1.3 Form of Guarantee C1.4 Adjudicator's Contract **Part 2: Pricing data** C2.1 Pricing instructions C2.2 Activity schedules / Bills of Quantities **Part 3: Scope of work** C3 Scope of work **Part 4: Site information** C4 Site information **Part 5: Drawings** C5 Drawings

Clause No.	Description
F.1.4	The Employer's Agent's (also referred to as the Engineer) details are as follows: Name: Vangisa Projects (Pty) LTD Address: Ridge Park Office 45 Ridge Road Hillcrest 4001 Tel N^0: +27 31 882 3861 Fax N^0: Mr Sizwe Msani Contact Person Email: sizwe@vangisap.co.za
F.2.1	The following tenders who are registered with the CIDB or are capable of being so registered prior to the evaluation of submissions, are eligible to submit tenders. a) contractors who have a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a **7CE** class of construction work; and b) contractors registered as potentially emerging enterprises with the CIDB who are registered in one contractor grading designation lower than that required in terms of a) above (**i.e. 7CE PE**) and who satisfy the following criteria: • They can demonstrate they have the financial resources to undertake the work being tendered for • They have priced documents fairly and can demonstrate the basis of pricing of items where in the Engineer's opinion the pricing is unbalanced. • They can demonstrate that they have experienced personnel to manage the work being tendered for. c) Joint ventures are eligible to submit tenders provided that: 1. Every member of the joint venture is registered with the CIDB. 2. the lead partner has a contractor grading designation in the CE class of work 3. The combined contractor grading designation calculated in accordance with the Construction Industry Board Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for **7CE** class of construction or a value determined in accordance Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations.
F2.7	The arrangements for a compulsory briefing meeting are: Location **UGU Municipality Offices, Oslo Beach Phase 2 Building** Coordinates **30° 19' 38.31"S and 30° 19 '54.28" E** Date **Thursday, 27 June 2024** Starting Time **10H30** Tenderers must sign the Attendance Register in the name of the tendering entity. Addenda will be issued to and tenders will be received only from those tendering entities appearing on the Attendance Register.

F2.12	If a tenderer wishes to submit an alternative offer, the only criteria permitted for such alternative tender offer is that it demonstrably satisfies the Employer's standards and requirements, the details of which may be obtained from the Employer's Agent. Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data must be submitted with the alternative tender offer to enable the Employer to evaluate the efficacy of the alternative and its principal elements, to take a view on the degree to which the alternative complies with the Employer's standards and requirements and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence and must clearly reflect all design assumptions in the development of the pricing proposal. Acceptance of an alternative tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the tenderer, in the event that the alternative is accepted, to accept the full responsibility and liability that the alternative offer complies in all respects with the Employer's standards and requirements. The modified Pricing Data must include an amount equal to 5% of the amount tendered for the alternative offer to cover the Employer's costs of confirming the acceptability of the detailed design before it is constructed.
F.2.13.5 F2.15.1	The employer's address for delivery of tender offers and identification details to be shown on each tender offer package are as follows: Location of Tender Box: **Foyer of Ugu District Municipality Offices, Phase 2 Building** Physical Address: **96 Marine Drive, Oslo Beach** Tender Documents Endorsed: **Contract: UGU- 07-1661- 2024**
F.2.13 F.3.5	A two-envelope procedure will not be followed.
F.2.15	The closing time for submission of tender offers is **12h00** on **Friday, 26 July 2024.**
F.2.15	Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be acceptable.
F.2.16	The tender offer validity period is eight (13) weeks (90 days) from the tender closing date
F.2.23	The tenderer is required to submit with his tender: 1) either a copy of the Certificate of Contractor Registration issued by the Construction Industry Development Board or a computer printout confirming the registration of the tenderer. ***The tenderer has the responsibility to ensure that his/her details are reflected correctly on the CIDB Website, which may be used for confirmation.*** 2) Copies of company registration documents. 3) An original valid Tax Clearance issued by the South African Revenue Services. 4) Copies of ID documents of Shareholders/Members/Directors of the business enterprises. 5) The BBBEE compliance certificate issued by an accredited Institution or sworn SMME affidavit 6) Proof of address in the form of Municipal Rates Invoice or copy of signed lease agreement or original stamped letter from Ward Councillor. 7) Skills Development Levy Certificate 8) Unemployment Insurance Fund Certificates 9) Workman's Compensation Registration Certificate (or Proof of Payment of contributions in terms of the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993
F.3.4	The time and location for opening of the tender offers are: Time: **12h00** Date: **Friday, 26 July 2024** Location: **Tender Box, Foyer of Ugu District Municipality Offices, Phase 2 Building, 96 Marine Drive, OSLO BEACH.**

F.3.11 The procedure for the evaluation of responsive tenders is **Method 2** with the 80/20 Preference Point System. Tenderers will be scored for quality first and only those tenders that meet the specified minimum total score for quality will be considered further. These tenders will then be evaluated on the basis of the 80/20 Preference Points System.

Method 4: Financial Offer, Quality and Preferences

(a) Quality
The score for quality is to be calculated using the following formula:

$$W_Q = W_2 \times S_o / M_s$$

where:
W_2 = is the percentage score given to quality and equals **100**
S_o = is the score for quality allocated to the submission under consideration
M_s = is the maximum possible score for quality in respect to the submission, which equals **100**

The quality will comprise scores for the following based on criteria indicated in the respective tender returnables and summarised as follows:

Description	Maximum Allocated Points
Experience of Bidder with respect to similar projects	50
Experience of Key Personnel (Construction Manager/ Site Agent)	10
Experience of Key Personnel (Foreman)	10
Construction Methodology and Preliminary Programme	10
Financial Capacity	10
Machinery/Equipment availability	10
TOTAL MAXIMUM POINTS	**100**

The score for quality can be further broken down per individual criteria as follows:

Key Aspect Criterion	Basis for points allocation	Score	Maximum Points	Verification Method
Experience of Bidder	Five completed water projects with similar scope of works and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M	Very Good	50	A set of certified copies of Letter of Appointment, Reference letters and Completion Certificate per project
	Four completed projects with similar scope of works and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M	Good	40	

		Three completed projects with similar scope of work and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M	Fair	30	
		Two completed projects with similar scope of work and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M	Poor	20	
		One completed projects with similar scope of work and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M Poor 10	Very Poor	10	
		No response/no similar water project completed.	Dismal	0	
	Experience of Key Personnel (Construction Manager/Site Agent	10 or more years' experience of the Construction Manager/ Site Agent with a minimum qualification of a BSC Civil Eng /Btech Degree in Civil Engineering	Very Good	10	Curriculum Vitae and Certified Copies of Qualification certificates
		7-9 years' experience of the Construction Manager/Site Agent with a minimum qualification of a BSC Civil Eng /Btech Degree in Civil Engineering	Good	7	
		2-6 years' experience of the Construction Manager/Site Agent with a minimum qualification of a BSC Civil Eng /Btech Degree in Civil Engineering	Fair	3	

		Construction Manager/ Site Agent proposed does not fit the above requirements. (Less than 2 year's experience)	Poor	0	
	Experience of Key Personnel (Foreman)	10 or more years' experience of the Foreman with a minimum qualification of NQF Level 5 "Manage Labour-Enhanced Construction Processes and National Diploma in Civil Engineering	Very Good	10	Curriculum Vitae to be attached with traceable references
		7-9 years' experience of the Foreman with a minimum qualification of NQF Level 5 "Manage Labour-Enhanced Construction Processes and National Diploma in Civil Engineering	Good	7	
		2-6 years' experience of the Foreman with a minimum qualification of NQF Level 5 "Manage Labour-Enhanced Construction Processes and National Diploma in Civil Engineering	Fair	3	
		Foreman proposed does not fit the above requirements (Less than two (2) years' experience)	Poor	0	
	Construction Methodology and Preliminary Programme Construction Methodology (relevant to the tendered project. The methodology and preliminary programme must	Construction Methodology met all the requirements. The methodology is precise and specific to this project and preliminary programme has correct linkages to relevant activities	Very Good	10	Construction Methodology And Preliminary Programme
		Construction Methodology and preliminary sub tasks	Good	7	

	include the following sub-headings: Approach Method, Time Frames, Activities (in construction sequence), Construction Administration, Quality Management, Health and Safety	are in line with the scope of works.			
		Construction Methodology and preliminary programme are generic for similar works	Fair	3	
		Construction Methodology and preliminary programme are inadequate and unrealistic and/or no submission.	Very Bad	0	
	Financial Capacity	Undoubted for the amount of your enquiry	A	10	Rating by bank where account is held
		Good for tender amount quoted	B	7	
		Average to good for the amount of tender enquiry, if strictly in the way of business	C	5	
		Rating below good (C)	D-F	0	
	Machinery/Equipment Availability Plant & Equipment Having OWN complete construction Plant (proof of ownership must be attached) Plant Hire will be awarded half-points allocated. Bidder shall provide a letter from a registered Plant Hire Company indicating the list of plant to be hired for the duration of this contract. Such letter shall be qualified before the Commissioner of Oaths verification purposes.	Contractor owns all the machinery required for the execution of the contract • Excavator fitted with bucket or rock breaker • TLB • 3 x Tipper Trucks • Roller	Excavator = 4 3/Tipper Trucks = 3 Roller = 1 TLB = 2	10	Certified Copies of Plant Ownership documents to be attached. Or Letter from the equipment hiring company confirming availability.

NB: Tenderers are required to submit supporting documents to score full points

Tenderers that score less than 70% of the total score allowed for quality will *NOT* be considered further.

(b) Financial Offer

The financial offer will be scored using the following formula.

$$Nf = W1 \times [1-(P-Pm) / Pm$$

where:
W1 = **80** for financial values up to R50 000 000 (inclusive of VAT) of all responsive tenders received, and **90** for financial values over R50 000 000;
Pm = the value of the comparative offer of the most favorable tender;
P = the value of the comparative offer under consideration

(c) Preferences

Up to **20** points (for financial values up to R50 000 000) or **10** points (for financial values over R50 000 000) will be awarded to tenderers who are found to be eligible for the preference claimed.

Points will be awarded to Tenderers for attaining specific goals as determined by Ugu District Municipality. For this tender the preference points will be allocated as follows

	Goal	Maximum Possible Score	
		80/20	90/10
1	Specific Goals (Broad Based Black Economic Empowerment Contribution)	10	5
2	SMME Empowerment	4	2
3	Reconstruction and Development Programme – Promotion of Local Businesses	4	2
4	Enterprise Ownership by targeted designated groups (youths/disabled/women/war veterans)	2	1
	TOTAL	**20**	**10**

Specific Goals

For Specific Goals, the Broad Based Black Economic Empowerment Contribution will utilised and points will be allocated to a maximum of 10/ 5 for the as follows:

BBBEE Level	Points		Verification Method
	80/20	90/10	
1	10	5	BBBEE Certificate or sworn affidavit
2	8	4	
3-8	2	1	
9 and above	Nil	Nil	

Tenderers will be required to submit a sworn affidavit or BBBEE Verification Certificate as detailed in the Returnables.

SMME Empowerment

For this contract, it has been determined that up to 30% of the tendered contract value can be subcontracted to SMME's. Points will be allocated on the basis of maximum points possible, proportioned on the class of SMME, value of work to be subcontracted and the maximum points attainable.

Points for SMME Empowerment will be awarded as follows:

Points (SMME Empowerment) = $f_1 \times f_2 \times S_c$

Please note:

1. The maximum points for subcontracting to an SMME will be S_c, based on the price/preference points as follows:

Description	Price Preference
	80/20
S_c	4

2. If the tendered contract amount (excluding provisional sums, contingencies, escalation and VAT) is **C,** the work agreed to be subcontracted is valued at **S,** the factor based on value of subcontracted f_1 **= S/(0.3 X C).** The maximum value of f_1 is 1.

3. The factor f_2 for the class of SMMEE will be determined as follows:

	Class/description of SMME	Factor, f_2	Verification Method
1	An EME or QSE which is 100% owned by black people	100%	Company registration certificate (CK Document), sworn affidavit and audited financial statements or a letter from a registered Audited Firm confirming the Financial Statements.
2	An EME or QSE whose ownership by black persons is over 50% but below 100% owned by black people	50%	
3	A EME or QSE which is 25 to 50% owned by black people	25%	
4	An EME or QSE whose ownership by black persons is less than 25%	0%	

Promotion of Local Business

Preference will be given to tenderers who are locally based, as follows:

	Description	Price Preference		Verification Method
		80/20	90/10	
1	Enterprise located within the District Municipality- Rural	4	2	Municipal rates or copy of signed lease agreement or confirmation letter from Ward Councillor
2	Enterprise located within the Ugu District Municipality - Urban	2	1	
3	Enterprise located within the province of KwaZulu Natal	1	0.5	

Other Specific Goals

Should the tendering enterprise, be owned 100% by the youth, women, disabled and military war veterans, a further preference points will be awarded as follows:

Price Preference	80/20	90/10	**Verification Method**
Points to be awarded	2	1	Company registration certificate (CK Document) and ID copies of members ID's/medical certificate/ confirmation from WVA

F.3.1 3.1 Tender offers will only be accepted if:

a) the tenderer has in his or her possession an original valid Tax Clearance Certificate issued by the South African Revenue Services or has made arrangements to meet outstanding tax obligations
b) the tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation, by tender closing date;
c) the tenderer is not in arrears for more than 3 months with the municipal rates and taxes and municipal services charges;
d) the tenderer or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited form doing business with the public sector;
e) the tender has not
   i) abused the Employer's Supply Chain Management System; or
   ii) failed to perform on any previous contract and has been given a written notice to this effect; and
f) has completed the Compulsory Enterprise Questionnaires and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interest of the employer or potentially compromise the tender process.
g) Tenderer's Health and Safety Declaration of Compliance with the Occupational Health and Safety Act No 85 of 1993 and the Construction Regulations 2003, is signed by an authorized person.
h) the Tenderer or a competent authorized representative of the Contractor who submitted the tender has attended the compulsory clarification meeting and/or site inspection, as specified;
i) the tender offer is signed by a person authorized to sign on behalf of the Tenderer;
j) a Tenderer who submitted a tender as a Joint Venture has included an acceptable Joint Venture Agreement with his tender.
k) the tenderer has completed the schedule of quantities in full. Items against which no price is entered are to be considered as incomplete and invalidate the tender. Items against which **N/A**, **left blank** or – (dash) is entered are to be considered as incomplete and will also invalidate the tender. Items against which **Nil** or **zero (0)** is entered are to be considered to be fully priced and the tenderer will provide the items in questions as specified at **zero (0)** or **Nil** price.
l) A Tenderer **HAS NOT** grouped a number of items together and provided one tender sum for such group of items.

F.3.1 8 The number of paper copies of the signed contract to be provided by the Employer is one original plus one original duplicate.

The additional conditions of tender are as follows:

1. The BBBEE Certificate from an accredited organisation or sworn SMME affidavit

2. Proof of address in the form of Municipal Rates Invoice or copy of signed lease agreement or original stamped letter from Ward Councillor.

APPENDIX: STANDARD CONDITIONS OF TENDER

(As contained in Annexure F of Board Notice 86 of 2010: Standards for Uniformity in Construction Procurement)

F.1 General

F.1.1 Actions

F1.1.1. 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.

F1.1.2. 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 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 the 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 decision 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 for the calling for expressions of interest, 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 interest which make it difficult to fulfil his or her duties impartially;

ii) an individual or organization 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 organization which employs that employee.

(b) **comparative offer** means the tenderer's financial offer after the factors of non-firm prices, all unconditional discounts and any other tendered parameters that will affect the value of the financial offer 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; and

(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) **Quality (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 read, copied and recorded. Writing 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 The employer's right to accept or reject any tender offer

F.1.5.1 The employer may accept or reject any variation, deviation, tender offer, or alternative tender offer, and may cancel the tender process and reject all tender offers at any time before the formation of a contract. The employer shall not accept or incur any liability to a tenderer for such cancellation and rejection, but will give reasons for such action upon written request to do so.

F.1.5.2 The employer may not subsequent to the cancellation or abandonment of a tender process or the rejection of all tender offers re-issue a tender covering substantially the same scope of work within a period of six months unless only one tender was received and such tender was returned unopened to the tenderer.

F.1.6 Procurement Procedures

F.1.6.1 General

Unless otherwise stated in the tender data, a contract will, subject 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 positions 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 data, shall be invited in each round to enter the 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 and 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 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 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 complies with 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 prior to do so prior to the closing time of tenders.

F.2.2 Cost of tendering

Accept that 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 satisfy requirements.

F.2.3 Check documents

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

F.2.4 Confidentiality and copyright 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 Site visit and clarification meeting

Attend, where required, a site visit and 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) may 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

Not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations. Erasures and the use of masking fluid are prohibited.

F.2.12 Alternative tender offers

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. The alternative tender offer is to be submitted with the main tender offer together with a schedule that compares the requirements of the tender documents with the alternative requirements the tenderer proposes.

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.2.13 Submitting a tender offer

F.2.13.1 Submit one tender offer only, either as a single tendering entity or as a member in joint venture, to provide the whole of the works, services or supply identified in the contract data, 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 in black 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 proposal" and place the remaining returnable documents in an envelope marked "technical proposal". Each envelope shall state on the outside the employer's address and identification details stated in the 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 shall 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 email 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. Proof of posting shall not be accepted as proof of delivery. The employer shall not accept tender offers submitted by telegraph, telex, facsimile or e-mail, unless stated otherwise in the tender data.

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.

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.

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, policies, etc.

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 Respond to a request for clarification received up to five working days prior to 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 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 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 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 of the Tender Notice until seven days before the tender closing time stated in the Tender Data. If, as a result a tenderer applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, will then notify it to 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 opening 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, the total of his prices, preferences claimed and time for completion, if any, 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 the quality 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 quality evaluation above the minimum number of points for quality stated in the tender data, and announce the score obtained for the technical proposals and the total price and any preferences claimed. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for quality.

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, on opening and before detailed evaluation, whether each tender offer properly received:

(a) meets 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:

- detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,
- change the Employer's or the tenderer's risks and responsibilities under the contract, or
- 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

F.3.9.1 Check responsive tender offers for arithmetical errors between amounts in words and amounts in figures. Where there is a discrepancy between the amounts in figures and in words, the amount in words shall govern.

F.3.9.2 Check the highest ranked tender or tenderer with the highest number of tender evaluation points after the evaluation of tenders in accordance with F.3.11 for:

a) The gross misplacement of the decimal point in the unit rate,
b) Omissions made in completing the pricing schedule or bills of quantities or
c) Arithmetic errors in

- Line-item totals resulting from the product of unit rate and a quantity in bills of quantities or schedule of prices; or
- The summation of the prices.

F3.9.2 Notify the tenderers of all errors or omissions that are identified in the tender offer and invite the tenderer to either confirm the tender offer as tendered or accept the corrected total of prices.

F.3.9.3 Where the tenderer elects to confirm the tender offer as tendered, correct the errors as follows:

a) If bills of quantities or pricing schedules apply and there is an error in the line-item total resulting from the product of the unit rate and the quantity, the line-item total as quoted shall govern, and the unit rate will be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line-item total as quoted shall govern and the unit rate shall be corrected.
b) Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall govern, and the tenderer will be asked to revise selected item prices (and their rates if a bill of quantities applies) 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 his arithmetical errors 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

F3.11.1 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 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 prescribed in paragraphs 4 and 5 below.

The 80/20 preference point system for acquisition of services, works or goods up to Rand value of R50 million

4) (a)(i) The following formula must be used to calculate the points for price in respect of tenders (including price quotation) with a rand value equal to, or above R 30 000 and up to Rand value of R 50 000 000 (all applicable taxes included):

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

Where.
Ps = Points scored for comparative price of tender or offer under consideration.
Pt = Comparative price of tender or offer under consideration; and
Pmin = Comparative price of lowest acceptable tender or offer.

(4)(a)(ii) An employer of state may apply the formula in paragraph (i) for price quotations with a value less than R30 000, if and when appropriate:

(4)(b) Subject to subparagraph(4)(c), points must be awarded to a tender for attaining the Specific Goals in accordance with the table below:

	Categories	**Weight**	**80|20**	**90|10**
1	Ownership	50%	10	5
2	Empowerment	20%	4	2
3	Reconstruction & Development Programme	20%	4	2
4	Other (Specify)	10%	2	1
	Total	**100%**	**20**	**10**
#	**Specific Goal(s)**	**Weight**	**80|20 PP**	**90|10 PP**
	Ownership Categories:			
1	**Broad Based Black Economic Empowerment:**			
	BBBEE Level 1	100%	10	5
	BBBEE Level 2	80%	8	4
	BBBEE Level 3 to 8	40%	4	2
	Empowerment			
2	**Sub-Contracting: [Min 5% for >R5 Million] [Max 30% < R30 Million]**			
	1. an EME or QSE which is at least 100% owned by black people;	100%	4	2
	2. an EME or QSE which is at least 51% owned by black people;	50%	2	1
	3. an EME or QSE which is at 25% - 50% owned by black people;	25%	1	0.5
3	**Promotion of Local Business(s) - RDP**			
	1. Enterprise Located within the District Municipality - Rural	100%	4	2
	2. Enterprise Located within the District Municipality - Urban	75%	3	1.5
	3. Enterprise Located within the Province	25%	1	0.5
4	**Other Specific Goals**			
	1. Enterprise 100% owned by Youth/Women/Disabled/ Military Veterans	100%	2	1

(4)(c) A maximum of 20 points may be allocated in accordance with subparagraph (4)(b)

(4)(d) The points scored by tender in respect of Specific Goals contemplated in contemplated in subparagraph (4) (b) must be added to the points scored for price as calculated in accordance with subparagraph (4)(a).

(4)(e) Subject to paragraph 4.3.8 the contract must be awarded to the tender who scores the highest total number of points.

The 90/ 10 preference points system for acquisition of services, works or goods with a Rand value above R 50 million

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

90/10

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

Where:
Ps = Points scored for comparative price of tender or offer under consideration.
Pt = Comparative price of tender or offer under consideration; and
Pmin = Comparative price of lowest acceptable tender or offer.

(5)(b) Subject to subparagraph(5)(c), points must be awarded to a tender for attaining the Specific Goals in accordance with the table below:

	Categories	Weight	80|20	90|10
1	Ownership	50%	10	5
2	Empowerment	20%	4	2
3	Reconstruction & Development Programme	20%	4	2
4	Other (Specify)	10%	2	1
	Total	**100%**	**20**	**10**
#	**Specific Goal(s)**	**Weight**	**80|20 PP**	**90|10 PP**
	Ownership Categories:			
1	**Broad Based Black Economic Empowerment:**			
	BBBEE Level 1	100%	10	5
	BBBEE Level 2	80%	8	4
	BBBEE Level 3 to 8	40%	4	2
	Empowerment			
2	**Sub-Contracting: [Min 5% for >R5 Million] [Max 30% < R30 Million]**			
	1. an EME or QSE which is at least 100% owned by black people;	100%	4	2
	2. an EME or QSE which is at least 51% owned by black people;	50%	2	1
	3. an EME or QSE which is at 25% - 50% owned by black people;	25%	1	0.5
3	**Promotion of Local Business(s) - RDP**			
	1. Enterprise Located within the District Municipality - Rural	100%	4	2
	2. Enterprise Located within the District Municipality - Urban	75%	3	1.5
	3. Enterprise Located within the Province	25%	1	0.5
4	**Other Specific Goals**			
	1. Enterprise 100% owned by Youth/Women/Disabled/ Military Veterans	100%	2	1

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

(5)(d) The points scored by tender in of Specific Goals contemplated in subparagraph (5) (b) must be added to the points scored for price as calculated in accordance with subparagraph (5)(a).

(5)(e) Subject to paragraph 4.3.8 the contract must be awarded to the tender who scores the highest total number of points.

F.3.11.6 Decimal places

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

F.3.11.7 Scoring Price

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

$N_{FO} = W_1 \times A$

where:
N_{FO} is the number of tender evaluation points awarded for price.
W_1 is the maximum possible number of tender evaluation points awarded for price as stated in the Tender Data.
A is 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 = (1 +(P - Pm)) Pm	A = P / Pm
2	Lowest price or percentage commission / fee	A = (1 - (P - Pm)) Pm	A = Pm / P
[a] *Pm* is the comparative offer of the most favourable comparative offer. *P* is the comparative offer of the tender offer under consideration.			

F.3.11.8 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.3.11.9 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:

NQ = W2 x SO / MS

where:
SO is the score for quality allocated to the submission under consideration;
MS is the maximum possible score for quality in respect of a submission; and
W2 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.

CONTRACT: UGU-07-1661-2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

PART T2: RETURNABLE DOCUMENTS AND SCHEDULES

INDEX

TENDER EVALUATION CRITERIA

1. PREAMBLE

Tenderers are to note that returnables will be utilised to check compliance with the requirements of the tender and at the same time evaluate the respective tender for functionality, price and preference. It is important that the details submitted as part of the returnables assist in the evaluation, summarised hereunder,

2. EVALUATION OF TENDERS

The procedure for the evaluation of responsive tenders is **Method 2** with the 80/20 Preference Point System. Tenders will be scored for quality first and only those tenders that meet the specified minimum total score for quality will be considered further. These tenders will then be evaluated on the basis of the 80/20 Preference Points System.

Method 2: Financial Offer, Quality and Preferences

(a) Quality

The score for quality is to be calculated using the following formula:

$W_q = W_2 x S_o / M_s$

where:
W_2 = is the maximum percentage score given to quality and equals **100**
S_o = is the score for quality allocated to the submission under consideration
M_s = is the maximum possible score for quality in respect to the submission, which equals **100**

The quality will comprise scores for the following based on criteria indicated in the respective tender returnables and summarised as follows:

Description	Maximum Allocated Points
Experience of Bidder with respect to similar projects	50
Experience of Key Personnel (Construction Manager/ Site Agent)	10
Experience of Key Personnel (Foreman)	10
Construction Methodology and Preliminary Programme	10
Financial Capacity	10
Machinery/Equipment availability	10
TOTAL MAXIMUM POINTS	**100**

The score for quality can be further broken down per individual quality criteria as follows:

Key Aspect Criterion	Basis for points allocation	Score	Maximum Points	Verification Method
Experience of Bidder	Five completed water projects with similar scope of works and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M	Very Good	50	A set of certified copies of Letter of Appointment, Reference letters and Completion Certificate per project
	Four completed projects with similar scope of works and	Good	40	

	value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M			
	Three completed projects with similar scope of work and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M	Fair	30	
	Two completed projects with similar scope of work and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M	Poor	20	
	One completed projects with similar scope of work and value (i.e Reinforced concrete reservoirs and Pumpstation buildings) in the last 5 years, each of at least R2.5M Poor 10	Very Poor	10	
	No response/no similar water project completed.	Dismal	0	
Experience of Key Personnel (Construction Manager/Site Agent	10 or more years' experience of the Construction Manager/ Site Agent with a minimum qualification of a BSC Civil Eng /Btech Degree in Civil Engineering	Very Good	10	Curriculum Vitae and Certified Copies of Qualification certificates
	7-9 years' experience of the Construction Manager/Site Agent with a minimum qualification of a BSC Civil Eng /Btech Degree in Civil Engineering	Good	7	
	2-6 years' experience of the Construction Manager/Site Agent with a minimum qualification of a BSC Civil Eng	Fair	3	

	/Btech Degree in Civil Engineering			
	Construction Manager/ Site Agent proposed does not fit the above requirements. (Less than 2 year's experience)	Poor	0	
Experience of Key Personnel (Foreman)	10 or more years' experience of the Foreman with a minimum qualification of NQF Level 5 "Manage Labour-Enhanced Construction Processes and National Diploma in Civil Engineering	Very Good	10	Curriculum Vitae to be attached with traceable references
	7-9 years' experience of the Foreman with a minimum qualification of NQF Level 5 "Manage Labour-Enhanced Construction Processes and National Diploma in Civil Engineering	Good	7	
	2-6 years' experience of the Foreman with a minimum qualification of NQF Level 5 "Manage Labour-Enhanced Construction Processes and National Diploma in Civil Engineering	Fair	3	
	Foreman proposed does not fit the above requirements (Less than two (2) years' experience)	Poor	0	
Construction Methodology and Preliminary Programme Construction Methodology (relevant to the tendered project. The methodology and preliminary programme must include the following sub-headings: Approach	Construction Methodology met all the requirements. The methodology is precise and specific to this project and preliminary programme has correct linkages to relevant activities	Very Good	10	Construction Methodology And Preliminary Programme
	Construction Methodology and preliminary sub	Good	7	

Method, Time Frames, Activities (in construction sequence), Construction Administration, Quality Management, Health and Safety	tasks are in line with the scope of works.			
	Construction Methodology and preliminary programme are generic for similar works	Fair	3	
	Construction Methodology and preliminary programme are inadequate and unrealistic and/or no submission.	Very Bad	0	
Financial Capacity	Undoubted for the amount of your enquiry	A	10	Rating by bank where account is held
	Good for tender amount quoted	B	7	
	Average to good for the amount of tender enquiry, if strictly in the way of business	C	5	
	Rating below good (C)	D-F	0	
Machinery/Equipment Availability Plant & Equipment Having OWN complete construction Plant (proof of ownership must be attached) Plant Hire will be awarded half-points allocated. Bidder shall provide a letter from a registered Plant Hire Company indicating the list of plant to be hired for the duration of this contract. Such letter shall be qualified before the Commissioner of Oaths verification purposes.	Contractor owns all the machinery required for the execution of the contract • Excavator fitted with bucket or rock breaker • TLB • 3 x Tipper Trucks • Roller	Excavator = 4 3/Tipper Trucks = 3 Roller = 1 TLB = 2	10	Certified Copies of Plant Ownership documents to be attached. Or Letter from the equipment hiring company confirming availability.

NB: Bidders are required to submit supporting documents to score full points
Tenderers that score less than 70% of the total score allowed for quality will *NOT* be considered further.

3. PREFERENTIAL PROCUREMENT SYSTEM

3.1 Provisions of the Preferential Points system

3.1.1 Preferential points will be allocated to each tenderer in respect of contracts estimated to amount to more than R 50 000 000 as follows,

(a) 10 points out of 100 points shall be allocated for aspects related to specific goals.

(b) Points shall be deducted in respect of all other acceptable tenders with higher prices. In accordance with the formula set out in Part 2 of the Regulations 2022 Pertaining to the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000)

3.1.2 Preferential points will be allocated to each tenderer in respect of contracts estimated to amount to R 50 000 000 or less as follows,

(a) 20 points out of 100 points shall be allocated for aspects related to specific goals.

(b) Points shall be deducted in respect of all other acceptable tenders with higher prices. In accordance with the formula set out in Part 2 of the Regulations 2022 Pertaining to the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3.1.3 Preferential Points shall be rounded off to two decimal places.

3.1.4 Only the qualifying tender with the highest number of points scored may be selected provided that the Municipality may, in exceptional circumstances and on reasonable and justifiable grounds, award a contract to a tender that did not score the highest number of points.

3.1.5 Where Tenders are called for the sale of Municipal assets the same system of Preferential Points shall be calculated except that the Highest Price and not the Lowest Price shall be the basis of the calculation.

3.1.6 Points scored for price shall be calculated after prices have been brought to a comparative basis.

3.2 Preferential Points

Up to **20** points (for financial values up to R50 000 000) or **10** points (for financial values over R50 000 000) will be awarded to tenderers who are found to be eligible for the preference claimed.

Points will be awarded to Tenderers for attaining specific goals as determined by Ugu District Municipality. For this tender the preference points will be allocated as follows

	Goal	**Maximum Possible Score**		**Verification Documentation Required**
		80/20	**90/10**	
1	Broad Based Black Economic Empowerment Contribution	10	5	Sworn Affidavit or copy of BBBEE Certificate
2	SMME Empowerment	4	2	Agreement of Intent, Financial statements Company Ownership documents
3	Reconstruction and Development Programme – Promotion of Local Businesses	4	2	Utility Bills
4	Enterprise Ownership by targeted designated groups (youths/disabled/women/war veterans)	2	1	ID's/medical certificate/ confirmation from WVA
	TOTAL	**20**	**10**	

Broad Based Black Economic Empowerment Contribution

For Broad Based Black Economic Empowerment Contribution, points will be allocated to a maximum of 10/ 5 for the as follows:

BBBEE Level	Points
	80/20
1	10
2	8
3-8	2
9 and above	Nil

Tenderers will be required to submit a sworn affidavit or BBBEE Verification Certificate as detailed in the Returnable.

SMME Empowerment

For this contract, it has been determined that up to 30% of the tendered contract value can be subcontracted to SMME's. Points will be allocated on the basis of maximum points possible, proportioned by the class of SMME, value of work to be subcontracted and the maximum points attainable.

Points for SMME Empowerment will be awarded as follows:

Points (SMME Empowerment) = $f_1 \times f_2 \times Sc$

Please note:

1. The maximum points for subcontracting to an SMME will be S_C, based on the price/preference points as follows:

Description	Price Preference
	80/20
S_c	4

2. If the tendered contract amount (excluding provisional sums, contingencies, escalation and VAT) is **C,** the work agreed to be subcontracted is valued at **S,** the factor based on value of subcontracted f_1 **= S/(0.3 X C).** The maximum value of f_1 will be 1.

3. The **factor f_2** for the class of SMMEE will be determined as follows:

	Class/description of SMME	Factor, f_2
1	An EME or QSE which is 100% owned by black people	100%
2	An EME or QSE whose ownership by black persons is over 50% but below 100% owned by black people	50%
3	A EME or QSE which is 25 to 50% owned by black people	25%
4	An EME or QSE whose ownership by black persons is is lees than 25%	0%

4.0 PREFERENTIAL PRICE POINTS FORMULAE

4.1 Points Scored for Price

4.1.1 For Tenders in respect of which the estimated price is R 50 000 000 or less:

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

.1.2 For Tenders in respect of which the estimated price is greater than R 50 000 000:

$$Ps = Pp \{1 - (Pt - \frac{Pmin}{Pmin}) \}$$

Where:

Ps	=	Points scored for price of the offer tender under consideration.
Pp	=	Points available for allocation for the lowest price.
Pt	=	Rand value of the offer tender under consideration.
Pmin	=	Rand value of the lowest acceptable tender.

Ps	=	Points scored for price of tender under consideration.
Pt	=	Rand value of tender under consideration.
Pmin	=	Rand value of lowest acceptable tender.

MBD1
INVITATION TO BID

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE UGU DISTRICT MUNICIPALITY					
BID NUMBER:	**UGU-07-1661-2024**	CLOSING DATE:	**26 JULY 2024**	CLOSING TIME:	**12h00**
DESCRIPTION	UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS				
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)

96 Marine Drive

Phase 2 Building, Oslo Beach

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]

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

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:		**TECHNICAL INFORMATION MAY BE DIRECTED TO:**	
DEPARTMENT	Budget & Treasury Office: SCM Unit	CONTACT PERSON	M Shabane
CONTACT PERSON	N Mabaso	TELEPHONE NUMBER	039 688 5791
TELEPHONE NUMBER	039 688 5706	FACSIMILE NUMBER	
E-MAIL ADDRESS	Ntabiso.Mzotho@ugu.gov.za	Mfanufikile.Shabane@ugu.gov.za	

PART T2 RETURNABLES

T2.1 LIST OF RETURNABLE DOCUMENTS

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

The list of returnable documents comprise the following:

NB: The tenderer is required to submit certified copies of all compulsory returnable documents,. Failure to return such documents in full will lead to rejection of the tender on the grounds that the tender is non-responsive

FORM A: Attendance at Clarification Meeting

UGU DISTRICT MUNICIPALITY

CONTRACT: UGU-07-1661-2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

(Please print)

It is hereby CERTIFIED that I, ... *(name)*

in my capacity as..... and a duly authorized

representative of..... (the TENDERER)

of (address).....

in the company of.....(the ENGINEER)

attended the official Site Inspection on .....(date)

for and on behalf of the above named Tenderer.

I hereby further DECLARE that I am satisfied with the description of the Works and the explanations given by the above named Engineer.

SIGNATURE .....
(On behalf of TENDERER)

DATE .....

AS WITNESS:-
(On behalf of ENGINEER)

NAME .....

SIGNATURE .....

DATE .....

FORM B: Certificate of Authority To Sign Tender

UGU DISTRICT MUNICIPALITY

CONTRACT: UGU-07-1661-2024
UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

Signatories for firms must establish their authority thereto by attaching a duly signed and dated copy of the relevant resolution of the [1]Directors/Partners/Members to this form, or by the completion of this form.

RESOLUTION

By resolution of the [1]Board of Directors / Partners / Members passed at a meeting held on

……*(date), at* ……*(place)*

…… *(name of signatory)*

whose signature appears below, has been duly authorised to sign all documents in connection with the Tender for;

Contract UGU-07-1661-2024 and any contract which may arise therefrom on behalf of:-

……
(Name Of Tenderer in Block Capitals)

SIGNED ON BEHALF OF THE FIRM:-

(1) …… (Director/Partner/Member)

(2) …… (Director/Partner/Member)

(3) …… (Director/Partner/Member)

(4) …… (Director/Partner/Member)

SIGNATURE OF AUTHORISED SIGNATORY:-

SIGNATURE …… (On behalf of TENDERER)

DATE: ……

*Tenders in Joint Venture must attach the Joint Venture Agreement to the Tender

FORM C: Schedule of Work Carried out by the Tenderer.

The Tenderer shall list below the last ten civil engineering contracts of a similar nature awarded to him. This information is material to the award of the Contract.

EMPLOYER (Name, Tel No and Fax No)	**CONSULTING ENGINEER** (Name, Tel No and Fax No)	**NATURE OF WORK**	**VALUE OF WORK**	**YEAR OF COMPLETION**

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

FORM D: Details of Key Personnel

Tenderers shall provide details of the Site Agent(s) and General Foreman's experience in work of a similar nature to that for which their tender is submitted.

Failure to complete this schedule may result in the tender not being considered.

(a) Site Agent

SITE AGENT	**NAME:**.....			
CONTRACT & CLIENT	**NATURE OF WORK**	**POSITION HELD**	**VALUE OF WORK**	**YEAR COMPLETED**

(b) Foreman

GENERAL FOREMAN	**NAME:**.....			
CONTRACT & CLIENT	**NATURE OF WORK**	**POSITION HELD**	**VALUE OF WORK**	**YEAR COMPLETED**

DATE: ..... SIGNATURE OF TENDERER :.....

QUALIFICATION OF KEY PERSONNEL

Tenderers are to attach (to this page) certified copies of the relevant NQF Qualifications for the following personnel:

- ***Site Agent***
- ***Foreperson***

CURRICULUM VITAE OF KEY PERSONNEL

Tenderers are to attach detailed CV of Site Agent and Foreman to this page. The CVs must demonstrate experience to enable scoring as per Quality Scorecard.

FORM E: Schedule of Construction Plant & Equipment

The following are lists of major Construction Plant and Equipment that I / We presently own or Lease and will have available for this contract if my / our tender is accepted.

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

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

Attach additional pages if more space is required

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

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

Attach additional pages if more space is required

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

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

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

FORM F: Schedule of Proposed Sub-Contractors (Optional)

We notify that it is our intention to employ the following Subcontractors for work in the contract.

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

We inform that all subcontractors who are contracted to construct a house are registered as home builders with the National Home Builders Registration Council.

NAMES AND ADDRESSES OF PROPOSED SUBCONTRACTORS	NATURE AND EXTENT OF WORK TO BE SUBCONTRACTED	PREVIOUS EXPERIENCE WITH SUBCONTRACTOR OR RECENT WORK EXECUTED BY THE SUB-CONTRACTOR

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

FORM G: Preliminary Programme

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

PROGRAMME

ACTIVITY	WEEKS / MONTHS													

[Note: The programme must be based on the completion time as specified in the Contract Data. No other completion time that may be indicated on this programme will be regarded as an alternative offer, unless it is listed in the Contract Data provided by the Tenderer hereafter and supported by a detailed statement to that effect, all as specified in the Tender Data]

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

FORM H: Registration with CIDB

Contractor is to attach a copies of Contractor's Certificate of Registration with CIDB or alternatively furnish the CIDB registration no. and details in the space provided. This information will be verified with the CIDB via the CIDB website. It is the tenderer/contractor's responsibility to ensure that their details are displayed on the CIDB website. If in joint venture, details of all members require to be furnished.

Name of Contractor or JV Member	CIDB registration No.	Category and class of registration, eg 1 CE

My/Our failure to submit the certificate(s) or furnish the required details, with my / our tender document will lead to the conclusion that I am / we are not registered with the CIDB and therefore not eligible to tender.

Signature

Date

FORM I: Contractor's Tax Clearance Certificate

The Tenderer is to attach his original Tax Clearance Certificate on this page. In the case of a Joint Venture all members of the Joint Venture's original Tax Clearance Certificates must be attached.

Tenderers are to note that failure to comply with this requirement will render their tender invalid.

FORM J: Form concerning fulfilment of the construction regulations, 2003.

In terms of regulation 4(3) of the Construction Regulations, 2003 (hereinafter referred to as the Regulations), promulgated on 18 July 2003 in terms of Section 43 of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) the Employer shall not appoint a contractor to perform construction work unless the Contractor can satisfy the Employer that his/her firm has the necessary competencies and resources to carry out the work safely and has allowed adequately in his/her tender for the due fulfilment of all the applicable requirements of the Act and the Regulations.

1 I confirm that I am fully conversant with the Regulations and that my company has (or will acquire/procure) the necessary competencies and resources to timeously, safely and successfully comply with all of the requirements of the Regulations.

(Tick)

YES	
NO	

2 Proposed approach to achieve compliance with the Regulations.

(Tick)

Own resources, competent in terms of the Regulations (refer to 3 below)	
Own resources, still to be hired and/or trained (until competency is achieved)	
Specialist subcontract resources (competent) - specify:	

3 Provide details of proposed key persons, competent in terms of the Regulations, who will form part of the Contract team as specified in the Regulations (CVs to be attached):

.....
.....
.....

4 Provide details of proposed training (if any) that will be undergone:

.....
.....
.....

5 Potential key risks identified and measures for addressing risks:

.....
.....
.....

6 I have fully included in my tendered rates and prices (in the appropriate payment items provided in the Schedule of Quantities) for all resources, actions, training and any other costs required for the due fulfilment of the Regulations for the duration of the construction and defects repair period.

(Tick)

YES	
NO	

SIGNATURE OF PERSON(S) AUTHORISED TO SIGN THIS TENDER:

1 ..... ID NO: .....

2 ..... ID NO: .....

FORM K: Record of Addenda to Tender Documents

We confirm that the following communications received from the Engineer 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.

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

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

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

FORM L: Amendments, Qualifications and Alternatives

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

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

(a) Amendments

PAGE, CLAUSE OR ITEM NO	PROPOSED AMENDMENT

[Notes:

(1) Proposals for amendments to the General and Special Conditions of Contract are not acceptable and will be ignored.

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

(b) Alternatives

PROPOSED ALTERNATIVE	DESCRIPTION OF ALTERNATIVE

[Notes:

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

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

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

(c) Discounts

ITEM ON WHICH DISCOUNT IS OFFERED	DESCRIPTION OF DISCOUNT OFFERED

[Note:

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

SIGNATURE: ..... *DATE:* .....

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

FORM M: PREFERENCE POINTS CLAIM FORM – MBD 6.1

MBD 6.1

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

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

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

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1. GENERAL CONDITIONS

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

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (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 To be completed by the organ of state

(*delete whichever is not applicable for this tender*).

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

1.3 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

(a) Price; and

(b) Specific Goals.

1.4 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOALS	20
Total points for Price and SPECIFIC GOALS	**100**

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

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

2. DEFINITIONS

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

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

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

(d) **"tender for income-generating contracts"** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and

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

3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

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

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

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

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

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmin = Price of lowest acceptable tender

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

3.2.1. POINTS AWARDED FOR PRICE

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

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

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

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

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

4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

4.3.

(a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or

(b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,

then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the table below.

(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.

Note to tenderers: The tenderer must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system) (To be completed by the organ of state) PART A	Number of points claimed (80/20 system) (To be completed by the tenderer)
BBBEE Contribution		
BBBEE Level 1	10	
BBBEE Level 2	8	
BBBEE Level 3-8	4	
Empowerment		
1. an EME or QSE which is at least 100% owned by black people;	4	
2. an EME or QSE which is at least 51% owned by black people;	2	
3. an EME or QSE which is at 25% - 50% owned by black people;	1	
RDP		
1. Enterprise Located within the District Municipality - Rural	4	
2. Enterprise Located within the District Municipality - Urban	3	
2. Enterprise Located within the Province	1	
Other Specific Goal		
1. Enterprise 100% owned by Youth/Women/Disabled/ Military V	2	

DECLARATION WITH REGARD TO COMPANY/FIRM

4.4. Name of company/firm.....

4.5. Company registration number: .....

4.6. TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

4.7. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

i) The information furnished is true and correct;

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

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

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

(i) disqualify the person from the tendering process;

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

(iii) 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.

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

(v) forward the matter for criminal prosecution, if deemed necessary.

.....
SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME: .....

DATE: .....

ADDRESS: .....
.....
.....
.....

FORM N: Bidder's Disclosure – MBD 4

BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. BIDDER'S DECLARATION

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest1 in the enterprise, employed by the state?

YES/NO

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

2.2 Do you, or any person connected with the bidder, have a relationship.

---

1 the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.

with any person who is employed by the procuring institution? **YES/NO**

2.2.1 If so, furnish particulars:

.....

.....

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract? **YES/NO**

2.3.1 If so, furnish particulars:

.....

.....

3. DECLARATION

I _____, the
(name)

undersigned in submitting the accompanying bid, do hereby make the following statements that I certify to be true and complete in every respect:

3.1 I have read and I understand the contents of this Disclosure;

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

3.3 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 consortium2 will not be construed as collusive bidding.

3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

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

3.6 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring

---

2 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.

Institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

3.7 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.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

....

Signature Date

....

Position Name of bidder

FORM O: Joint Venture Agreement

The Tenderer must attach to this page a joint venture agreement, if applicable.

FORM P: Current Commitments Schedule

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

2) SIGNATURE: ..... DATE: .....

3) (of person authorized to sign on behalf of the Tenderer)

FORM Q: Proof of Good Standing with Municipal Accounts

The tenderer is to affix to this page:

- Proof that they are not in arrears for more than 90 days with municipal rates and taxes and municipal service charges. The latest municipal account statement is to be attached. In case of a tenderer that is leasing the property, a full lease agreement must be attached and for bidders residing in areas where payment for municipal services does not apply, an affidavit must be attached.

Note:

1. Failure to affix such documentation as prescribed to this page shall result in this tender not being further considered for the award of the contract.
2. Should this tender be considered for award of the contract, based on proof of submission and should proof of such submission be found to be invalid, erroneous or inaccurate, the this tender will no longer be considered for the award of the contract.

Attach latest municipal account statement to this page.

4) SIGNATURE: ..... DATE: .....

5) (of person authorized to sign on behalf of the Tenderer)

FORM R: Declaration for Procurement above R10 Million

(ALL APPLICABLE TAXES INCLUDED)

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

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 any municipality for more than three months 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 any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days.

2.2 If yes, provide particulars.

.....

.....

.....

3 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

.....

.....

* Delete if not applicable

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

(Please use block capitals when completing the section below)

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.

6) SIGNATURE: ..... DATE: .....
7) (of person authorized to sign on behalf of the Tenderer)

8) NAME: .....

9) POSITION: .....

FORM S: Central Supplier Database Registration

Name of Tenderer:

.....

Database Registration Number:

.....

No awards will be made to a tenderer who is not registered on the Central Supplier Database (CSD).

The establishment of a Central Supplier Database (CSD) will result in one single database to serve as the source of all supplier information for all spheres of government. The purpose of centralising government's supplier database is to reduce duplication of effort and cost for both supplier and government while enabling electronic procurement processes.

Registration on the Central Supplier Database must be done online via the website:

https://secure.csd.gov.za/

10) SIGNATURE: ..... DATE: .....

11) (of person authorized to sign on behalf of the Tenderer)

FORM T: Tenderer's Financial Position Declaration

In terms of the tender requirements, the tender shall not be insolvent, in receivership, bankrupt or being wound up, have their affairs administered by a court or judicial officer, have suspended their business activities, or be subject to legal proceedings;

To that effect a person duly authorised by the tenderer must complete and sign the declaration

hereafter in detail.

Declaration by Tenderer:

1. I hereby declare that my company shall not be insolvent, in receivership, bankrupt or being wound up, have their affairs administered by a court or judicial officer, have suspended their business activities, or be subject to legal proceedings during the time of tender.

2. I agree that my failure to complete and execute this declaration to the satisfaction of the Employer will mean that I am unable to comply with the requirements of the tender, and accept that my tender will be prejudiced and may be rejected at the discretion of the Employer.

SIGNATURE: ..... DATE: .....

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

FORM U: Rates for Special Materials

Each material dealt with as a special material in terms of Clause 4 of the Contract Price Adjustment Schedule of the Conditions of Contract is stated in the list below. The rates and prices for the special materials shall be furnished by the Tenderer, which rates and prices shall not include VAT but shall include all other obligatory taxes and levies.

SPECIAL MATERIAL	UNIT*	Rate or Price for the Base Month

Indicate whether the material will be delivered in bulk or in containers.

Notes to Tenderer:

1. When called upon to do so, the tenderer shall substantiate the above rates or prices with acceptable documentary evidence.

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

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

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

FORM V: Compulsory Enterprise Questionnaire

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

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

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

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

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	Identity number*	Personal income tax number*

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

Section 5: Particulars of companies and close corporations

Company registration number .....

Close corporation number .....

Tax reference number .....

Section 6: Record of service of the state

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

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

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

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

*insert separate page if necessary

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

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

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

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

*insert separate page if necessary

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

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

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

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

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

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;

Signed ..... Date _____

Name ..... Position _____

Enterprise name

_____

FORM W: BBBEE Compliance Certificate

Tenderers are required to attach their BBBEE compliance certificate on this page or in the case of a joint venture, certificates of individual firms making up the joint venture, should they wish to claim for scores for BBBEE Compliance.

FORM X: Company Registration Documents

Tenderers are to attach copies of company registration documents (eg CK Documents) to this page.

FORM Y: Identity Documents of Shareholders/Directors/Members

Tenderers are to attach ID Documents of Members/Directors to this page.

FORM Z: Tenders Financial Standing

Tenderers are to attach a letter from their banks showing the financial ratings (A, B, C, D, E or F) ***for the value of the final tendered amount*** as per the quality score rating.

FORM AA : Proof of Bank Details

Tenderers are to attach a letter from their bank confirming their banking details

FORM AB: Tenderer's Intention to Subcontract a Portion of the Works to a Qualifying Small, Micro And Medium Sized Enterprise

The Employer has determined that works of a value of a maximum of 30% of the net tendered amount (excluding VAT, contingencies, provisional sums and allowances for escalation) can be subcontracted in this contract. The nett tendered amount (excluding VAT, contingencies, provisional sums and allowance for escalation) is calculated as follows:

Item	Description	Amount	Calculation Instruction
1	Nett Tendered Amount		**brought forward from Schedule of Quantities**
2	Less Provisional Sums	R10 680 000.00	Extracted by Employer from Schedule of Quantities
3	Amount for calculation of Maximum Value of subcontracted work qualifying for subcontracting for the purposes of preferencing		1 - 2
4	Maximum value of contracting work qualifying for preferencing		30% OF 3

The tenderer and subcontractors hereby agree as follows:

1. The Tenderer hereby nominates the following subcontractor to undertake a portion of the works, should he be appointed for work under the contract.

Name of Subcontractor	
Company registration No.	
Name of authorized company representative	

2. The value of the work (excluding Value Added tax) agreed to be subcontracted is:

_____

_____

_____ (amouint in words.

3. The work to be contracted includes the following activities:

Activity	Description of Activity
1	
2	
3	
4	
5	

4. The Tenderers accepts that if he does successfully subcontract the work of a value indicated above, the tenderer will be liable to a penalty calculated for every payment certificate as follows:

   Penalty (R) = 1% x net amount due to the contractors (for that payment certificate).

5. The subcontractor declares that the entity to be subcontracted falls under one of the following categories (indicate by a tick) of a small, micro, medium sized enterprise:

1. an EME or QSE which is at least 100% owned by black people;	
2. an EME or QSE which is at least 51% owned by black people;	
3. an EME or QSE which is at 25% - 50% owned by black people;	

6. The Subcontractor accepts his/her intention to be subcontracted by the following:

   - counter signature of this Intention to subcontract,
   - submission of the following documents as attachments:

     - Company Registration Documents
     - Authority of representative to represent subcontractor
     - 3-year annual statements up to year 2022
     - ID Documents of Owners/shareholders
     - BBBEE Compliance Certificate

Signed by both tendering entity and enterprise agreeing to be subcontracted.

Name of Representative of Tenderer	Signature of Tenderer's Representative
Name of Subcontractor's Representative	Signature of Subcontractor's Representative

SUBCONTRACTOR'S COMPANY REGISTRATION DOCUMENTS

Please attach Subcontractor's Company registration Documents to this page

SUBCONTRACTOR'S BBBEE CERTIFICATE

Please attach Subcontractor's BBBEE Certificate or signed sworn affidavit to this page,

SUBCONTRACTOR'S FINANCIAL STATEMENTS FOR THE LAST 3 YEARS UP TO 2023
Please attach subcontractor's financial statements for years 2020/2021; 2021/2022 and 2022/2023 to this page.

FORM AC : Claim with Respect to Ownership by Targetted Groups

The Employer will give preference to targeted designated groups. Should tenderers wish to claim the relevant preference points for this goal they may attach supporting documents with respect ownership by targeted designated groups.

Name of Shareholder	%-age Interest	Indicate Designated Group (Women, youth, disabled, war veterans)

The following evidence must be attached as proof of belonging to the designated group:

Designated group	Evidence Required
Women, Youth	Certified copy of ID Documents
Disabled	Copy of medical report
War Veterans	Confirmation by War Veteran Association of South Africa

Tenderers are to attach evidence of certified copies of documents in support of claims for preference points for targeted designated groups.

Signed ..... Date .....

Name ..... Position .....

CONTRACT: UGU-07-1661-2024
UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

PART C1: AGREEMENTS AND CONTRACT DATA

INDEX

PART C1: AGREEMENTS AND CONTRACT DATA

C1.1 Form of Offer and Acceptance

A: Offer

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a Contract for the procurement of:

Contract UGU-07-1661-2024: UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

The Tenderer, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the returnable schedules, and by submitting this offer has accepted the conditions of tender.

By the representative of the tenderer, deemed to be duly authorized, signing this apart 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 PRICE INCLUSIVE OF VALUE ADDED TAX (VAT) IS

.....

.....

..... Rand (in words);

R .....(in figures),

This offer may be accepted by the employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document to the tenderer before the end of the period of validity stated in the tender data, whereupon the tenderer becomes the party named as the contractor in the conditions of contract identified in the contract data.

Signature: .....

Name: *(in capitals)* .....

Capacity: .....

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

Address: .....

.....

.....

Tel: ..... Fax: .....

Witness:

Signature: ..... Name: .....

Date: .....

CIDB Registration N°:.....

B: 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 as 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.

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. 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.

Signature: .....

Name: *(in capitals)* .....

Capacity: .....

Name of Employer *(organisation):* .....

Address: .....

.....

Witness:

Signature: ..... Name: .....

Date: .....

C: 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: .....
   .....
   .....

By the duly authorised representatives signing this agreement, 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 changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance.

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

FOR THE TENDERER:

Signature: .....

Name: .....

Capacity: .....

Tenderer: *(Name and address of organisation)* .....

.....

Witness:

Signature: .....

Name: .....

Date: .....

FOR THE EMPLOYER

Signature: .....

Name: .....

Capacity: .....

Employer: *(Name and address of organisation)* .....

.....

Witness:

Signature: .....

Name: .....

Date: .....

D: **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

PART C1.2 CONTRACT DATA

C1.2.1 General Conditions of Contract

The General Conditions of Contract for Construction Works (3RD Edition 2015) published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685 is applicable to this contract.

Copies of these conditions of contract may be obtained from the South African Institution of Civil Engineering (Tel 011- 805 5947, Fax: 011 – 805 5971).

The Contract Data referred to in the General Conditions of Contract follow, with the Data to be completed Employer furnished. The Tenderer is to provide his details in the spaces provided.

C1.2.2 Contract Data Provided by Employer

CONTRACT UGU-07-1661-2024
UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

REF. CLAUSE NO.	DATA BY EMPLOYER	
1.1.13	**The Defects Liability Period is:**	12 months
1.1.1.15	**The name of the Employer is:**	Ugu District Municipality
1.1.1.26	**The Pricing Strategy is:**	Re-measurement
1.2.1.2	**The address of Employer:**	
	Physical	Postal:
	96 Marine Drive,	P O Box 51006
	Oslo Beach,4240	Musgrave, 4100
	Telephone No: (039) 688 3536	Fax No: (039) 682 4190
1.1.1.16	**Name of Employer's Agent** Vangisa Consulting Engineers & Project Managers, Represented by Mr Sizwe Msani	
1.2.1.2	**Address of Engineer:**	
	Physical:	Postal:
	45 Ridge Road Hillcrest 3610	P.O BOX 4603 Durban 4001
	Telephone No: (031) 882 3861 ..... Fax No: (086) 522 2152 E-mail: sizwe@vangisap.co.za	
5.3.1	**The documentation required before commencement with Works execution are:**	
	• Health and Safety File (Refer to Clause 4.3) • Initial programme (Refer to Clause 5.6) • Performance guarantee (Refer to Clause 6.2) • Insurance (Refer to Clause 8.6)	
5.3.2	**The time to submit the documentation required before commencement with Works execution is:** 14 Days	
5.8.1	**Non-working days are:** Sundays	
	The special non-working days are: 1) Public holidays 2) The year-end break which commences on the first working day after 15 December and ends on the first Tuesday after 5 January of the next year.	
5.13.1	**The penalty for failing to complete the Works is:** R1 000.00 excluding VAT per calendar day.	
5.16.3	**The latent defect period is:** 10 years	
6.2.1	**Security:** The security to be provided by the Contractor shall be a Performance Guarantee of 10% of the contract sum (delivered within the time stated in 5.3.2 above) plus a retention of 10% of the value of the works	

	The liability of the Performance Guarantee is provided by the Contractor shall be up to the issue of the Certificate of Completion, when the Guarantee shall be returned to the Contractor. Where a Performance Guarantee is provided by the Contractor, Retention monies shall be deducted at 10% per payment claim, to a maximum of 10% of the value of the works.
6.2.3	**Performance Guarantee:** "Expiry date means date of issue of certificate of completion of the project.
6.5.1.2.3	**Daywork:** The percentage allowances to cover overhead charges: • 10% of the gross remuneration of workmen and foremen actually engaged in the daywork; and • 10% on the net cost of materials actually used
6.8.2	**Price Adjustment will be applicable 12 Months after the tender closing date.** The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule with the following values: The value of "x" is 0.1 The values of the coefficients are: A = 0.40 B = 0.10 C = 0.45 D = 0.05 Base Month = Month before closing of tenders
6.10.1.5	**The percentage advance on materials not yet built into the Permanent Works is:** 80% provided indemnity in favour of the Employer is provided from both the supplier and the Contractor.
6.10.3	**The limit of retention money is:** The percentage retention on the amounts due to the Contract is 10% of the contract value.
8.6.1	**INSURANCE EFFECTED BY THE EMPLOYER** Nil **INSURANCE EFFECTED BY THE CONTRACTOR** a) The Contractor and Sub-contractor shall where applicable provide as a minimum the following: **CONTRACT WORKS AND SASRIA SPECIAL RISKS INSURANCE** – which will provide cover against accidental physical loss or damage to the Works, Temporary Works and materials intended for incorporation in the Works. **PUBLIC LIABILITY INSURANCE** – which will provide indemnity against legal liability in the event of accidental death of or injury to third persons and/or loss of or damage to third party property arising directly from the execution of the contract and occurring during the period of insurance with a limit of indemnity of R 10 000 000.00 in respect of all claims arising from any one occurrence or series of occurrences consequent on or attributable to one source or original cause. **OTHER INSURANCE:** Other insurances that should be provided by the Contractor to limit his risk exposure, but which are not mandatory include the following: i) 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. ii) Insurance in terms of the provisions of the Compensation for Occupational Injuries and Diseases Act (COID) Act No 130 of 1993. iii) Employers Common Law Liability Insurance with a limit of indemnity of not less than R 1 000 000.00. iv) Motor Vehicle Liability Insurance comprising (as a minimum) "balance of Third

	Party" Risks including Passenger Liability indemnity of not less than R 1 000 000.00 (one million Rand) ; and v) ...Where the Contract involves manufacturing and/or fabrication of the Works or parts thereof at premises other than at the Contract 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 the endorsement to the relevant Policies of Insurance.
8.6.1.1.3	**Amount to cover professional fees for repairing damage and loss**: 14% of required amount
10.5.1	**Dispute resolution:** Standing Adjudication Board
10.5.3	**The number of Adjudication Board Members to be appointed is:** One
10.7.1	**Dispute Determination:** Arbitration
	ADDITIONAL CLAUSES
1.1.1.5	**Commencement Date:** "Commencement Date" means a date determined by the Employer and communicated to the Contractor at the "Site Hand Over Meeting" which meeting is to take place within 14 days from the date that the Agreement made in terms of the Form of Offer and Acceptance comes into effect and such Commencement Date is to be within 14 days from the date of the Site Handover Meeting. "Site Hand Over Meeting" means the meeting arranged by the Engineer to communicate the commencement date to the Contractor, to instruct Contractor to Commence execution of the works on the commencement date as per Clause 5.3.1, to provide the Contractor with the necessary details and documentation to execute the works and for the Employer to give the Contractor right of access to the Site, as per Clause 5.4.1.
4.4.2	**Subcontracting** The contractor will be required to subcontract up to a maximum of 30% of the work to local subcontractors. The work to be subcontracted will be agreed with the Employer

SIGNATURE OF TENDERER: .....

DATE: .....

C1.2.3 Data Provided by the Contractor

	Clause	
Name of Contractor	1.1.1.9	.....
Address of Contractor (Physical and Postal) Tel: Fax: Email:	1.2.1.2	....
Time for Achieving Practical Completion:	1.1.1.14	..... **Weeks**
Security to be Provided by Contractor	6.2.1	Refer to Table Below

Type of Security	**Contractor's Choice (Indicate "YES" or "NO")**
Is Value Added Tax included in the Contract Sum and value of Works for calculating percentages?	
Cash deposit of .....% of the Contract Sum	
Performance Guarantee of .....% of the Contract Sum	
Retention of .....% of the value of Works	
Cash Deposit of .....% of the Contract Sum plus Retention of .....% of the value of Works	
Performance Guarantee of .....% of the Contract Sum plus Retention of .....% of the value of Works	

Price variation of special materials*	6.8.3	.....

Type of Special Material	**Unit**	**Rate or Price***

Rate or price for base month of*	6.8.2	.....

Tenderers are to note that failure to provide a time for completion of the contract will invalidate the tender offer.

* ***Delete inapplicable***

Signature: .....

Name of Signatory: .....

Date: .....

Name of Tenderer .....

C1.3: PERFORMANCE GUARANTEE

For use with the General Conditions of Contractor for Construction Works, Second Edition, 2010.

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

Physical Address: .....

"Employer" means: .....

"Contractor" means: .....

"Engineer" means: .....

"Works" means: .....

"Site" means: .....

"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: .....

.....

"Expiry Date" means: .....

CONTRACT DETAILS

Engineer issues; Interim Payment Certificates, Final Payment Certificate and the Certificate 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 Engineer of the Certificate of Completion of the Works or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Engineer 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 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 Engineer 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 Contactor 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 Guarantor in terms of 4 or shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

9. Payment of 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 his Performance Guarantee on account of any conduct alleged to the 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 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 1994, 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 my 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) .....

C1.4: DISCLOSURE STATEMENT

(Date).....

Contract: *(Name)*.....

Contractor: *(Name)*.....

Employer: *(Name)*.....

Engineer: *(Name)*.....

Dear Sirs,

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

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

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

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

.....
.....
.....

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

Name in full: .....

Signature: .....

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

THIS AGREEMENT is made between **UGU DISTRICT MUNICIPALITY** (hereinafter called the EMPLOYER) of the one part, herein represented by:

.....
.....

in his capacity as:

AND:

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

.....
.....

in his capacity as:

duly authorized to sign on behalf of the Contractor.

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

CONTRACT No: ..... (CONTRACT TITLE)

.....
for the construction, completion and maintenance of the works;

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

NOW THEREFORE the parties agree as follows:

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

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

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

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

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

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

on this the ..... day of ..... 20.....

SIGNATURE:
.....

NAME AND SURNAME:
.....

CAPACITY:
.....

WITNESSES: 1. .....

2. .....

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

on this the ..... day of ..... 20.....

SIGNATURE:
.....

NAME AND SURNAME:
.....

CAPACITY:
.....

WITNESSES: 1. .....*2.*.....

C1.6: ADJUDICATION BOARD MEMBER AGREEMENT

This Agreement is entered into between:

Adjudication Board Member: *(Name, physical address, postal address, email address, fax number, telephone number and mobile number)*.....
.....
.....

Contractor: *(Name, physical address, postal address, email address, fax number, telephone number and mobile number)*
.....
.....
.....

Employer*: (Name, physical address, postal address, email address, fax number, telephone, number and mobile number)*
.....
.....
.....

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

The Parties entered into a Contract for ..... (*name of project*) which provides that a dispute under or in connection with the General Conditions of Contract for Construction Works, Second Edition, 2010,must be referred to (*ad-hoc adjudication/ standing adjudication***).

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

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

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

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

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

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

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

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

   a. A monthly retainer of R.....(*amount*) for .....(*number)* of months, and /or
   b. A daily fee of R.....(*amount*) based on a .....(*number*) hour day, and /or
   c. A hourly fee of R.....(*amount*), and /or
   d. A non- recurrent appointment fee of R.....(*amount*) which shall be accounted for in the final sums payable.

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

This Agreement is entered into by:

Contractor's Signature : .....

Contractor's name : .....

Place : .....

Date : .....

Employer's signature : .....

Employer's name : .....

Place : .....

Date

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

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

Place : .....

Date : .....

CONTRACT: UGU-07-1661-2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

PART C2: PRICING DATA

INDEX

PART C2: PRICING DATA

C2.1 Pricing Instructions

1 The Conditions of Contract, the Contract Data, the Specifications (including the Project Specifications) and the Drawings shall be read in conjunction with the Bill of Quantities.

2 The Bill comprises items covering the Contractor's profit and costs of general liabilities and of the construction of Temporary and Permanent Works.

Although the Tenderer is at liberty to insert a rate of his own choosing for each item in the Bill, he should note the fact that the Contractor is entitled, under various circumstances, to payment for additional work carried out and that the Engineer is obliged to base his assessment of the rates to be paid for such additional work on the rates the Contractor inserted in the Bill. Clause 8 of each Standardized Specification, and the measurement and payment clause of each Particular Specification, read together with the relevant clauses of the Project Specifications, all set out which ancillary or associated activities are included in the rates for the specified operations.

3 Descriptions in the Bill of Quantities are abbreviated and may differ from those in the Standardized and Project Specifications. No consideration will be given to any claim by the Contractor submitted on such a basis. The Bill has been drawn up generally in accordance with the latest issue of Civil Engineering Quantities from the South African Institution of Civil Engineers. Should any requirement of the measurement and payment clause of the appropriate Standardized or Project Specification(s) be contrary to the terms of the Bill or, when relevant, to the Civil Engineering Quantities, the requirement of the appropriate Standardized, Project, or Particular Specification as the case may be, shall prevail.

4 Unless stated to the contrary, items are measured net in accordance with the Drawings without any allowance having been made for waste.

5 The amounts and rates to be inserted in the Bill of Quantities shall be the full inclusive amounts to the Employer for the work described under the several items. Such amounts shall cover all the costs and expenses that may be required in and for the construction of the work described, and shall cover the costs of all general risks, profits, taxes (but excluding value-added tax), liabilities and obligations set forth or implied in the documents on which the Tender is based.

6 The tenderer has to complete the schedule of quantities in full. Items against which no price is entered are to be considered as incomplete and invalidate the tender. Items against which **N/A**, **left blank** or – (dash) is entered are to be considered as incomplete and will also invalidate the tender. Items against which **Nil** or **zero (0)** is entered are to be considered to be fully priced and the tenderer will provide the items in questions as specified at **zero (0)** or **Nil** price

Rates are to be inserted in **BLACK ink.** Any amendments must be neatly crossed and initialled. The use of correction ink is **NOT** permitted.

The Tenderer shall also fill in a rate against the items where the words "rate only" appear in the amount column. Although no work is foreseen under these items and no quantities are consequently given in the quantity column, the tendered rates shall apply should work under these items actually be required.

A Tenderer is **NOT PERMITTED** to group a number of items together and tender one sum for such group of items. **IF THIS IS DONE IT WILL RENDER THE TENDER INVALID.**

The tendered rates, prices and sums shall, subject only to the provisions of the Conditions of Contract, remain valid irrespective of any change in the quantities during the execution of the Contract.

7 The quantities of work as measured and accepted and certified for payment in accordance with the Conditions of Contract, and not the quantities stated in the Bill of Quantities, will be used to determine payments to the Contractor. The validity of the Contract shall in no way be affected by differences between the quantities in the Bill of Quantities and the quantities certified for payment.

Ordering of materials are not to be based on the Bill of Quantities, but only on information issued for construction purposes.

8 For the purposes of this Bill of Quantities, the following words shall have the meanings hereby assigned to them:

Unit	:	The unit of measurement for each item of work as defined in the Standardized, Project or Particular Specifications
Quantity	:	The number of units of work for each item
Rate	:	The payment per unit of work at which the Tenderer tenders to do the work
Amount	:	The quantity of an item multiplied by the tendered rate of the (same) item
Sum	:	An amount tendered for an item, the extent of which is described in the Bill of Quantities, the Specifications or elsewhere, but of which the quantity of work is not measured in units

9 The units of measurement indicated in the Bill of Quantities are metric units. The following abbreviations may appear in the Bill of Quantities:

mm	=	millimetre
m	=	metre
km	=	kilometre
km-pass	=	kilometre-pass
m^2	=	square metre
m^2-pass	=	square metre-pass
ha	=	hectare
m^3	=	cubic metre
m^3-km	=	cubic metre-kilometre
kW	=	kilowatt
kN	=	kilo newton
kg	=	kilogram
t	=	ton (1 000 kg)
%	=	per cent
MN	=	meganewton
MN-m	=	meganewton-metre
PC Sum	=	Prime Cost Sum
Prov Sum	=	Provisional Sum

10. **This project is estimated to be completed within 12 Months.**

C2.2 Schedule of Quantities

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS
CONTRACT NO. : UGU-07-1661-2024

ITEM NO	PAYMENT		UNIT	QTY	RATE	AMOUNT (R)
1	SANS 1200A	GENERAL				
	8,3	**Fixed - Charge Items**				
1,1	8.3.1	Contractual Requirements	Sum	1		
	8.3.2	Establish Facilities on the Site :				
1,2	8.3.2.1	i) Facilities for Engineer:				
1.2.1		a) Offices: 15m² air conditioned furnished office	Sum	1		
1,2.2		b) Site notice board (2 No)	Sum	2		
1,3	8.3.2.2	ii) Facilities for Contractor:				
1.3.1		a) Offices and storage sheds	Sum	1		
1.3.2		b) Ablution and latrine facilities	Sum	1		
1.3.3		c) Tools and equipment	Sum	1		
1.3.4		d) Telephone	Sum	1		
1.3.5		e) Water supplies, electric power and communications	Sum	1		
1.3.6		f) Access (Subclause 5.8)	Sum	1		
1,4	8.3.3	Other fixed-charge obligations	Sum	1		
1,5	8.3.4	Remove Engineer's and Contractor's Site establishment on completion	Sum	1		
1,6		Compliance with Occupational Health and Safety Act and Construction Regulations. This item must include dealing with Covid-19 requirements.	Sum	1		
1,7		Submission of Health and Safety File	Sum	1		
1,8		Compliance with Environmental Management Plan; including all reports, meetings, approvals, etc.	Sum	1		
					TOTAL CARRIED FORWARD	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS
CONTRACT NO. : UGU-07-1661-2024

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
					TOTAL BROUGHT FORWARD	
	8,4	**Time - Related Items**				
1,9	8.4.1	Contractual Requirements	Sum	1		
	8.4.2	Operate and maintain facilities on the Site:				
1,10	8.4.2.1	i) Facilities for Engineer for duration of construction:				
1.10.1		a) Offices: 15m² air conditioned furnished office	Sum	1		
1.10.2		b) Site notice board (2 No)	Sum	2		
1,11	8.4.2.2	ii) Facilities for Contractor for duration of construction, except where otherwise stated:				
1.11.1		a) Offices and storage sheds	Sum	1		
1.11.2		b) Ablution and latrine facilities	Sum	1		
1.11.3		c) Tools and equipment	Sum	1		
1.11.4		d) Telephone	Sum	1		
1.11.5		e) Water supplies, electric power and communications	Sum	1		
1.11.6		f) Access (Subclause 5.8)	Sum	1		
1.11.7		g) Plant	Sum	1		
1,12	8.4.3	Supervision	Sum	1		
1,13	8.4.4	Company and head office overhead costs	Sum	1		
1,14	8.4.5	Other time-related obligations	Sum	1		
1,15		Compliance with Occupational Health and Safety Act and Construction Regulations. This item must include dealing with Covid-19 requirements.	Sum	1		
					TOTAL CARRIED FORWARD	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS
CONTRACT NO. : UGU-07-1661-2024

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
					TOTAL BROUGHT FORWARD	
1,16		Contractor's obligation in respect of community communication.	Sum	1		
1,17		Temporary access to affected properties.	Sum	1		
		Sums Stated Provisionally By Engineer				
1,18		i) Allow for community Liaison Officer	PC Sum	1	90000,00	R 90 000,00
1.18.1		ii) Overheads, charges, and profit on item 1.18	%	R 90 000,00		
1,19		i)Allow for crop compensation	Prov Sum	1	15000,00	R 15 000,00
1.19.1		ii) Overheads, charges, and profit on item 1.19	%	15000,00		
1,20		Allow for the repairs of existing services carried out by service providers	Prov Sum	1	150000,00	R 150 000,00
1.20.1		Overheads, charges and profit on item 1.20	%	150000,00		
1,21		Cellphone allowance for Site Engineer	Prov Sum	1	12000,00	R 12 000,00
1.21.1		Overheads, charges and profit on item 1.21	%	12000,00		
1,22		i) Allow for additional Survey as requested by Engineer.	Prov Sum	1	15000,00	R 15 000,00
1.22.1		ii) Overheads, charges, and profit on item 1.22	%	15000,00		
1,23		Allow the Provisional Sum for locating existing services and crop compensation, only where ordered by Engineer	Prov Sum	1	100000,00	R 100 000,00
1.23.1		% mark up on items 1.23	%	100000,00		
					TOTAL CARRIED FORWARD	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS
CONTRACT NO. : UGU-07-1661-2024

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
					TOTAL BROUGHT FORWARD	
1,24		Appointment of an ISD Consultant to facilitate stakeholders liaison and formation of project steering committee.	Prov Sum	1	60000,00	R 60 000,00
1.24.1		% mark up on items 1.24	%	60000,00		
1,25		Allow a Provisional Sum of R300 000for Subcontractor P&Gs	Prov Sum	1	300000,00	R 300 000,00
1.25.1		% mark up on items 1.25	%	300000,00		
	8,8	**Temporary Works**				
1,26	8.8.1	Maintaining accesses for residents	Sum	1		
1,27	8.8.2	Dealing with Traffic	Sum	1		
1,28		Complete As-Built Survey of works. Y, X & Z Co-Ordinates to be supplied in digital format of all sewer manholes (cover levels and invert levels)				
1.28.1		a) Survey for the preparation of As-built drawings	Sum	1		
1.28.2		b) Setting Out of the Works	Sum	1		
		DAYWORKS (The employer reserves the right to review the rates and ask for amendments before acceptance of contract)				
1,29		**LABOUR**				
1.29.1		a) Foreman	Hours			Rate Only
					TOTAL CARRIED FORWARD	

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
					TOTAL BROUGHT FORWARD	
1.29.2		b) Section Leader	Hours			Rate Only
1.29.3		c) Skilled (Artisans)	Hours			Rate Only
1.29.4		d) Semi-Skilled	Hours			Rate Only
1.29.5		e) Unskilled	Hours			Rate Only
1.30		**CONSTRUCTIONAL PLANT**				
1.30.1		a) 10m³ Tip Truck	Hours			Rate Only
1.30.2		b) 6m³ Tip Truck	Hours			Rate Only
1.30.3		c) TLB	Hours			Rate Only
1.30.4		d) 12 tonne Speedy Loader	Hours			Rate Only
1.30.5		e) Pedestrian vibrating Roller (Bomag 60 or similar)	Hours			Rate Only
1.30.6		g) Plate Compactor	Hours			Rate Only
					SECTION 1: TOTAL CARRIED SUMMARY	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS
CONTRACT NO.:UGU-07-1661-2024
SITE CLEARANCE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
2	**SANS 1200C**	**SITE CLEARANCE**				
2,1	8.2.1	Clear and grub (2m width)	m	4870		
2,2	8.2.2	Remove and grub large trees and tree stumps of girth				
2.2.1		a) Over 1m and up to and including 2m	No.	13		
2,3	8.2.5	**Removal of existing fences, maintain and store on site re-install**				
2.3.1		a) Wire fences to a maximum height of 1.8m	m	15		
2.3.2		b) Brickwall up to 230mm thick and up to 1m high	m	500		
2.3.3		c) Brickwall up to 230mm thick between 1.1 m and 2 m high	m^3	100		
2,4	8.2.10	Remove topsoil to a nominal depth of 150mm, stockpile and maintain	m^2	1500		
2,5		Saw-cut existing concrete surfaced driveways/areas (overall width 0.76m) and spoil material at an approved dump site (Rate to include for cutting with diamond saw and haulage).	m^3	50		
					SECTION 2: TOTAL CARRIED SUMMARY	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS
CONTRACT NO. : UGU-07-1661-2024
EARTHWORKS (PIPE TRENCHES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
3	**SANS 1200DB**	**EARTHWORKS (PIPE TRENCHES)**				
		Excavation				
3,1	8.3.2(a)	**Excavate in all materials for trenches, backfill, and compact to 93% MOD. AASHTO and dispose of surplus material for up to 630mm nominal diameter pipe at depths:**				
		For up to 600mm diameter pipes :				
3.1.1		a) from 0m to 1m deep	m	1000		
3.1.2		b) from 1,1m to 2m deep	m	2191,5		
3.1.3		c) from 2,1m to 3m deep	m	1948		
3.1.4		d) From 3.1m to 4m	m	487		
3.1.5		d) From 4,1m to 5m	m	243,5		
3,2	8.3.2(b)	**Extra-over items 3.1.1 to 3.1.4 for :-**				
3.2.1		1) Intermediate excavation (Provisional)	m^3	1461		
3.2.2		2) Hard rock excavation, no blasting (Provisional)	m^3	974		
3.2.3		3)Boulders	m^3	487		
3.2.4	8.3.2(c)	Excavate and dispose of unsuitable material from trench bottom (Provisional).	m^3	243,5		
3.2.5	8.3.4(a)	Shore trench opposite structures, services and deep unstable excavation above 1.5m	m	1300		
3.2.6	8.3.4(b)	**Temporary works: Control groundwater (800m)**				
3.2.7		1) Provide equipment	Prov Sum	1	350000,00	R 350 000,00
3.2.8		2) Operate and maintain	days	60		
3.2.9	8.3.3.3	Allow for excavation in confined areas (Provisional)	m	20		
	8.3.3	**Excavation Ancillaries**				
3,3	8.3.3.1	Make up deficiency in backfill material (Provisional)				
					TOTAL CARRIED FORWARD	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS						
CONTRACT NO. : UGU-07-1661-2024						
EARTHWORKS (PIPE TRENCHES)						
ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
					TOTAL BROUGHT FORWARD	
3.3.1	8.3.3.1(c)	a) by importation from commercial or off-site sources selected by the Contractor	m^3	343		
3.3.1	8.3.2	a) by importation from commercial or off-site sources selected by the Contractor	m^3	343		
	8.3.6	**Finishing**				
3,4		**Reinstate driveways and road surfaces:**				
3.4.1		a) Concrete driveways/areas: 100mm thick (25 Mpa Concrete) plus 100mm G2 (compacted to 98% MOD. AASHTO)	m^2	45		
3.4.1		b) Asphalt driveways/areas: 150mm thick	m^2	45		
3,5		**Construct new fencing (Provisional):**				
3.5.1		a) Welded wire mesh, Lightly galvanised: Mesh size : 50 x 25mm Wire Diameter : 2.5mm Fences to a maximum height of 1.8m	m	25		
3.5.2		b) Imperial Brickwall : up to 230mm thick (10-12mm mortar joint sizing hollow key jointing profile) and up to 1.8m high 25/19 Concrete grade base (600mm wide x 250mm thick)	m^2	15		
3,6	PSDB.5.9.5.3	Reinstatement of topsoil and grassing (sodding) as instructed by the Engineer.	m	388		
					SECTION 3: TOTAL CARRIED TO SUMMARY	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS
CONTRACT NO. :UGU-07-1661-2024
BEDDING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
4	**SABS 1200LB**	**BEDDING**				
4,1	8.2.2	**Supply of bedding by importation from:**				
4.1.1	8.2.2.3	Commercial Sources (for pipes up to 600mmØ)				
4.1.1.1	(a)	a) Selected granular material	m^3	1168,8		
4.1.1.2	(b)	b) Selected fill material	m^3	876,6		
4.1.1.3	(b)	b) From Commercial source	m^3	1168,8		
4,2	PSLB-8.2.6	**Supply all material and install Subsoil Drain for trenches with unsuitable material due to a shallow water table (Provisional).**				
4.2.1		a) Dust free 19mm stone (0.76m x 0.1m)	m	550		
4.2.2		b) Geo – Fabric blanket (U24 or equal) for subsoil. The rate shall cover cost of supplying, laying, joining, cutting and waste	m^2	550		
					SECTION 4: TOTAL CARRIED TO SUMMARY	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS

CONTRACT NO. :UGU-07-1661-2024

GABIONS AND PITCHING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
5	**SANS 1200DK**	**GABIONS AND PITCHING (PROVISIONAL)**				
5,1	8.2.1	Surface preparation for the Construction of Protection Works (Bedding for Gabion Reno mattresses).	m^2	40		
5,2		Excavation in existing embankment for the construction of gabions and stockpile.	m^3	20		
5,3	8.2.2	Supply all material and install Gabion Reno Mattress with Galvanized wire.				
5.3.1		a) Compacted density stone	m^3	20		
5.3.2		b) Galvanised Reno mattress basket (3 x 1 x 0.3)	No.	6		
5.3.3		c) Galvanized Reno mattress toe (2 x 0.5 x 0.5)	No.	5		
5,4	8.2.2	Supply all material and construct gabions with Galvanized wire.				
5.4.1		a) Compacted density stones	m^3	40		
5.4.2		b) Galvanized Gabion basket (3 x 1 x 1)	No.	4		
5,5	8.2.4	Geo – Fabric blanket (U24 or equal) for gabions. The rate shall cover cost of supplying, laying, joining, cutting and waste	m^2	100		
5,6		Deal with water from Natural water course	Sum	1		
					SECTION 5: TOTAL CARRIED TO SUMMARY	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS
CONTRACT NO. :UGU - 07-1661-2024
SEWERS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
6	SABS 1200LD	**SEWERS**				
		Pipes				
6,1	8.2.1	Supply, lay, joint, bed and test Class 34 Upvc sewer pipes with spigot and socket joints.				
6.1.1		a) 250mm Ø Class 34 HD uPVC Sewer	m	700		
6.1.2		b) 315mm Ø Class 34 HD uPVC Sewer	m	1900		
6.1.3		c) 400mm Ø Class 34 HD uPVC Sewer	m	1300		
6,2		Supply, lay, joint, bed and test Concrete Pipe.				
6.2.1		a) 600mm Ø 75D Concrete Pipes	m	1050		
6,3	8.2.6	**Erf Connections**				
6.3.1		Property terminal connection to connecting sewers complete. Allow 2m of 110mm diameter sewer per connection. Rate to include for all materials and fittings as shown.	No.	40		
6,4		Extra-over item 6.2.1 for :-				
6.4.1		a) 110mm dia. uPVC pipe from junction to property connection	m	1000		
6.4.2		b) Connection made into a manhole, rate to include for benching in manhole.	No.	15		
	8.2.3	**Manholes**				
6,5		Precast Concrete Manholes (1250mm dia.) with light duty cover and frame, complete with Type 'A' benching, etc. Rate shall include for excavation, shoring, backfilling, and compaction to 93% MOD. AASHTO minimum density.				
6.5.1		a) Over 0.0m and up to 1m	No.	5		
6.5.2		b) Over 1m and up to 2m	No.	56		
6.5.3		c) Over 2m and up to 3m	No.	20		
					TOTAL CARRIED FORWARD	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS
CONTRACT NO. :UGU - 07-1661-2024
SEWERS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
		TOTAL BROUGHT FORWARD				
6,6		Precast Concrete Manholes (1500mm dia.) with light duty cover and frame, complete with benching, etc. Rate shall include for excavation, shoring, backfilling, and compaction to 93% MOD. AASHTO minimum density.				
6.6.1		d) Over 3m and up to 4m	No.	5		
6.6.2		e) Over 4m and up to 5m	No.	4		
6.6.3		b) Supply and fit heavy duty concrete manhole cover.	No.	6		
6.6.4		c) Supply and fit light duty concrete manhole cover and frame.	No.	8		
6,7		**Break into and connect to existing manholes for new connection, deal with live sewer flow and make good all benching.**				
6.7.1		a) 160mm Ø Class 34 HD uPVC sewer	No.	50		
6,8	8.2.12	Raising of existing Manhole (500mm to new cover level)	No.	10		
6,9		Conduct manhole water test	No.	20		
6,8		**Demolish existing Vandalised Pumphouse**				
6.8.1		a) Demolish and dispose material from vandalised pumphouse	Prov Sum	1	70000,00	R 70 000,00
6,9		**Connect to Existing Pump Sump**				
6.9.1		a) Connect to Existing Pumphouse	Prov Sum	1	30000,00	R 30 000,00
		SECTION 6: TOTAL CARRIED TO SUMMARY				

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS
CONTRACT NO. :UGU-07-1661-2024
WASTEWATER TREATMENT WORKS REFURBISHMENT

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
7,1		**Head Works Uphgrade**				
7.1.1		Supply of ultrasonic flow meter (Level sensor and Controller)	No.	1		
7.1.2		Installation and cpmmissioning of ultrasonic flow meter	No.	1		
7.1.3		Design and Supply Automatic Screen including Starter (VSD), Controls and Cabling	No.	1		
7.1.4		installation and commissioning of automatic Screen including Starter (VSD), Controls and Cabling	No.	1		
7.1.5		Rehabilitate New Headwall structure	No.	1		
7,2		**Biological Reactor - Anearobic**				
7.2.1		Anaerobic Reactor - Supply Stirrer Drive unit (Gearbox and Motor)	No.	1		
7.2.2		Anaerobic Reactor - installation and commissioning of Stirrer Drive unit (Gearbox and Motor)	No.	2		
7.2.3		Remove Stirrer Blades	No.	2		
7.2.4		Assessment and Reconditioning of Stirrer blades		2		
7.2.5		Installation and commissioning of Stirrer	No.	2		
7.3		**Aerobic**				
7.3.2		Aerobic Reactor - Supply Aerator Drive unit (Gearbox and Motor)	No.	1		
7.3.3		Aerobic Reactor - Installation and commissioning of Aerator Drive unit (Gearbox and Motor)	No.	2		
7.3.4		Remove Aerator blades	No.	2		
7.3.5		Assessment and Reconditioning of Aerator blades	No.	1		
7.3.6		Installation and commissioning of Aerator blades	No.	2		
7.3.7		Supply Dissolved Oxygen Meters	No.	1		
7.3.8		Installation of Dissolved Oxygen Meters	No.	2		
7.3.9		Upgrade of Aerator Starting unit to VSD's including PLC - Supply of VSD's and Programmable Logic Controller	No.	1		
7.3.10		Upgrade of Aerator Starting unit to VSD's including PLC - Installation of VSD's and Programmable Logic Controller	No.	2		
					TOTAL CARRIED FORWARD	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS
CONTRACT NO. :UGU-07-1661-2024
WASTEWATER TREATMENT WORKS REFURBISHMENT

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
					TOTAL BROUGHT FORWARD	
7.4		**Sedimentation Tanks:**				
		Old Primary Sedimentation Tanks:				
7.4.1		Rehabilitation of Sedimentation tank - Crane hire	Hrs	1		
7.4.2		Rehabilitation of Sedimentation tank - Dismantling	Sum	1		
7.4.3		Rehabilitation of Sedimentation tank - Supply of bridge scrapper rehabilitation materials	Sum	1		
7.4.4		Rehabilitation of Sedimentation tank - Fabrication of bridge scrapper	Sum	1		
7.4.5		Rehabilitation of Sedimentation tank - Supply of New Slip Ring	No.	2		
7.4.6		Rehabilitation of Sedimentation tank - Supply of Centre Bearing	No.	1		
7.4.7		Rehabilitation of Sedimentation tank - Supply of sedimentation tank Drive Motor & Gearbox,	No.	1		
7.4.8		Rehabilitation of Sedimentation tank - Desludge Valve	No.	1		
7.4.9		Installation and Commissioning	Sum	1		
7.5		New Secondary Sedimentation Tanks:				
7.5.1		Rehabilitation of Sedimentation tank - Crane hire	Hrs	1		
7.5.2		Rehabilitation of Sedimentation tank - Dismantling	Sum	1		
7.5.3		Rehabilitation of Sedimentation tank - Supply of bridge scrapper rehabilitation materials	Sum	1		
7.5.4		Rehabilitation of Sedimentation tank - Fabrication of bridge scrapper	Sum	1		
7.5.5		Rehabilitation of Sedimentation tank - Supply of New Slip Ring	No.	2		
7.5.6		Rehabilitation of Sedimentation tank - Supply of Centre Bearing	No.	1		
7.5.7		Rehabilitation of Sedimentation tank - Supply of sedimentation tank Drive Motor & Gearbox,	No.	1		
7.5.8		Rehabilitation of Sedimentation tank - Desludge Valve	No.	1		
7.5.9		Installation and Commissioning	Sum	1		
					: TOTAL CARRIED FORWARD	

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS
CONTRACT NO. :UGU-07-1661-2024
WASTEWATER TREATMENT WORKS REFURBISHMENT

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)

		TOTAL BROUGHT FORWARD				
7.6		**Pumps:**				
		Mixed Liquor Pumps:				
7.6.1		Supply of Vertical axial flow pump	No.	2		
7.6.2		Installation of Vertical axial flow pump - 2 off	Sum	1		
7.7		~~Old~~ Primary Sedimentation Tank Effluent Recycle Pump				
7.7.1		Supply of Submersible Pump	No.	2		
7.7.2		Installation of Submersible Pump - 2 off	Sum	1		
7.8		~~New~~ Secondary Sedimentation Tank Effluent Recycle Pump				
7.8.1		Supply of Submersible Pump	No.	2		
7.8.2		Installation of Submersible Pump - 2 off	Sum	1		
7.9		**Desludge Ponds**				
7.9.1		Desludge existing ponds	Sum	1		
7.9.2		Refurbish existing ponds	Sum	1		
7.10		**Clearing & Rehabilitation of Drying Beds**				
7.10.1		Clearing of drying beds	Sum	1		
7.10.2		Refurbishment of drying beds	Sum	1		
7.11		**Programmable Logic Controller**				
7.11.1		Supply of Programmable Logic Controller including panel (Includes Supply of Software and programme)	No.	1		
7.11.2		Installation and commissioning of Programmable Logic Controller imcluding panel (Programming)	No.	1		
7.11.3		Supply of communication cabling and accessories	No.	1		
7.11.4		Installation of communication cabling and accessories	Sum	1		
		TOTAL CARRIED FORWARD				

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF WASTEWATER TREATMENT WORKS
CONTRACT NO. :UGU-07-1661-2024
WASTEWATER TREATMENT WORKS REFURBISHMENT

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT (R)
					TOTAL BROUGHT FORWARD	
7.12		**Supply and Installation of Gas Chlorine System**				
7.12.1		Supply of Chlorine Gas System - System will have two chlorination wings	Sum	1		
7.12.2	PSLD-3.5.8	Installation and Commissioning of Chlorine Gas System - System will have two chlorination wings	Sum	1		
7.13	PSLD-3.5.8	**Refurbishment of Chlorine House and Admin Building**				
7.13.1	PSLD-8.2.11	Refurbish and Repaint Chloring House	No.	1		
					TOTAL CARRIED FORWARD	

SUMMARY OF SCHEDULE OF QUANTITIES

SECTION	DESCRIPTION	TOTAL AMOUNT (R)
SECTION 1	PRELIMINARY & GENERAL	
SECTION 2	SITE CLEARANCE	
SECTION 3	EARTHWORKS (PIPE TRENCHES)	
SECTION 4	BEDDING	
SECTION 5	GABIONS AND PITCHING	
SECTION 6	SEWERS	
SECTION 7	WASTEWATER TREATMENT WORKS REFURBISHMENT	
	SUB-TOTAL	
	Vat @ 15%	
	TOTAL CARRIED FORWARD TO FORM OF OFFER	

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

UGU DISTRICT MUNICIPALITY

CONTRACT: UGU-07-1661-2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

PART C3: SCOPE OF WORK

INDEX

PART C3: SCOPE OF WORKS

C3.1 STANDARDISED SANS 1200 SPECIFICATIONS

The standard specifications on which this contract is based are Standards South Africa's Standardized Specifications for Civil Engineering Construction SABS 1200. Although not bound in nor issued with this Document, the following Sections of the Standardized Specifications of SABS 1200 shall form part of this Contract:

AA	1986	:	GENERAL
AB	1986	:	ENGINEER'S OFFICE
C	1980	:	SITE CLEARANCE (As amended 1982)
DA	1988	:	EARTHWORKS (Small Works)
DB	1989	:	EARTHWORKS (Pipe trenches)
DK	1984	:	GABIONS AND PITCHING
LB	1982	:	BEDDING (PIPES)
GA	1982	:	CONCRETE (Small Works)
HA	1990	:	STRUCTURAL STEELWORKS
HC	1988	:	CORROSION PROTECTION FOR STRUCTURAL STEELWORKS
LD	1982		SEWERS
LE	1982	:	STORMWATER DRAINAGE
LF	1983	:	ERF CONNECTIONS
LG	1996	:	PIPE JACKING
M	1996	:	ROADS (General)

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

SANS 1921 (2004): Construction and Management Requirements for Works Contracts

- Part 1: General Engineering and Construction Works; and
- Part 2: Accommodation of Traffic on Public Roads Occupied by the Contractor.

C3.2 PROJECT SPECIFICATIONS

The project specification is covered in the following sections:

ITEM	DESCRIPTION
	STATUS
	PROJECT SPECIFICATION PORTION 1: GENERAL
PS-1	Project Description
PS-2	Extent of the Works
PS-3	Description of the Site and Access
PS-4	Nature of Ground and Subsoil Conditions
PS-5	Construction and Management Requirements
PS-6	Construction Programme
PS-7	Site Facilities Available
PS-8	Site Facilities Required
PS-9	Existing Services
PS-10	Requirements for Accommodation of Traffic
PS-11	Occupational Health and Safety
PS-12	Adverse Weather Conditions
PS-13	Site Meetings & Reporting
PS-14	Preferential Procurement
	PROJECT SPECIFICATION PORTION 2
PSA	General
PSD	Earthworks
PSDB	Earthworks (Pipe Trenches)
PSG/PSGA	Concrete (Small Works)
PSLB	Bedding (Pipes)
PSLD	Sewers
PSLE	Stormwater Drainage
	PARTICULAR SPECIFICATIONS
PA	Brickwork and Plaster
PB	Carpentry, Joinery and Ironmongery
PC	Painting
PD	Disinfection of Pipelines
PSP	Steel Pipes
PE	The Client's Pre-Construction and Health Plan
PF	Valves
PES	Environmental Specification

STATUS

The Project Specification, consisting of two parts, forms an integral part of the contract and supplements the Standard Specifications.

Part A contains a general description of the works, the site and the requirements to be met.

Part B contains variations, amendments and additions to the Standardized Specifications and, if applicable, the Particular Specifications.

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

PROJECT SPECIFICATION: PORTION 1

SABS 1200 PS: GENERAL

PS-1 PROJECT DESCRIPTION

PS-1.1 Employer's Objective

Ugu District Municipality as part of the municipality's sanitation programme, under the terms of reference as per contract. This appointment is for the assessment of waterborne sanitation within the Harding area which includes assessment, upgrade or replacement of existing reticulation sewerage pipelines and associated infrastructure up to WWTW and refurbishment of the wastewater treatment works.

District Municipality	Local Municipality	Areas
Ugu DM	Umuziwabantu Local Municipality	Harding Town

The observed area consists of full waterborne sewerage system for town (CBD and suburban area. Each erf is connected into the system via manholes (MH) some of which are located in the road reserves. The manholes are either fabricated by pre-cast concrete manholes and 160 mm diameter uPVC piping. Most of the manholes are fitted with cast iron manhole covers.
The effluent from the catchments ultimately discharges into the Wastewater Treatment Works (WWTW) located north-east of the town across the N2. The capacity of Harding WWTW is 2Mℓ/d. Harding Wastewater Treatment has operational challenges mainly related to mechanical and electrical problems.

PS-1.2 Overview of the Works

Under this Contract **UGU-07-1661-2024,** the Ugu District Municipality is inviting tenders for the Upgrade of Harding Sewer Reticulation System & Refurbishment of the Wastewater Treatment Works. Simultaneously with this contract, tenders have also been invited for the following contracts:

PS-2 EXTENT OF THE WORKS

Under this contract, the successful contractor will be required to Upgrade of Harding Sewer Reticulation System & Refurbishment of the Wastewater Treatment Works.

The work will, *inter alia,* include the following:

- Upgrade of Harding Sewer Reticulation System & Refurbishment of the Wastewater Treatment Works:
  - Upgrade of Hawkins Street Sewer Pipeline
  - Upgrade of Musgrave Street Sewer Pipeline
  - Upgrade of Field Street Sewer Pipeline
  - Livingstone Street Sewer Pipeline

- Refurbishment of Wastewater Treatment Works.

PS-3 DESCRIPTION OF THE SITE AND ACCESS

PS-3.1 Access

The Project Plan being a drawing 1703/ENG001 is included with the tender documentation and shows the general access to the sites. A locality map of the Upgrade of Harding Sewer Reticulation System & Refurbishment of the Wastewater Treatment Works are as follows:

Latitude	Longitude
30°34'34.51"S	29°52'53.50"E

The Ugu DM will arrange for the right to access the site.

PS-4 NATURE OF GROUND AND SUBSOIL INVESTIGATIONS

Subsoil geotechnical investigations have been not been undertaken on the site. No responsibility is accepted for any conclusions drawn by Tenderers from the results and information supplied (if any) and Tenderers must satisfy themselves as to the nature of materials to be excavated under this contract.

PS-5 ENGINEERING AND DESIGN

PS-5.1 Design Services and Activity Matrix

The following matrix of responsibilities for design of permanent and temporary works will apply:

Activity Work designed by, per design stage	Responsible Party
Concept, feasibility and overall process	Employer
Basic engineering and detail layouts to tender stage	Employer
Final design approved for construction stage	Employer
Temporary works	Contractor
Permanent Works	Contractor
Preparation of as built drawings	Contractor

PS-5.2 Employer's Design

The Employer's design will be for all permanent works and will be detailed in drawings, site instructions the technical specifications to be issued with the tender documents and issued during construction.

PS-5.3 Design Brief

The contractor will be responsible for design of the following (which are all subject to approval by the Engineer):

- Site layouts for the contractor's camp and office accommodation
- Site layouts for the Engineer Representative's temporary office accommodation
- Construction Methodology
- Formwork
- Scaffolding and all staging work
- All other temporary works
- Concrete Mix designs

The costs of the designs will be deemed to have been included in the scheduled items in the Schedule of Quantities. No other additional payments will be certified to cover these activities.

PS-5.4 Drawings

The following drawings will be required to be prepared by the contractor as a minimum:

- Site layouts for the contractor's camp and office accommodation
- Site layouts for the Engineer Representative's temporary office accommodation
- Scaffolding and all staging work

The costs of the designs will be deemed to have been included in the scheduled items in the Schedule of Quantities. No other additional payments will be certified to cover these activities.

The tender drawings are applicable to the contractor are detailed in Part C5 of these documents. These drawings have been used for setting up the Bills of Quantities.

PS-5.5 Design Procedures

The contractor will be required to furnish the following designs for approval by the Engineer at the indicated times:

Site layouts of the Contractor's camp and office accommodation – within 14 days from commencement date of the contract and in any case prior to the erection of the contractor's camp and offices

Layouts for the Engineer's representative office – within 14 days from commencement date of the contract and in any case prior to the erection of the Engineer's Representative's temporary office premises.

Formwork design – within 14 days of commencement of work and in any case prior to the construction of permanent reinforced concrete works.

Scaffolding and all staging work – within 14 days of commencement of work and in any case prior to the construction of permanent reinforced concrete works.

Concrete Mix Designs for the all classes of concrete as measured in the Schedule of Quantities prior to the placement of any concrete work

The costs of the designs will be deemed to have been included in the scheduled items in the Schedule of Quantities. No other additional payments will be certified to cover these activities.

PS-5.6 Interface with other Contractors

The contractor may be required to provide access to other contractors undertaking work as per the parallel contracts. The costs of this interface will be deemed to have been allowed for in the appropriate items in the Schedule of Quantities. No other additional payments will be certified to cover these activities.

PS-6 CONSTRUCTION AND MANAGEMENT REQUIREMENTS

PS-6.1 General

The Contractor is referred to SANS 1921: 2004: Construction and Management Requirements for Works Contracts, Part 1: General Engineering and Construction Works, and Part 2: Accommodation of Traffic on Public Roads. These specifications shall be applicable to the contract under consideration and the Contractor shall comply with all requirements relevant to the project.

Certain aspects however require further attention as described hereafter.

PS-6.2 Quality Assurance (QA) *(Read with SANS 1921 – 1: 2004 clause 4.4)*

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

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

PS-6.3 Management and disposal of water *(Read with SANS 1921-1: 2004 clause 4.6)*

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

PS-6.4 Disposal of spoil or surplus material *(Read with SANS 192-1: 2004 clause 4.10)*

The Contractor shall dispose all surplus and unsuitable material in legal spoil areas of his own choice. He shall be responsible for all arrangements necessary to obtain such spoil sites.

PS-6.5 Testing *(Read with SANS 1921 – 1: 2004 clause 4.11)*

PS-6.5.1 Process control

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

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

PS-6.5.2 Acceptance control

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

PS-6.6 Survey beacons *(Read with SANS 1921 - 1: 2004 clause 4.15)*

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

PS-6.7 Existing Services *(Read with SANS 1921 - 1 : 2004 clause 4.17)*

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

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

PS-6.8 Management of the environment *(Read with SANS 1921 - 1 : 2004 clause 4.19)*

The Contractor shall pay special attention to the following:

(a) Natural Vegetation

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

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

(b) Fires

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

PS-6.9 Overhaul

No payment will be made for overhaul on this contract unless provision is made thereof in specific items.

PS-6.10 Excavations

Due to the depths of sewer lines and their location nets to a water course, the Contractor is to allow in their tendered rates for excavation, for shoring and protection of trenches. No additional payment will be made for protection of excavations for whatever reason.

PS-6.10 Security

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

PS-7 CONSTRUCTION PROGRAMME

PS-7.1 Preliminary programme

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

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

In determining his construction programme, the contractor should allow for disruptions/stoppages/requirements and intermittent "hold" of work while awaiting Engineer's inspections at the following critical stages:

Stage		Delay
1.	Agreements and Compensation for Land with Land Owners	2 weeks
2.	Excavation works for pipelines and prior to preparation of bedding	1 day
3	Excavation works for structures and prior to casting of blinding	1 day
4.	Following preparation of bedding and laying of pipes and prior to backfilling	1 day
5.	Prior to commencement of pressure testing of pipelines	1 day

No additional payments, other than through scheduled items, will be made for these stoppages/disruptions/constraints.

In addition, the contractor is required to establish the Engineer's facilities within 14 days of commencement. Should the contractor fail to provide approved establishment within the stipulated 14 days, the contractor will pay a penalty calculated as follows:

- Mileage of the Engineer's Representative from other offices from the nearest business centre to site and back to office at R3.00/km.
- Rented Office space equivalent to that stipulated in this contract at offices in Port Shepstone or other place closer to the site.

The Employer intends to award this contract for commencement of construction in July 2023.

PS-7.2 Programme in terms of Clause 5.6 of the General Conditions of Contract

It is essential that the construction programme, which shall conform in all respects to Clause 5.6 of the General Conditions of Contract, be furnished within the time stated in the Contract Data. The preliminary programme to be submitted with the tender shall be used as basis for this programme. The Contractor's attention is also drawn to clause 5.7.1 of the General Conditions of Contract 2015.

The Employer intends to award construction contracts by June 2014.

PS-8 SITE FACILITIES AVAILABLE

PS-8.1 Contractor's camp site and depot *(Read with SANS 1921 - 1: 2004 clause 4.14)*

The Contractor will be permitted to locate his offices, storage facilities, workshops, latrines, etc, on a site approved by the Engineer, in liaison with the community.
Temporary buildings and fencing are to be neat and presentable and the surrounding areas must at all times be kept in a neat, clean and orderly condition. The Contractor must not cut down or damage any trees nor make any excavation without the written permission of the Engineer and will be required to restore the site to its original condition on completion of the Works.

All buildings and latrines shall be in accordance with the Local Authority and State Heath regulations and shall be kept in a clean, sanitary condition to the satisfaction of the Engineer.

PS-8.2 Accommodation of Employees

No employees except for security guards will be allowed to sleep or be accommodated on the site in urban areas. No housing is available for the Contractor's employees and the Contractor shall make his own arrangements to house his employees and to transport them to site. No informal housing or squatting will be allowed.

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

PS 8.3 Source of Water Supply

The Contractor shall make his own arrangements for the supply of water for construction purposes. The source of water shall be subject to the approval of the Engineer. The Water Services Authority in the area is Ugu District Municipality. Should the contractor's source of water be Ugu District Municipality, the contractor will be required to ensure that the water account with Ugu District Municipality is in good standing prior to the issue of completion certificate. The Engineer will withhold any payments until arrears are cleared with Ugu District Municipality.

PS 8.4 Source of Power Supply

The power supply authority is Eskom. The Contractor will be required to make his own arrangements with, and pay all the requisite connection and consumption charges to Eskom for whatever temporary power supplies he may require for his use on the site and his tender will be held to include for all such costs and charges. Should the Contractor use power supply at the Vulamehlo WTW, he will be required to enter into an agreement with the Employer for the use of power supply at the works.

PS-9 SITE FACILITIES REQUIRED

PS-9.1 Facilities Required for the Engineer

PS 9.1.1 Temporary/Permanent Offices

The Contractor is to provide a temporary office for use by the Engineer. The offices should be able to accommodate one full time Engineer's Representative and two assistants.

The Engineer's offices are to be equipped with the following as a minimum:

- Three desks each with lockable drawers
- Three high back swivel chairs
- Three visitors chairs
- A facility to store/hang drawings
- An electric refrigerator of at least 200 litres capacity

The Contractor should also make arrangements for covered facilities to enable the accommodation of approximately 12– 16 people during progress site meetings, to be held fortnightly or monthly.

The facilities are to be provided, to the satisfaction of the Engineer, within 14 days of commencement date. ***The Engineer may withhold certification of the first progress payment until these facilities are provided.***

PS 9.1.2 Laboratory Facilities

The Contractor will not be required to provide a testing laboratory on site for use by the Engineer.

PS 9.1.3 Sanitary Facilities

All latrines shall conform to the requirements of the Local Authority and shall be subject to approval by the Engineer. All sanitary fees and charges due under the Local Authority or State Health Regulations or bylaws shall be paid by the Contractor. Throughout the progress of the contract, all latrines shall be maintained by the Contractor in a clean, sanitary condition to the satisfaction of the Engineer.

PS 9.1.4 Telephone Facilities

The Contractor will not be required to provide a telephone for use by the Engineer. The contractor will however be required cover cellphone costs for the engineer's site staff for airtime valued at R150/week. Appropriate items have been provided in the Schedule of Quantities to cover these costs.

PS 9.1.5 Housing Facilities

The Contractor will not be required to provide housing facilities for the Engineer's staff. However, a provisional sum has been provided in the schedule of quantities for payment through the contract for accommodation for the Engineer's staff.

PS 9.1.6 Parking Facilities

The Contractor will be required to provide two uncovered parking bays for the Engineer.

PS 9.1.7 Engineer's Transport

The Contractor will not be required to provide transport for the Engineer's staff.

PS 9.1.8 Security

The Contractor will be responsible for providing adequate security for the Works and for the site establishment. All costs associated with the provision of security staff shall be borne by the Contractor and should allowed for in the rates tendered for items in the Schedule of Quantities. No additional payments will be made for security measures taken during the contract period, other through the schedule items in the Schedule of Quantities.

PS 9.1.9 Contract staff to assist the Engineer

The following staff will be recruited by the contractor to assist the Engineer in carrying out his services:

Description of Staff	Nº Required	Remarks
Environmental Monitoring	1	Provisional sum provided for appointment as directed by the Engineer. Personnel directed by and report to Engineer
Occupational Health & Safety Monitoring	1	
Technical Assistant	1	
ISD Consultant	1	
Community Liaison Officer	1	

The required personnel will be identified by the Engineer and report to the Engineer. Provisional Sums and the relevant mark-up Items are provided for in the Schedule of Quantities to cover these costs.

PS 9.1.10 Survey Equipment

The contractor shall provide the following survey equipment, in good condition, for use by the Engineer throughout the duration of the contract:

- A dumpy level
- Measuring tape
- An assistant, when required, to assist the Engineer to operate survey equipment, when provided

PS 10. EXISTING SERVICES

PS 10.1 Care, Damage and Protection

Known services will be indicated in the tender and contract documents. The Contractor will be responsible for identifying all services with the relevant Service Providers.

The Contractor shall familiarize himself with all services and expose them at the start of the Contract to verify their position and establish their depths.

No additional payment will be made to the Contractor for identifying and locating services. Therefore the Contractor will have to include the costs thereof in the scheduled items in the Schedule of Quantities.

Any information regarding existing services is given in good faith and without guarantee.

PS 10.2 Blasting

No blasting will be permitted unless the Contractor can satisfy the Engineer that his proposed blasting methods and controls are such that no damage will be caused to the adjoining building structures, pipelines or services. In any event the Engineer will require the Contractor to plan and execute each blast in such a manner as to ensure that no damage will be caused to any structure, pipeline or service. In addition, the Engineer will require vibro-recordings to be taken at no additional cost to the Employer. No blasting is to be carried out in Eskom servitudes or wayleaves unless the Eskom authorities have been advised in writing three weeks prior to blasting. Where blasting is done adjacent to Eskom power lines, the Contractor shall arrange for a representative of Eskom to be present prior to and during any blast.

PS 10.3 Environmental Aspects

The Contractor will be required to plan and undertake his work in a manner that minimises its impact on the natural environment. Trees and other vegetation shall, wherever possible, be left undisturbed. Trees that are marked by the Engineer shall not be damaged and in the event of the Contractor doing so, a penalty will be deducted from monies due to the Contractor.

Every effort shall be made by the Contractor to prevent pollution of the adjacent areas and river and to reduce the noise, dust and fumes emanating from his construction activities.

PS 10.4 Dealing with Water

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

In drawing up his programme, the tenderer is to take into account the following:

i) Permissible period of downtime of the existing infrastructure to allow the contractor to make the necessary interconnections: 09:00 up to 16:00, i.e. 7 hours, during the day.

ii) The infrastructure must be operational every day except for the period mentioned above.

iii) The infrastructure is currently in use.

iv) The employer shall be responsible for the operation of all valves and its water supply system.

The Contractor shall not operate any valve unless the Contractor has received from the Engineer prior written permission to do so which permission shall be limited to a specific time and operation in each case unless expressly stated to the contrary in writing by the Engineer.

It shall be the responsibility of the Contractor to give prior written notice timeously (min 2 working days) to the Engineer in every case in which the Contractor may request valve operation or prevention of valve operation by the Employer.

The Employer cannot guarantee watertight closing of valves; it shall be the responsibility of the Contractor to do and provide everything necessary for the timeous, efficient and safe disposal of all water which may leak through closed isolating valves and thence into places from which, in the opinion of the Engineer, the leaking water has to be removed for good reason. (The Engineer shall certify extra payment in respect of the costs of such valve-leakage-water disposal measures as in his opinion could not reasonably have been avoided or reduced.)

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

Where necessary, the Contractor shall construct temporary drainage channels to divert ground water or leakage from non-closing valves and fire hydrants from his excavation and excess water must be pumped out.

No compensation for any variation of the actual conditions during construction from the data given will be considered. Neither will additional compensation be considered for data omitted or inaccurately given.

The rates tendered shall allow for the requirements of this clause and all incidentals.

PS 10.5 Servitudes and Rights of Way

The Employer will, where necessary, obtain permanent servitudes and rights of way along the road routes indicated on the tender drawings. New servitudes will only be registered after completion of the Works.

PS 10.6 Dealing with Damaged Services

In the event of any service being damaged or accidentally disconnected for any reason, the Contractor shall immediately contact the relevant authority for instruction and shall report the occurrence of the incident. The damage is to be repaired as soon as possible to the approval of the Engineer and the authority. The Contractor will be held responsible for paying all costs incurred by the authority or himself as a result of each such incident, where relevant.

PS 10.7 Accommodation of Traffic

The Contractor shall ensure the safe and expeditious passage of traffic at all times and shall provide all necessary temporary road traffic signs, barricades, flagmen, etc to safeguard the travelling public. Any detours or bypasses constructed by the Contractor shall be adequately signposted, as per the South African Road Traffic Signs Manual, and maintained in such a manner as to provide safe and easy passage of traffic.

The contractor shall also ensure that property owners have access to the properties at all items regardless of pipeline trenches being excavated across driveways.

PS 10.8 Spoil Material

No indiscriminate spoiling of material will be allowed. All surplus or unsuitable material shall be spoiled, levelled and spread in designated areas as directed by the Engineer. All haul will be regarded as free haul.

PS 10.9 Finishing and Tidying and Defects Liability Period

On no account must rubble and spoil materials, other materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily impede the activities of other Contractors or Authorities.

Finishing and tidying must not simply be left until the end of the construction period. The Contractor will be entitled, subject to prior agreement with the Engineer and within reasonable limits, to request that work in a particular area and/or work of a particular discipline, be inspected for partial completion. The specified defects liability period in respect of any specific section of the Works shall commence on the date on which the relevant section is accepted by the Engineer as being completed, i.e. fully commissioned, including finishing and tidying.

On completion of the Contract the Contractor shall ensure that all materials used in the construction of the temporary Site office, workshop and storage yard are removed from Site. Waste materials such as construction debris and soil contaminated with oil and fuel are to be disposed of at the solid waste disposal site used approved by the Engineer. Prior to the handover of the Site to the Employer, the Contractor and the Engineer will conduct a post construction audit to determine if any additional measures that are to be taken. The Completion Certificate will only be issued after this stage.

PS 10.10 Employee Accommodation

(See Subclause 3.2.1 of Section A of Part 2 and Subclause 1.2.1 of Section A of Part 3 of SABS 0120)

The Contractor shall conform in all respects with the provisions of any Act, Regulations or By-Law of Ugu District Municipality, which may be applicable to employee accommodation. Save for a security guard on active duty, no employees may be housed on Site or the Contractor's campsite after normal working hours.

PS 10.11 Employment of Local Labour

The Employer has determined that 100% of the Contractor's unskilled labour force shall be made up from the local community. A labour sub-committee (of a Project Steering Committee) comprising representatives of the community and other stakeholders will be responsible for the recruitment of all local labour. The Contractor will be required to provide details of the numbers

of semi-skilled and unskilled workers he will require, together with their anticipated starting dates. The PSC through its labour sub-committee will then make this labour available to the Contractor.

A minimum of 50% of the local labour shall comprise of women and, where appropriate, disabled labour shall be employed. It is a requirement that tenderers acquaint themselves fully with requirements for registration with Unemployment Insurance Fund.

The Employer requires that the successful contractor registers all labour with the Unemployment Insurance Fund. The local labour rate has been determined at R199 per day per labourer. The task for excavation by hand has been agreed at 2,4 m³/day (e.g. 0,76 m x 1,0 m x 3,15 m).

During project execution, the successful contractor will be required to provide progress reports indicating to what level these requirements have been met.

PS 10.12 Frequency of Labour Wages Payments

The contractor will be required to pay labour on a fortnightly basis.

PS 10.13 Training and Capacity Building

No training of personnel is required under this contract.

PS-11 REQUIREMENTS FOR ACCOMMODATION OF TRAFFIC

PS-11.1 General

The Contractor will be responsible for the safe and easy passage of public traffic past and on sections of roads of which he has occupation or where work has to be done near traffic.

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

PS-11.2 Basic Requirements

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

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

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

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

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

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

PS-11.3 Traffic Safety Officer

Where warranted by traffic conditions on or near the site, the Contractor shall nominate a suitable member of his staff as traffic safety officer to be responsible for the arrangement and maintenance of all the measures for the accommodation of traffic for the duration of the project. Duties of the traffic safety officer shall be as set out in SANS 1921 Part 2 and shall also be in compliance with the Occupational Health and Safety Act No 85 of 1993 and the Construction Regulations 2003.

PS-11.4 Payment

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

Items that may be considered for payment are specified in SABS 1200 Standardized Specifications and the related project specification.

PS-12 OCCUPATIONAL HEALTH AND SAFETY (*Read with SANS 1921 - 1: 2004 clause 4.14)*

PS-12.1 General statement

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

For the purpose of this contract the Contractor is required to confirm his status as mandatary and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of the Occupational Health and Safety Act by executing the Agreement form C1.2.4 included in Section C1: Agreements and Contract Data.

PS-12.2 Health and Safety Specifications and Plans to be submitted at tender stage

(a) Employer's Health and Safety Specification

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

(b) Tenderer's Health and Safety Plan

The successful Tenderer shall, on receipt of notification that he has been awarded the contract, submit without delay his own documented Health and Safety Plan for the execution of the work under the contract. His Health and Safety Plan must at least cover the following:

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

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

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

PS-12.3 Cost of compliance with the OHSA Construction Regulations

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

Items that may qualify for remuneration will be specified in the Safety Specifications included or in the Project specifications.

PS-13 ADVERSE WEATHER CONDITIONS

In terms of Clause 5.12.2 of the General Conditions of Contract, extension of time will be considered for **abnormal rainfall**. The numbers of days per month on which work is expected not to be possible as a result of **normal rainfall**, and for which the Contractor shall make provision in his tendered rates, prices and programme, are listed in Table PS-12.1 hereafter. Only the number of days lost as a result of adverse weather conditions, exceeding the number of days listed in Table PS-12.1, will qualify for consideration of extension of time.

During the execution of the Works, the Engineer's Representative will certify a day lost due to abnormal rainfall and adverse weather conditions only:

- if no work was possible on the relevant working day on any item which is on the critical path according to the latest approved construction programme; or

- if less than 30% of the work force and plant on site could work during that specific working day.

Extension of time as a result of abnormal rainfall and adverse weather conditions shall be calculated monthly being equal to the number of working days certified by the Engineer's Representative as lost due to rainfall and adverse weather conditions, less the number of days allowed for as in Table PS-13, which could result in a negative figure for certain months. The total extension of time as a result of abnormal climatic conditions for which the Contractor may apply, shall be the cumulative algebraic sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as nil."

Table PS-13: Expected Nº of Working Days Lost Monthly Due to Normal Rainfall

MONTH	Expected number of working days lost as result of normal rainfall
JANUARY	*5
FEBRUARY	5
MARCH	4
APRIL	1
MAY	1
JUNE	1
JULY	1
AUGUST	1
SEPTEMBER	2
OCTOBER	3
NOVEMBER	4
DECEMBER	5
TOTAL	***33 days***

(Based on information obtained from the Weather Bureau, Department of Environment Affairs, Margate. The average monthly rainfall figures quoted, are included for information only, and shall not be taken into consideration for calculation of extension of time. The number of working days lost for December and January allows for the builders' holidays from 15 December 2024 and ending on 09 January 2025.)

PS-14 SITE MEETINGS AND REPORTING

The Contractor will be required to attend site meetings organised by the Engineer. In these meetings he (the Contractor) will be required to provide progress reports and other reports to monitor the outputs of the contractor, as may be required from time to time, to be presented in a format prescribed by the Engineer. The frequency of such meetings will be monthly, as a minimum. However the frequency can be reviewed, depending on the progress of the contract.

PS-15 PREFERENTIAL PROCUREMENT

For the purpose of this contract the Contractor shall comply with the preferential procurement statement provided in F.3.11 and T2.2 of the Tender Data.

PROJECT SPECIFICATION: PORTION 2

AMENDMENTS TO THE STANDARD AND PARTICULAR SPECIFICATIONS

INTRODUCTION

In certain clauses the standard, standardized and particular specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains additional specifications required for this particular contract.

The number of each clause and each payment item in this part of the project specifications consists of the prefix PS followed by a number corresponding to the number of the relevant clause or payment item in the standard specifications. The number of a new clause or payment item, which does not form part of a clause or a payment item in the standard specifications and which is included here, is also prefixed by PS, but followed by a new number which follows on the last clause or item number used in the relevant section of the standard specifications.

PROJECT SPECIFICATION: PORTION 2

SABS 1200 PSA: GENERAL

PSA-3 MATERIALS

PSA-3.1 Quality

Where there is a standardization mark programme for any material, all such material supplied shall bear the official standardization 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-3.3 Applicable Standards for Cement (*Additional Subclause*)

The standard cement specifications SABS 471, SABS 626, SABS 831 and SABS 1466, referred to in clause 3.3, have been withdrawn and are replaced by the new SANS 50197-1 and -2: Common cements, and SANS 50413-1 and -2: Masonry cement. These specifications will be applicable to this contract, and the descriptions and types of cements specified, will be based on the designations as defined in these specifications.

PSA-4. PLANT

PSA-4.2 Contractor's Office, Stores and Services

The Contractor's camp shall be kept neat and clean at all times and all surplus or rejected material shall be removed from the site.

PSA-5 CONSTRUCTION

PSA 5.1 Survey

PS A 5.1.1 Setting Out Of the Works

Substitute the first sentence in A 5.1.1 with the following:

"Setting out of the works is the sole responsibility of the Contractor and shall be done from survey beacons identified by the Engineer. The Contractor shall, within two (2) weeks after the site has been handed over to him, confirm himself that the survey beacons are correct. Any discrepancy shall immediately be reported in writing to the Engineer. Any costs or subsequent costs arising from discrepancies, which had not been reported to the Engineer within the aforementioned period, shall be the sole responsibility of the Contractor. A grid of final terrace levels over the site of the works will be issued to the Contractor at the commencement of the contract and it is the Contractors responsibility to preserve all setting out pegs based on this information as given for the duration of the contract."

PS A 5.4 Protection of Overhead and Underground Services

Add the following paragraph:

"The Contractor shall as soon as possible after handing over of the site, commence with the detection to existing services, continue with it without interruption, and finalise it at least 7 days before excavation starts at that particular section."

PSA-5.8 Ground and access to works

Add the following:

"On completion of operations the Contractor shall restore the ground surface, wherever it may have been disturbed, to its original condition by filling in all ruts with material similar to the material within the rut and levelling the ground and, where necessary, planting grass and shrubs as may be required. Any boundary fences which have been removed or damaged by his operations and activities shall be repaired and/or reinstated at the Contractor's expense".

PSA-5.9 Accommodation of Traffic *(additional subclause)*

Where construction work has to be carried out on or near public roads, the Contractor shall deal with traffic as specified in SANS 1921-2 (2004): Construction and Management Requirements for Works Contracts, Part 2 : Accommodation of Traffic on Public Roads occupied by the Contractor. The Contractor is also referred to Project Specification PS-10.

PSA-8. MEASUREMENT AND PAYMENT

PSA-8.3 Scheduled fixed-charge and value-related items

PSA-8.3.2 Establishment of Facilities on the Site

PSA-8.3.2.1 Facilities for the Engineer

Add the following additional subitems:

(d) Carports *(state number)* Unit : Sum

The tendered rate shall cover all costs as specified in Subclause 8.3.2.3 of SABS 1200 A (and 5.5 of SABS 1200 AB to provide these facilities as specified in Clauses PSAB-3.2, 3.3 and 4.2. if applicable).

PSA-8.3.2.2 Facilities for Contractor

For this contract the facilities for the Contractor will not be measured and paid for separately as itemised in Subclause 8.3.2.2. The subitems (a) to (j) will be consolidated into one item and payment under item PSA-8.3.2.2 shall be deemed to cover all these subitems.

PSA-8.4 Scheduled time-related items

PSA-8.4.2 Operation and maintenance of Facilities on Site

PSA-8.4.2.1 Facilities for Engineer

Add the following additional subitems:

(e) Carports ..... Unit : Sum
(f) Survey instruments ..... Unit : Sum

The rates tendered shall cover all costs as specified in Subclause 8.4.2.3 of SABS 1200 A and 5.5 of SABS 1200 AB to operate and maintain these facilities as specified in Clauses PSAB-3.2, 3.3 and 4.2.

PSA-8.4.2.2 Facilities for Contractor

Consolidate subitems (a) to (j) of Clause 8.4.2.2 into one item as in PSA-8.3.2.2. Payment under PSA-8.4.2.2 shall be deemed to cover subitems (a) to (j).

PROJECT SPECIFICATION: PORTION 2

SABS 1200 PSD: EARTHWORKS

PSD-1 EARTHWORKS

The Contractor is referred to SANS 1921 - 5: Earthworks activities which are to be performed by hand

PSD-3 MATERIALS

PSD-3.1 Classification for excavation purposes

PSD-3.1.2 Classes of excavation

The classes of excavation in clause 3.1.2 shall in general apply to all excavations where use is made of conventional methods and plant and equipment.

Where labour-intensive methods applicable to targeted labour are specified, soft excavations shall be defined as follows:

"PSD-3.1.2(a) Soft excavation

Soft excavation for labour-intensive work where excavations are to be carried out by hand methods, shall be excavation in material that can be efficiently removed and loaded with picks, shovels and other hand tools by an average able-bodied person or group of persons. Soft excavation shall include small boulders that can be removed by hand methods.

Soft excavation can be further broken down by introduction of an additional class such as "Soft Excavation Class A", which is excavation defined as soft, but which can only be excavated with difficulty.

The criteria for classifying Soft Excavation Class A shall be as follows:

Granular material: - dense material with high resistance to penetration by the point of a geological pick; several blows are required for removal of material; 7 to 15 blows of the dynamic cone penetrometer are required to penetrate 100 mm; and

Cohesive materials - stiff to very stiff material requiring 6 to 8 blows of the dynamic cone penetrometer to penetrate 100 mm, where:

"stiff" material can be indented by thumbnail; slight indentation produced by pushing a geological pick point into the soil; cannot be moulded by fingers; and where:

"very stiff" material can be indented by thumbnail with difficulty; slight penetration of point produced by blow of geological pick.

Where soft excavation class A material is encountered, it shall be measured and paid for as an extra over soft excavation.

PSD-5 CONSTRUCTION

PSD-5.1 Precautions

PSD-5.1.1 Safety

PSD-5.1.1.2 Safeguarding of excavations

- ***Add the following subparagraph:***

"(g) The Contractor or his agent or his representative shall **not** require or allow any person to work under unsupported overhanging material or in an excavation which is more than 1,5 m deep, and any excavation which has not been adequately supported or braced if there is a danger of the overhanging material or the sides of the excavation collapsing. The support, shoring or bracing to be designed and constructed by the Contractor, shall be strong and sturdy enough to support the sides of the excavation in question."

PSD-5.2.2.1 Excavations for general earthworks and for structures

- ***Add the following additional subparagraph:***

"(f) The Contractor shall so plan his cut-to-fill operations that all excavated material is used in the manner that is most appropriate.

The Contractor shall conserve all suitable surplus material and he shall not borrow, spoil or waste any material unnecessarily. If excavated material designated for a particular purpose become contaminated, is incorrectly used or becomes unavailable through injudicious planning of excavation operations, the Contractor shall replace the contaminated material and make good any shortfall with material of quality at least equal to that of the said selected material.

Where selection of excavated material is required, the method of excavation shall be so arranged as to avoid double handling. Wherever possible excavated material shall be placed in its final position without being stockpiled. If stockpiling is unavoidable, materials intended for different uses shall be stockpiled separately

PROJECT SPECIFICATION: PORTION 2

SABS 1200 PSD: EARTHWORKS (PIPE TRENCHES)

PSDB-5 CONSTRUCTION

PSDB- 5.1 Precautions

PSDB-5.1.5 Trench Excavations *(additional subclause)*

The precautions for excavations as specified in Clause 5.1.1 of Section 1200 D, 1200 DA, and the relevant clauses in PSD and PSDA, shall also apply to all trench excavations.

The Contractor shall take all the steps necessary to ensure that no person is required or allowed to work in a trench or any other unsupported overhanging excavation which is more than 1,5 m deep, and any excavation which has not been adequately supported, shored or braced if there is any danger whatsoever of the sides of the excavation collapsing. The support, shoring or bracing to be designed and constructed by the Contractor, shall be strong and sturdy enough to support the sides of the excavation in question.

PROJECT SPECIFICATION: PORTION 2

SABS 1200 GA: CONCRETE (SMALL WORKS)

PS GA-3 MATERIALS

PS GA-3.2 Cement

PS GA-3.2.1 Applicable specifications

The standard cement specifications SABS 471, SABS 626, SABS 831, SABS 1466 and SABS 1491, have been withdrawn and are replaced by SANS 50197-1: Common cements, and SANS 50413-1: Masonry cement. These specifications will be applicable to this contract and the descriptions and types of cements, where specified, will be based on the designations as defined in these specifications.

PS GA-5.4.1.4 Prescribed mix concrete

Add the following :

"The structural concrete in this contract shall comply with the following specification.

- The minimum 28 day strength shall be as specified in drawings
- The maximum water/cement ration shall be 0.42
- The minimum cement content shall be 400 kg/m3
- The cement used must be extended with a minimum of 30% Fly Ash or 50% GGBS

A detailed mix design by an approved concrete testing laboratory before any concrete is poured in the works and provision shall be made by the contractor for the cost of the design in his rates.

PS GA-8: MEASUREMENT AND PAYMENT

PS GA-8.1 Measurement and rates

PS GA-8.1.2 Reinforcement

Replace subclause 8.1.2.2 with the following:

PSGA-8.1.2.2 Mild steel and high tensile steel will be measured by mass for the diameters or range of diameters as scheduled.

Welded mesh will be scheduled separately for each type and mass per square metre of mesh."
Replace subclause 8.1.2.3 with the following:

"PSGA-8.1.2.3 The unit rate for steel bars shall cover the cost of supply, cutting, bending, placing in position, and fixing of the reinforcing and supporting steel scheduled. The rate shall also include the provision of all spacer devices and binding wire, as well as the cost of tests in terms of SANS 920.

The unit rate for welded mesh shall cover the supply, cutting and placing of mesh, as well as the cost of all waste due to laps."

PROJECT SPECIFICATION: PORTION 2

SABS 1200 LB: BEDDING (PIPES)

PS LB 3.3 BEDDING

Add the following to LB 3.3:

All pipes shall be classified as rigid pipes and shall be laid on a Class C bedding except sub soil drainage, which shall be classified as flexible pipes.

PS LB 5 CONSTRUCTION

PS LB 5.1 General

PS LB 5.1.4 Compacting

Substitute "90 % of mod AASHTO" in LB 5.1.4 with "93 % of mod AASHTO (100 % for sand)".

PS LB 8 MEASUREMENT AND PAYMENT

PS LB 8.2 Scheduled Items

PS LB 8.2.2.4 From stockpile (provisional)

a) Selected granular material ..... Unit: m^3

b) Selected fill material ..... Unit: m^3

The rate shall cover the cost of obtaining, handling and transport regardless the distance, of the required bedding material from the stockpile, the delivery thereof at positions that are spaced along the trench in such a way as suits the working method of the Contractor, as well as the removal of material displaced by this importation within the free-haul distance.

PROJECT SPECIFICATION: PORTION 2

SABS 1200 LD: SEWERS

PSLD 2.3 DEFINITIONS

Add to the Sub-Clause:

Normal Blasting

The method which an experienced blaster employs when carrying out general blasting of hard rock material in trenches.

Close Proximity Blasting

The method which an experienced blaster employs when carrying out blasting of hard rock close to adjacent service or structures requiring additional but smaller charges in order to break up the hard rock without damaging the adjacent services or structures.

PSLD 3 MATERIALS

PSLD 3.1.1 Vitrified Clay Pipes

Delete Sub-Clause 3.1.1.2 and substitute:

Vitrified clay sewer pipes shall be plain ended "Vitro" (or equal) pipes having a crushing strength of at least 45Kn/m. The joints of pipes of 100mm and 150mm diameter shall comprise natural rubber rings within polypropylene couplings.

PSLD 3.1.3 FC Pipes

The FC pipes and fittings comply with the applicable requirements for Series 4 pipes as set out in SABS 819.
The FC pipes and couplings shall be bitumen dipped.

PSLD 3.4 Bedding

Bedding of sewers shall be for flexible pipes (SABS 1200 LB) or concrete encased.

PSLD 3.5.2 Precast Concrete Manhole Sections

Add the following end of the Sub-Clause:

Joints between all wall sections and under roof slab shall be primed and sealed with a plasticized butyl rubber compound ("Built Joint Putty" by ABE or similar approved) complete with one layer of 200mm wide compatible PVC tape and primer (similar or equal to the "Coro Clad" system supplied by Denso South Africa (Pty) Ltd) to be supplied and applied circumferentially to the outside of each wall section joint.

PSLD 3.5.6 Mortar
Delete the sub-clause and substitute the following:

Mortar for brickwork and, where so ordered by the Engineer, for external plasterwork to manholes shall be composed of one part of cement to three parts of clean pit sand. Mortar for the internal plasterwork to manholes where ordered and to the benching within manholes shall be composed of one part of cement to three parts of sand.

PSLD 3.5.8 Manhole Covers and Frames

Add to the first paragraph of the Sub-Clause:

After installation all exposed portions of the CI cover and frame shall be thorough cleaned and painted with two coasts of approved epoxy tar, particular attention being paid to the painting of the underside of the covers and frames.

Precast concrete manhole cover slabs, adaptor slabs and lids shall comply with the applicable requirements of SABS 1294 and to the details shown on the drawings. The precast concrete cover slab shall be so designed as to withstand a point load in the centre, as specified in Clause 8.7 of SABS 1294, of 50 kN for light duty covers and 100Kn for heavy duty covers. The lifting lugs shall be made of 6mm diameter grade 316 stainless steel rod. The openings and undersides of all covers and slabs be coated with two coats of "Proofex 3".

PSLD 4 PLANT

PSLD 4.1 Pipe Handling and Rigging Equipments

Add to the Sub-Clause

The Contractor will be responsible for clearing the areas required for pipe storage which shall include the removal of rock, stones and all combustible material. He shall also be responsible for maintaining the area in a clean and tidy condition for the duration of the Contract.

Upon delivery of the pipes, fittings, specials and valves, these will be inspected jointly by the Engineer's Representative and the Contractor. Any pipes, etc found to be damaged shall be returned to the factory for repair or replacement; in which case the costs of additional transport, repair or replacement shall be borne by the Contractor.
The Contractor will be held fully responsible for the care and safety of all pipes and fittings, etc on site and shall bear the cost of all renewals which may be necessary to make good losses, damages or breakages. Furthermore, he shall fully responsible for handling and re-loading material at the storage areas and for transporting and offloading of all such materials to their correct places along the pipeline route.

PSLD 5 CONSTRUCTION

PSLD 5.4 Connections to Manholes

Add the following paragraph to the sub-clause:

The rates tendered for the construction of manholes are to include for whatever additional costs there may be over and above the tendered rates for the supply, lay, joint, bed and test pipelines, for the supply and fixing the short lengths of pipes entering and leaving manholes.

PSLD 5.6.1 General

The underside of all manhole roofs and edges of the access opening therein and precast concrete covers and lids shall be painted with two coats of "Proofex 3" as supplied by Fosroc (Pty) Ltd, P.O. Box 477, New Germany,3620, or similar approved rubberized bitumen coating so as to protect the concrete from the effects of sewage gases.
The tendered rates for manholes shall include for this work.

PSLD 5.6.5 Precast Concrete Manholes

In the first sentence, delete "Delete LD-5" and substitute with "with drawings"

PSLD 5.7 Concrete Casing to Pipes

Add to the sub-clause:

Concrete casing is to be of 20/19 grade concrete with a minimum thickness of 100 mm below, above top and on each side of the pipe as and where ordered by the Engineer.

PSLD 5.9.3 Recording Location

Delete the last sentence and substitute

The records shall be handed to the Engineer, in a form acceptable to the Engineer, at the time when the Contractor claims payment for the relevant work.

PSLD 6 TOLERANCES

PSLD 6.2 Overall Centre-line Control and Manhole Locations

In second line delete "+-300mm" and substitute "+-150mm"

PSLD 6.3 Manhole Invert-levels

In second line read "+- 25mm" for "+-50mm"

PSLD 7 TESTING

PSLD 7.1.4 Sub Clause

Delete the Sub-Clause and substitute the following:

The sewer, and the house connections along its length, shall be tested simultaneously between manholes or chambers, as applicable. The house connections and the section of the sewer under test shall be suitably "plugged" at the open ends using plugs or stoppers which have been braced adequately.

PSLD 7.2.2 Water Test

The Water Test will not be acceptable under this Contract.

PSLD 7.2.6 Water tightness Testing of Manholes

Wherever ordered in writing by the Engineer that a manhole is to be tested, it is to be tested in his presence or in the presence of his authorized representative, in the following manner.

All sewer inlets and outlets to and from the manhole shall be closed with expanding plugs or other apparatus. Water is then to be introduced into the manhole up to a level 25mm below the underside of the roof slab. The water level is to be maintained for not less than one hour or such longer periods as may be necessary to accurately record the rate of leakage, if any. Careful and accurate records shall be kept at frequent and regular intervals of the variation in the level of the water in the manhole and of the quantity of the water added so that the rate of leakage may be properly determined. In the event of the rate of leakage, if any, exceeding 1.25l/h/m of depth of manhole, or in the event of any weakness, defect or fracture or visible signs of leakage occurring in the manhole under test, the Engineer shall have the right to order the test to be discontinued and the Contractor shall thereupon, at his own expense, search for and rectify any weakness or defect in the manhole under test, such work or rectification to consist of repair or replacement or both. The manhole shall thereafter be refilled with water and retested in the manner specified. This process shall be repeated until a satisfactory test is obtained.

The Contractor will be paid once only for the hydraulic testing of any given manhole at the rate per manhole to be quoted by him in the Schedule of Quantities. The Contractor's prices for the hydraulic testing of manholes shall include for all arrangements for the supply of water for testing the cost of water used in testing where the water is not obtained

free of cost from the Employer for all work of rectification for retesting and fro all labour required to carry out the specified tests.

PSLD 8 MEASUREMENT AND PAYMENT

PSLD 8.2.5 Inspection Chambers

Delete the first and second lines and substitute the following:

Separate items will be scheduled for manholes, backdrops and inspection chambers, etc of each type and of each depth (measured from top of cover to invert) in increments of 1.0m for the first one metre thereafter in increments of 0.5m. The rate shall cover the cost of dealing with any excavation (in all materials, including backfilling and the disposal of surplus materials).

PSLD 8.2.6 Erf Connections

Add at end of Sub-Clause:

"or servitude boundary"

PSLD 8.2.11 Connection to Existing Sewers

The tendered sum is to include for breaking into the existing sewer manholes, dealing with the flow, caulking in the new pipe and for breaking out and reforming benching as required, making the manholes watertight.

PSLD 8.2.13 Intermediate and Hard Rock Excavation (New Sub-Clause)

Insert new Sub-Clause as follows:

8.2.13 Extra over item 'Manholes' above for

a) Intermediate excavation ..... Unit : m^3

b) Hard rock excavation by **normal blasting** or other methods as selected by the contractor (see PSLD 2.3) ..... Unit : m^3

c) Hard rock excavation by **close proximity blasting** (see PSLD 2.3) ..... Unit : m^3

d) Boulder excavation Class A ..... Unit : m^3

Separate items will not be provided for depth increments. Volumes will be computed from the plan area of either the intermediate or hard rock material, excluding the plan area of the specified pipe trench, which is within the area occupied by the manhole plus a side allowance of 600mm and the depth from the top of either the intermediate or hard rock material to the bottom of the same material or to the underside of the Manhole base slab, whichever is the lesser.

THE RATES SHALL COVER THE ADDITIONAL COST OF THE EXCAVATION AND HANDLING OF THE MORE DIFFICULT MATERIAL AND THE DISPOSAL OF MATERIAL

PROJECT SPECIFICATION: PORTION 2

SABS 1200 LE: STORMWATER DRAINAGE

PS LE 3 MATERIALS

PS LE 3.1.1 Material for Subsoil Drainage

PS LE 3.1.1.1 Pipes

Pipes for subsoil drainage shall be uPVC pipes complying with the requirements of SABS 791, but shall be perforated or slotted.

The size of perforations in perforated pipes shall in all cases be 8 mm in diameter ± 1,5 mm and the number of perforations per metre shall be not less than 26 for 110 mm pipes and 52 for 160 mm pipes. Perforations shall be spaced in two rows for 110 mm pipes and in three rows for 160 mm pipes.

Slotted pipes shall have a slot width of 8 mm ± 1, 5 mm. The arrangement of slots shall be subject to the Engineer's approval, but the total slot area shall be not less than that presented for perforations.

Pipes without slots or perforations required for conveying ground water from the subsoil drainage proper to the point of discharge, shall be uPVC pipes as specified above.

PS LE 3.1.1.2 Crushed-stone

Crushed-stone in subsoil drains shall be 19 mm single-sized stone complying with the grading requirements of stone for concrete in SABS 1083.

PS LE 3.1.1.3 Geotextile Blanket

The geotextile blanket around subsoil drains shall comply with the requirements of PS DK 3.1.4 in all respects.

PS LE 3.1.1.4 Sand

Sand obtained from approved commercial sources shall be clean, hard and durable and shall comply with the following grading requirements:

D15 : 0,2 mm to 0,4 mm
D85 : 1,2 mm to 4,7 mm

PS LE 5 CONSTRUCTION

PS LE 5.1 Trench Botton

PS LE 5.1.3 Unsuitable Founding Conditions

Substitute "90 % of MAASHTO maximum density" in LE 5.1.3 with "90 % of MAASHTO maximum density (100 % for sand)".

PS LE8.2 BEDDING AND LAYING

PS LE 8.2.14 Supply and Install Subsurface Drains According To Drawings ..... Unit: m

The length shall be measured on the centre line of the completed subsurface drain.

The rate shall cover the cost of supplying, transporting, off-loading and installing all materials as well as for cutting, wasting, overlapping and installing of the materials where applicable.

PARTICULAR SPECIFICATION: PA

BRICKWORK AND PLASTER

PA1 SCOPE

PA1.1 This specification covers the general requirements for buildings and other masonry structures, including plastering.

PA2 INTERPRETATION

PA2.1 Other relevant Standards/Specification

This specification should be read together with SABS 1200 AA.

PA2.2 Applicable Edition of Standards

Each standard specification referred to in this specification shall be deemed to be the latest edition, applicable on the tender closing date.

PA2.3 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 specifications as "Building Act"), where applicable, shall apply. (Definitions: pages 5 to 14, Symbols: page 23.)

PA3 MATERIALS

PA3.1 Cement

Cement shall conform to the requirements of SABS 471.

PS3.2 Lime

Lime shall be of approved manufacture, well burnt and of uniform quality conforming to SABS 523.

PA3.3 Sand

Sand to be used for mortar and plaster shall comply with the requirements of SABS 1090.

PA3.4 Clay Bricks

Clay bricks must conform to SABS 227. A sample of bricks to be used for construction must be given to Engineer for approval before construction bricks are delivered to site.

The contractor will be required to carry out necessary tests and provide certificates for compliance of the bricks with SABS 227. The cost of these tests will be deemed part of the scheduled rates and no additional payment will be made therefore.

Best quality engineering bricks shall be used for all foundation and concealed situations.

PA3.5 Damp-Proofing

Material used as a damp-proof course shall conform to the requirements contained either in SABS 248 or in SABS 952. Type FV fibre-felt sheets or Type C polyethylene sheets shall be supplied under the contract.

PA3.6 Fibre Cement Sheets

Fibre cement flat sheets, minimum 15 mm thick, shall comply with the requirements of SABS 685.

PA3.7 Storage

PS3.7.1 Cement and Lime

Cement and lime stored on the site shall be properly protected against moisture to the satisfaction of the engineer.

PA4 CONSTRUCTION

PA4.1 Brickwork

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 8 mm thick in the case of the face work or 13 mm thick in the case of plastered walls or work not exposed to view. All joints, both horizontal and vertical, notwithstanding any grade 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. Horizontal joints and vertical joints of face work shall be pointed flush in manholes and catch pits, but shall be pointed and finished with a tooled recessed joint elsewhere. Plastered walls shall have the joints raked out to a depth not less than 13 mm and not more than 20 mm, and subsequently refilled with mortar of the same proportions as the original bedding mortar. In no circumstances may joints to be so formed as to expose any perforation in the units.

Wire ties, where required, shall be stainless steel and are to be installed at 5 per square metre.

PA4.2 Mortar

The mix proportions for the mortar are given below:

Portland cement	50 kg
Lime	0-40 l
Sand*	200 l max.

* measured loose and damp

PA4.3 Plastering

Plaster shall be of the same proportions as the bedding mortar. Any other plaster mixes will be subject to the approval of the Engineer.

PA4.4 Damp-proof Courses

The areas to be covered by damp-proof courses are indicated on the drawings. Damp-proof shall be laid on a surface which shall not contain any sharp objects which may perforate the membrane. The full width of the wall and the whole area under the floor is to be covered by the membrane and shall overlap by not less than 100 mm under the floor, and by not less than 150 mm under the wall. All joints shall be effectively sealed. Where shown on the drawing, the damp-proof course is to be stepped up one course of brickwork in the inner skin. Proper returns are to be made at all doorframes.

PA4.5 Window Sills

Windowsills shall be formed as shown on the drawings and as hereafter described:

Damp-proof sheeting shall be provided one brick course below the sill and shall be turned upwards and terminate behind the window frame to provide an efficient weather-tight seal.

All external sills and some internal sills, where shown, shall be formed in quarry tiles and other internal sills where shown are to be of fibre cement sheet minimum thickness 15 mm to SABS 685 with approximately 20 mm projection beyond the finished face of the walls.

External sills shall be laid to a 20° weathered slope while internal sills shall be laid horizontal.

All tiles shall be bedded in 3:1 cement mortar and neatly pointed.

PA4.6 Lintels with Brickwork Reinforcement

Lintels over doors, windows and openings, where ordered by the Engineer, shall be reinforced with four layers of BRC brick force, or approved equal. The latter reinforcement shall extend a minimum of 450 mm beyond any opening. All joints in the six courses of brickwork above the opening shall be fully flushed with cement mortar. Shoring to soffits of lintels shall be left in position for at least 14 days after building the lintel and the brickwork shall be kept damp with wet bags for the whole of this period.

PA4.7 Wall Vents

Ventilator openings shall be formed through walls where indicated and shall be provided with double brick terracotta louvered air bricks (fitted with plastic insect screens) both externally and internally (where scheduled) set flush into the work and neatly pointed. Internal wall vents are to be of an approved plaster of Paris type where scheduled.

PA4.8 Building in Frames, etc

Door and window 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 doorframes, wrought iron right angled cramps are to be fixed to doorframes 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 to 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.

PA4.9 Floor Finishes

PA4.9.1 Granolithic Floor Screed

Granolithic shall consist of one part cement, one part sand and two parts 5 mm stone chips and oxide where required, thoroughly mixed as for concrete and placed in a layer not less than 20 mm 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 finish is to be steel floated with V joints in squares of 1, 20 m to 1, 80 m, the joints extending for the full depth of the granolithic. Joints are not required in the granolithic screed where it is to be overlaid by tiles or carpeting.

PA4.10 Chasing Walls

Where indicated by the electrical contractor, the construction contractor shall chase brickwork and concrete work to accommodate electrical conduit - such chasing shall precede plastering or rendering and on no account shall plastering or rendering be commenced until the electrical tubing has been installed. No horizontal or diagonal chases shall be permitted.

Elsewhere, electrical conduit shall either be cast into concrete or shall be run on the surface afterwards as may be directed by the Engineer.

PA4.11 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.

PARTICULAR SPECIFICATION: PB

CARPENTRY, JOINERY AND IRONMONGERY WORK

PB1 SCOPE

PB1.1 This specification covers the general requirements for carpentry, joinery and ironmongery work for civil engineering projects and the methods by which the finished work is to be measured for the purpose of payment.

PB2 INTERPRETATION

PB2.1 Other Standards/Specification

This specification is to be read with SABS 1200 AA.

PB2.2 Applicable Edition of Standards

Each standard specification referred to in this specification shall be deemed to be the latest edition, at the closing date of tenders for this contract.

PB3 MATERIALS

PB3.1 Timber

Roof timber forming a permanent part of the work shall conform to the requirements of the relevant standard specifications SABS 563, SABS 653, SABS 876, SABS 1089 or SABS 1245.

All timber other than that used for temporary works or shuttering shall be treated as specified in SABS 1288 and SABS 05, and allowed to dry thoroughly before being used.

PB3.2 Fibre Cement Sheets

Fibre cement flat and corrugated sheets shall comply with the requirements of SABS 685. The flat sheets shall be minimum 15 mm thick.

PB3.3 Hardware

Locks, hinges and other hardware shall be provided to doors; all ironmongery and fixings shall be chromium plated on brass except where otherwise specified.

PB3.3.1 Hinges

Hardwood doors in hardwood frames are to be provided with brass butt hinges as scheduled with three hinges per leaf.

PB3.3.2 Door Locks and Furniture

External door to be fitted with a night latch (to be supplied by the Employer) and a Henderson No 463 bow handle, secured with brass bolts passing through the door with nuts on the inside.

PB3.3.3 Cabin Hooks

One 200 mm brass cabin hook complete with eyes to be fitted to each door including for hardwood block plugged to walls or post as scheduled.

PB4 **MEASUREMENT AND PAYMENT**

PB4.1 The work will be measured and paid for in accordance with the units and rates scheduled.

PB4.2 The tendered rates for doors are to include for the manufacture, fitting hanging and protective painting thereof.

PB4.3 The tendered rates for ironmongery shall include for the supplying and fitting complete with non-corrosive screws and/or bolts.

PARTICULAR SPECIFICATION: PD

DISINFECTION OF PIPELINES

PD 1 INTRODUCTION

The price for testing and disinfecting pipelines and fittings is included in the scheduled items for supply and installation. On completion of construction, after pressure testing and prior to commissioning the pipeline is to be disinfected by the contractor in accordance with this specification.

PD 1.1 Scope of the Code of Practice

This Code of Practice relates to the disinfection of parts used for the disinfection of complete installations. It includes the requirements for bacteriological sampling and dosage of disinfectants, dose rates of disinfectants, disposal of chlorinated water and quality standards for bacteriological samples.

PD 1.2 Definitions

Within this document the term HYPOCHLORITE SOLUTION means a commercial solution of sodium hypochlorite containing 10% to 15% of available chlorine. Also, 10% HYPOCHLORITE SOLUTION means hypochlorite solution diluted one part in ten which thus has approximately 1% of available chlorine. Within this document AVAILABLE CHLORINE and all chlorine concentrations means FREE CHLORINE available to the water environment for its disinfection. 'Water Supply Personnel' means any employee or contract or casual labour whose work includes, even temporarily, the performance of work concerned with partially or fully treated water and sources of underground water and who must possess a current certificate of medical suitability signed on behalf of the Authority.

PD 1.3 Hygiene

Only 'Water Supply Personnel' may undertake the procedures laid out in this Code of Practice.

PD 1.4 Safety

This Code of Practice does not cover the safety aspects of the construction or maintenance of installations or apparatus or of disinfection procedures. Remember always that chlorinating agents are strongly corrosive so protect EYES AND HANDS especially.

PD 2 GENERAL REQUIREMENTS FOR DISINFECTION OF POTABLE WATER APPARATUS

PD 2.1 Components and Equipment

Clean all pipework components, equipment and tools used for repair and remove all grease or scale from components and equipment before use or assembly.

Where full chlorination and bacteriological testing is impractical, then disinfect all materials, components and equipment which could transmit contamination.

Use a solution containing 1% of available chlorine (e.g. 10% chlorophides or other commercial hypochlorite solution or 2% solution of bleaching powder. Contact time must exceed 20 minutes. Rinse or flush the equipment with mains water to prevent excessive corrosion.

PD 2.2 Completed Installations

Ensure that all water used for disinfection purposes has a free chlorine residual of at least 20 mg/ℓ. Refer to section PD 4 and Tables 1 and 2 for volumes or dose rates.

During chlorination the pipeline shall be kept full of water.

Whenever possible keep the installation at normal operating pressure or greater during the contact period.

PD 2.3 Portable Test Equipment

Portable test equipment which may be used in contact with potable water must be kept clean. Any equipment which is in uncertain condition or which is contaminated must be cleaned and disinfected before use.

PD 3 MAINS

PD 3.1 New Mains

PD 3.1.1 Introduction

Do not connect any new main into supply until the water from designated sampling points, having stood in the main for at least 20 hours, has met the criteria specified herein.

New mains are laid with the intention of ensuring as far as possible, the exclusion of debris and contamination, but presume at the disinfection stage that debris and contamination does exist and that this debris is resistant to disinfection, e.g. compacted soil or detritus in joints.

The disinfection procedures, which should follow pressure testing, include:

(a) Swabbing and flushing of the main

(b) Soaking of the main for a minimum period of **20 hours**, using a minimum concentration of **20 mg/ℓ** of available chlorine in mains water.

(c) removal of excess chlorine by flushing the main

PD 3.1.2 Pressure Testing

Only use potable quality mains water for pressure testing new mains. Pressure testing normally follows the construction of each section of the pipeline but precedes final connection to supply. Do not rely on a single sluice valve to isolate the new main from the supply network, while the main is under pressure until disinfection and approval are complete.

PD 3.1.3 Swabbing and flushing

Swab all new mains after pressure testing and prior to disinfection.

After insertion of a soft foam swab, which has been soaked in 10% hypochlorite solution, recharge the pipeline at a rate less than 50 mm per second (3 m per minute) to ensure that the swab is not moved.

Open the inlet valve fully and drive the swab along the pipeline, at a velocity less than 0, 5 m per second (30 m per minute), by controlling the valve at the discharge end.

When the swab reaches the discharge end of the pipeline, flush the main for at least 5 minutes to remove all excess chlorine and discoloured or dirty water. Where possible open inlet and outlet valves as fully as possible.

If the swab removes excessive amounts of debris then re-swab the main.

PD 3.1.4 Chlorination

Chlorinate all new mains to a minimum of 20 mg/ℓ available chlorine and leave to soak for a minimum of 20 hours, prior to flushing with mains water to a chlorine residual equal to that of the background level in the incoming mains water.

Tables in PD 4 show the required minimum dose rates and volumes.

To chlorinate sections of distribution main, less than about 50 m long not exceeding 150 mm in diameter, use a soft swab which has been soaked in 10% hypochlorite solution and proceed as follows:-

- Pour 1 litre of hypochlorite solution for each 1 m^3 of pipeline, into the end of the pipe upstream of the final connection.
- Insert the swab into the end of the upstream pipe to retain the hypochlorite solution.
- Make the final connection.
- Drive the swab past the final connection and along the pipeline, but do not allow the swab to travel at a speed greater then 0, 3 metres per second (20 m per minute).
- Remove the swab and flush the main for 25 minutes.
- Close up the main prior to soaking and sampling in accordance with section PB 3.1.6.

The volume of hypochlorite needed for 50 m of pipeline is:-

50 mm - 100 mℓ,	75 mm - 200 mℓ,	100 mm - 500 mℓ,
150 mm - 900 mℓ,	200 mm -1600 mℓ,	250 mm - 2500 mℓ.

Take all necessary care with the disposal of chlorinated water; follow the procedure laid out in PB 5.

PD 3.1.5 Sampling for Bacteriological Analysis

Once all pressure testing, swabbing and chlorination is complete, fill the main with clean mains water free from excessive chlorine.

Flush all hydrants, washouts and other outlets until the water is clean and free from excessive chlorine. Shut the valves and leave the main to soak for a minimum period of 20 hours.

First check with the laboratory staff of the Ugu District Municipality to determine a suitable time for collection of samples and delivery of them to the laboratory for analysis.

Then pressurise the main and take samples for bacteriological analysis in accordance with the procedure given in section PB 3.1.6. Take these samples from sampling points agreed with the Resident Engineer.

Deliver all samples to the laboratory as soon as possible. Analysis must start within six hours but store the samples in a refrigerator if the delay between taking the sample and the start of analysis is likely to exceed four hours.

Then isolate and leave the main until the results of analysis are available. In the event that the samples fail, flush the main and re-sample after a further soak period of at least 20 hours.

Repeat the above process until disinfection criteria have been satisfied.

The costs of all necessary testing are to be borne by the Contractor.

PD 3.1.6 Sampling Points

Sample points should consist of a ferrule connection, with a short length of polythene piping terminating in a ½" BSP gate valve or manual air valve. Protect this sampling outlet by suitable boxing. Attach a sampling standpipe to the gate valve, disinfect the apparatus with hypochlorite solution and then flame the bib tap outlet on the standpipe. Flush out all traces of hypochlorite, check that the residual chlorine level is not greater than the normal level in the incoming mains water. At scour points and air valves, flush out all trace of hypochlorite, check that the residual chlorine level is not greater than the normal level in the incoming mains water, and then take samples.

PD 3.1.7 Temporary Cross Connections and Final Connections

Where a temporary cross connection supplies mains water to the new main, before making the final connection complete the disinfection procedure of the new main as set out above. When the new main has been proved bacteriologically satisfactory the cross connection may be removed and isolated after suitable disinfection.

PD 4 DOSAGE OF CHLORINATING AGENTS

PD 4.1 Sodium Hypochlorite Solution

Bulk supplies of sodium hypochlorite solution (Chlorophides for instance), are supplied at 10 to 15% available chlorine. This fraction declines progressively as the hypochlorite decays to chloride, chlorate and oxygen. Assume in practice that there is only 10% available chlorine. Assuming 10% available chlorine, and using mains water having a zero chlorine demand, then the following values give estimates of the dilutions required.

- 10% hypochlorite solution (1 part hypochlorite solution in 10 parts solution) contains 10,000 mg available chlorine per litre of 10 kg available chlorine per cubic metre.
- 20 mg available chlorine per litre is equivalent to 200 ml of hypochlorite solution per cubic metre of water.
- 0, 5 mg available chlorine per litre is equivalent to 5 ml of hypochlorite solution per cubic metre of water.

PD 4.2 Chlorine Gas

Chlorine gas, dosed into water by weight, is likely to be about 98% available chlorine. Therefore a direct measurement gives a reasonable estimate.

- Disinfection of replacement parts with chlorine gas in not a practicable possibility.
- 20 mg Chlorine gas (by weight) per litre for disinfection of complete installation is equivalent to 20 grams per cubic metre.
- 0, 5 mg Chlorine gas (by weight) per litre of water is equivalent to 0, 5 grams per cubic metre.

PD 4.3 Bleaching powder, granules and tablets

Bleaching powders, granules or tablets based on Calcium hypochlorite contains 50% to 70% of available chlorine by weight. These materials must be stored under dry conditions. During storage some available chlorine is lost. Follow the manufacturer's instructions particularly concerning the shelf life of the material and dose rate of the tablets. For calculation purposes presume a maximum value of 50% available chlorine i.e. 1 gm of powder, granules etc in 1 litre of water provides 500 mg per litre available chlorine.

PD 5 DISPOSAL OF CHLORINATED WATER

PD 5.1 Introduction

When the pipeline has passed all disinfection criteria if must be drained without causing hazard.

PD 5.2 Methods of Disposal

PD 5.2.1 Overland

Explore the possibility of soaking away disinfection water on adjacent land in rural situation.

PD 5.2.2 Foul sewers

Where disinfection water is discharged into a combined or foul sewer, no de-chlorination is normally necessary but in the former case take care that the rate of discharge of disinfection or flushing water avoids operation of storm sewage overflows and/or the creation of a hazardous atmosphere within the sewer.

PD 5.2.3 Watercourses

In rural areas where disinfection water is discharged to watercourses, either directly or through surface water drains, do not permit a free chlorine concentration in the receiving stream in excess of 0,1 mg/l about 50 metres downstream of the point of discharge. If the discharge is into a ditch, which is not a spawning ground or a nursery or a fishing stream, take advantage of that ditch to mop up chlorine provided that in a significant stream the earlier mentioned limit is not exceeded. In these circumstances use flush water to dilute the chlorinated water whenever possible. Avoid discharge of disinfection water to the head of a watercourse because this area is probably a spawning ground.

PD 5.2.4 Disposal of large volumes

When disposing of large volumes of disinfection water from very long lengths of new main, or in any cases of doubt, consult through the Resident Engineer, the laboratory staff of the Employer.

PD 5.3 De-chlorination

There is no objection to the use of theosulphate or sulphur dioxide as de-chlorination agents. In some cases, at least partial de-chlorination may be achieved by discharge over land. In all cases consult the Resident Engineer.

PD 6 QUALITY STANDARDS AND REPORTING PROCEDURES

PD 6.1 New Mains

PD 6.1.1 Bacteriological Standards

No coliform organisms shall be detected in 100 mℓs of the sample.

The increase in the yeast agar plate count when compared with that of the incoming water shall generally be less than 50 and never more than 150 colonies per ml when incubated at 37°C for 24 hours.

PD 6.1.2 Procedure for Unsatisfactory Samples

Whenever even one E.coli, or 5 or more coliforms per 100 ml are detected, re-chlorinate the main or serve reservoir. When E.coli are not detected but the total coliform count is less than 5 per 100 ml flush and re-sample the main.

D 6.1.3 Physical Standard

If the sample is unusually coloured, turbid or frothy flush the main until acceptable. If this condition is severe, re-sample the main but do not put into service until the samples have passed the required standards.

PD 6.2 Reporting Procedure

Records of disinfection are to be handed to the Resident Engineer.

PARTICULAR SPECIFICATION: PSP – MECHANICAL & ELECTRICAL

1. OPEN CHANNEL FLOW METER

1.1 Ultrasonic Sensor

Applicability: Designed for use with Parshall flumes, rectangular weirs, equal-width weirs, and triangular weirs.

- Voltage: Standard 24V DC or 220V AC.
- Output Signals:
- 4-20mA analogue output.
- RS485 or RS232 digital communication.
- Wiring: Requires a 4-wire connection between the transducer and transmitter (maximum transmission distance ≤100 meters).
- Blind Zone: Inherent blind zone of 0.25-0.45 meters.

1.2 Controller (Transmitter)

- Display: Large backlight LCD display.
- Housing: NEMA 4X (suitable for outdoor and harsh environments).
- Additional Features:
- Internal heater with thermostat for cold locations.
- Conformal coating for high humidity environments.
- Input Power: 120/220 VAC or 9-32 VDC.
- Low power consumption (<4 watts).

Consumption Equation:
The Parshall flume's consumption equation takes the form: Q = A1 * h^A2 (units: m^3/s; meters). Coefficients A1 and A2 are predefined for the ultrasonic level sensor located in the centre of the trough, where the level drop is minimal and the reflected ultrasonic signal returns correctly to the sensor.

Backflow Correction:
Some installations may experience backflow behind the gutter during floods or clogs. To ensure accurate measurement, consider using additional flow meters) to measure the level behind the Parshall flume and correct for any anomalies according to standards like ČSN ISO 98261.

ISO 9826:1992 (Measurement of liquid flow in open channels)

2. INLET SCREEN

The purpose of this section is to provide the technical specifications for an automatic mechanical bar pre-treatment screen (AMBS) to be installed at a sewer treatment plant. The AMBS is a device that separates and removes large solids from the wastewater before it enters the subsequent treatment processes.

2.1 Scope

The scope of this document covers the design, fabrication, installation, testing and commissioning of the AMBS. The AMBS shall comply with the relevant European or South African standards and regulations.

2.2 Design Criteria

The AMBS shall meet the following design criteria:

- The AMBS shall handle a flow rate of 120 cubic meters per hour.
- The AMBS shall have a screening mesh size of 10 mm or less, depending on the characteristics of the wastewater and the downstream treatment processes.
- The AMBS shall have an inclination angle of 60 to 75 degrees from the horizontal.
- The AMBS shall have a frame and a grid made of stainless steel 316L for corrosion resistance and durability.
- The AMBS shall have an automatic cleaning system that consists of a movable rake or a continuous belt that collects and discharges the screenings from the grid to a discharge spout located at the top of the machine.
- The AMBS shall have a motor and a gearbox that drive the cleaning system at a suitable speed and torque.
- The AMBS shall have a control panel that monitors and regulates the operation of the machine, including the start/stop, speed, overload, fault and emergency functions.
- The AMBS shall have a safety device that prevents access to the moving parts of the machine during operation and maintenance.

2.3 Fabrication and Installation

- The AMBS shall be fabricated and installed according to the following requirements:
- The AMBS shall be fabricated by a qualified manufacturer with proven experience and expertise in producing similar equipment.
- The AMBS shall be inspected and tested by the manufacturer before delivery to ensure its quality and performance.
- The AMBS shall be delivered to the site in one piece or in sections that can be easily assembled on site.
- The AMBS shall be installed in a concrete channel that is properly levelled, aligned and reinforced to support the weight and vibration of the machine.
- The AMBS shall be connected to the power supply, control panel and discharge spout by suitable cables, conduits and pipes.
- The AMBS shall be secured to the channel walls by bolts or anchors.

2.4 Testing and Commissioning

The AMBS shall be tested and commissioned according to the following procedures:

- The AMBS shall be checked for any damage or defects during transportation and installation.
- The AMBS shall be adjusted for optimal operation according to the manufacturer's instructions and specifications.
- The AMBS shall be operated under normal and peak flow conditions to verify its efficiency and reliability in removing screenings from the wastewater.
- The AMBS shall be inspected for any abnormal noise, vibration, wear or leakage during operation.
- The AMBS shall be calibrated and synchronized with the control panel and other related equipment.
- The AMBS shall be certified by the manufacturer and the client as ready for service.
- The screen should comply with the relevant European or South African standards for wastewater pretreatment equipment, such as EN 12255-10 or SANS 10247.

3. MIXED LIQUOR PUMPS

Technical Specifications for the Overhaul of Existing Vertical Axial Flow Mixed Liquor Pumps

3.1 Introduction

This report provides the technical specifications for the overhaul of existing vertical axial flow mixed liquor pumps with a capacity of 120 cubic meters at a head of 16 meters. The pump is used in a wastewater treatment plant at the aerobic reactor.

3.2 Scope of Work

The scope of work includes the following tasks:

- Inspection and assessment of the current condition of the pump, including the impeller, shaft, bearings, seals, suction bell, bowl, column and discharge elbow.
- Replacement or repair of any damaged or worn-out parts, such as impeller blades, shaft sleeves, bearings, seals, etc.
- Cleaning and painting of the pump components as required.
- Alignment and balancing of the pump assembly.
- Testing and commissioning of the overhauled pump.

3.3 Technical Requirements

The technical requirements for the overhaul of the pump are as follows:

- The pump shall be overhauled in accordance with the manufacturer's instructions and recommendations.
- The pump shall meet or exceed the original performance specifications, such as capacity, head, efficiency, power consumption, etc.
- The pump shall comply with the relevant European or South African standards for vertical axial flow pumps, such as EN 733 or SANS 1520.
- The pump shall be suitable for pumping mixed liquor with a density of 1.02 kg/m3 and a viscosity of 1.2 cP at a temperature of 20°C.
- The pump shall be capable of operating under variable flow and head conditions, as well as handling solids and fibrous materials in the mixed liquor.
- The pump shall have a minimum service life of 10 years under normal operating conditions.

4. ANAEROBIC REACTORS

The drive gearbox and motors for these stirrers will be replaced with new ones. The existing stirrer gearbox will be replaced. Two options will be considered, these being helical geared motor drives and epicyclical geared drives. The gearbox must be rated as follows:

- Drive Motor Power: 5.5 kW
- Motor Speed: 1460RPM
- Reduction Ratio: 23.9
- Vertical type

The gearbox must be designed to the following standards.

- ANSI/AGMA 6034-B92 - Practice for Enclosed Cylindrical Worm gear Speed Reducers and Gear motors.
- ANSI/AGMA 6113-A06 - Standard for Industrial Enclosed Gear Drives (Metric Edition).
- ANSI/AGMA 6123-B06 - Design Manual for Enclosed Epicyclical Gear Drives.

5. AEROBIC REACTOR

The Aerobic process had one aerator fully operational and one operating on manual mode. The dissolved oxygen meters were not in functional. The existing aerator gearbox will be replaced. The unit will be replaced with a helical geared motor drives rated as follows.

- Drive Motor Power: 30 kW
- Motor Speed: 1460RPM
- Reduction Ratio: 19.2
- Vertical type

The gearbox must be designed to the following standards:

- ANSI/AGMA 6034-B92 - Practice for Enclosed Cylindrical Worm gear Speed Reducers and Gear motors
- ANSI/AGMA 6113-A06 - Standard for Industrial Enclosed Gear Drives (Metric Edition)

The partial functionality of these units indicated possibility of refurbishment, though the cost of total refurbishment may be very close to acquisition of new units. The recommendation is that the drive gearbox and motors for both reactors be replaced with new units.

DO meter

The Dissolved oxygen meters will require replacement with new ones. The Sensor body must be made of stainless steel 1.4571Membrane cap: POM. The Measuring principle of the sensor shall be Optical oxygen measurement. The sensor must be able to read in still water and operate at a temperature between -5 degrees Celsius and 55 degrees Celsius at a maximum pressure of 10 bar. The measuring range will be:

- 0mg/l - 20mg/l
- 0%SAT - 200%SAT
- 0 - 400hPa

The sensor will be connected to a dissolved oxygen local transmitter of which the measuring principle shall be Amperometric oxygen measurement with a 4-wire transmitter with graphic display. The transmitter shall be in a field housing made of PC/ABS. the input will be a 1 channel transmitter with output/ communication being 0/4-20mA, Hart, Profibus.

6. SEDIMENTATION TANKS

6.1 Sedimentation Tank No.1

Complete rehabilitation including electrics replacement is recommended for the old SST. Galvanised material to be used for the scrapper bridge, and the scrapper material to be stainless steel. Rehabilitation of Scrapper Bridge will consist of new;

- Central support with thrust bearing, lubricated with grease and mounted on a fixing plate, and horizontal pins for attaching and supporting the mobile bridge deck.
- Central Baffle and Settling cylinder made of stainless steel 304L, anchored to the central plate with threaded rods.
- Peripheral Double Axis Drive Trolley made of carbon steel, with polyurethane coated iron wheels, shafts and wheel holders and supports;
- Bottom Scrapper Arm consisting of a set of vertical tubular supports attached to the mobile bridge deck; hinged at the ends of the supports are profiles on which are attached a logarithmic spiral blade and the travelling wheels. The height of the blade can be adjusted according to the gradient of the bottom.
- Replaceable Scrapper Plates made of acid-resistant neoprene
- Distribution Manifold of loop design, with brush holder, brushes, and terminals for connection to the geared motor (consisting of a central rotary manifold with plastic protective base and rainproof cover).

- Geared Motor (0.75 kW, 4 pole, and 380V, with output speed of 1.5RPM) connected directly to one of the wheels of the trolley. The gearbox must be designed to the following standards;
- ANSI/AGMA 6034-B92 - Practice for Enclosed Cylindrical Worm gear Speed Reducers and Gear motors
- ANSI/AGMA 6113-A06 - Standard for Industrial Enclosed Gear Drives (Metric Edition)

- Surface Scrapper Thompson profile, collection, and discharge tank of the scum box with supporting brackets
- Bridge Deck with accidental overload 250 kg/sqm, max deflection 1/500 of the span, resting on a steel rotating support at the center and, at the side, on a trolley with rubber wheels.
- Reinforced Bridge Deck made of electrically welded carbon steel profiles and cold pressed sheet metal; walkway consisting of galvanized grating, parapets and toe plates, in conformity with ISPESL standards.
- Central Baffle Cylinder made of stainless steel
- Quays and Bottom Scrappers made of hot-galvanized carbon steel 304L.
- Drive Wheels made of iron with polyurethane coating.
- Travel Wheels made of nylon.
- Thomson profile, skimming device and scum box made of AISI 304 stainless steel.

6.2 Sedimentation Tank No.2

The newer SST will require rehabilitation of the following;

- Peripheral drive unit – Includes drive wheel geared motor (1.1kW, 4 pole, 380V, with output speed of 1.5RPM), including the nylon drive wheels.
- Centre thrust bearing.

7. SLUDGE RECYCLE PUMPS

7.1 Purpose

The purpose of this section is to provide the technical specifications for the supply of a submersible sludge pump capable of pumping mixed sludge at a capacity of 60 cubic meters per hour at a head of 16 meters. The pump is used in a wastewater treatment plant at the sludge recycle pump.

7.2 Scope

The scope of this document covers the following aspects of the submersible sludge pump:

- Performance requirements
- Design features

- Material specifications
- Quality standards
- Installation and maintenance

7.3 Performance Requirements

The submersible sludge pump shall meet the following performance requirements:

- Capacity: 60 m3/h
- Head: 16 m
- Power: 11.8 kW (50 Hz)
- Voltage: 400 V (50 Hz)
- Frequency: 50 Hz
- Speed: 1450 rpm (50 Hz)
- Efficiency: >70%
- Impeller type: Semi-open, non-clogging
- Impeller diameter: 195 mm (50 Hz)
- Discharge size: DN100
- Maximum solids size: 80 mm
- Maximum liquid temperature: 40°C
- Maximum submergence depth: 20 m

7.4 Design Features

The submersible sludge pump shall have the following design features:

- Robust and compact construction with cast iron casing and impeller, stainless steel shaft and hardware, and wear-resistant rubber parts.
- Built-in electronic pump control unit that ensures correct direction of impeller rotation, provides motor protection, anti-clog function, level control, dry run protection, and energy save mode.
- Plug-and-pump installation with standard power cable and float switch.
- Modular design that allows easy serviceability and spare part availability.

7.5 Material Specifications

The submersible sludge pump shall be made of the following materials:

- Casing: Cast iron EN-GJL-250
- Impeller: Cast iron EN-GJL-250
- Shaft: Stainless steel AISI 420

- Hardware: Stainless steel AISI 304
- Seal housing: Cast iron EN-GJL-250
- Mechanical seal: Silicon carbide/Silicon carbide/NBR
- O-rings: NBR
- Cable: H07RN-F, 10 m length, with CEE plug
- Float switch: Polypropylene, 10 m length

7.6 Quality Standards

The submersible sludge pump shall comply with the following quality standards:

- All pumping equipment must meet or exceed the requirements of ISO 5199 and ISO 2858.
- CE marking according to the European Union directives on machinery, low voltage, and electromagnetic compatibility.
- ISO 9001 certification for quality management system.
- ISO 14001 certification for environmental management system.
- OHSAS 18001 certification for occupational health and safety management system.

7.7 Installation and Maintenance

The submersible sludge pump shall be installed and maintained according to the manufacturer's instructions and recommendations. The installation site shall have adequate space, access, ventilation, drainage, and electrical supply. The pump shall be securely fastened to the discharge pipe and submerged in the sludge tank. The pump shall be regularly inspected, cleaned, lubricated, and tested for optimal performance and safety. The pump shall be serviced by authorized personnel using genuine spare parts.

8. ISOLATION VALVES – Knife Gates Valves

This section provides the technical specifications for the supply and installation of knife gate valves to be used in a wastewater treatment plant. Knife gate valves are designed to isolate or control the flow of wastewater containing suspended solids, sludge, or other abrasive media. They have a thin, sharp-edged gate that can cut through the media and provide a tight seal when closed.

8.1 Requirements

The knife gate valves shall meet the following requirements:

- The valves shall be suitable for full bore flow and bidirectional sealing.
- The valves shall have a smooth and full bore to allow the passage of cleaning pigs and prevent pressure loss or clogging.
- The valves shall have a stainless steel gate and a soft seat seal made of elastomer or flexible metal.
- The valves shall have a cast iron, cast steel, stainless steel, fabricated steel, or exotic alloy body depending on the application and corrosion resistance.
- The valves shall have a yoke with a brass or bronze bearing and a spindle or rising screw for manual or automatic actuation.
- The valves shall have flanged, PE, spigot, socket, or tensile coupling ends compatible with the piping system.

- The valves shall have a minimum working pressure of 10 bar and a maximum working temperature of 80°C.
- The valves shall comply with the relevant ISO, European, or South African standards for wastewater applications, such as ISO 5208, EN 1074, SANS 664, etc.
- The face-to-face dimensions of all flanged valves shall comply with ISO 5211 Standards.
- All valves shall be to a class in excess of the maximum pressure they will attain in service including any surge pressures, but all valves shall be tested to stand a working pressure of 1.5 working pressure of pipeline or 6 bars, which is greater.

8.2 Installation

The knife gate valves shall be installed according to the following guidelines:

- The valves shall be inspected for any damage or defects before installation.
- The valves shall be installed in the orientation indicated by the manufacturer, with the arrow on the body pointing in the direction of flow.
- The valves shall be installed with adequate support and alignment to prevent stress or distortion on the valve body or stem.
- The valves shall be installed with sufficient clearance around the valve body and yoke for operation and maintenance.
- The valves shall be installed with appropriate gaskets, bolts, nuts, washers, and lubricants to ensure a leak-free connection.
- The valves shall be tested for proper operation and sealing after installation.

9. Valves - General

9.1 General

- All valves shall be flanged if not specified otherwise. All flanges of the valve shall be according to ISO 5211 Standards and in accordance with the required test pressure of and shall satisfy the requirements stated in these ISO 5211 standards.
- The face-to-face dimensions of all flanged valves shall comply with ISO 5211 Standards.
- All valves shall be to a class in excess of the maximum pressure they will attain in service including any surge pressures, but all valves shall be tested to stand a working pressure of 1.5 working pressure of pipeline or 6 bars, which is greater.
- Valves shall be capable of withstanding the same test pressures as the pipeline on which they operate. All nuts and studs subject to vibration shall be fitted with spring washers of locking taps.
- Valves shall carry identification marks and/or plates.
- All materials used in the manufacture of the valves (Cast Iron, Gun metal, Aluminum Bronze, Stainless Steel) shall conform to the relevant ISO 5211 minimum standards:
- Extended spindles and head stocks shall be provided where necessary and where indicated on the Contract Drawings. Head stocks shall be provided in stainless steel.
- Valves must have a provision for lock out mechanism.

9.2 Pressure Gauges

Bourdon type copper alloy Glycerine filled pressure gauges with a full scale reading of 1,5 times the maximum discharge pressure shall be provided on each pump discharge. These instruments are manufactured in accordance with EN837-1 standard.

9.3 Bolt, Nuts and Washers

All bolts, nuts and washers used in the jointing at flanged valves shall be of stainless-steel type 1.4571.

9.4 Support of Pipework and Valves

- All necessary supports including structural steelworks foundations, hangers, saddles, sliding shoes, slings, expansion pieces, fixing bolts, foundation bolts, fixing and anchor points and all attachments shall be supplied to support the pipework and its associated equipment in an approved manner.
- Valves, meters, strainers and other devices mounted in the pipework shall be supported independently of the pipe to which they connect.

10. PUMPING EQUIPMENT

All pumping equipment must meet or exceed the requirements of ISO 5199 and ISO 2858.

10.1 Pumps

- Pumps supplied shall be capable of satisfying the performance requirements specified.
- Low maintenance costs, reliability and trouble-free operation will be prime considerations when selecting pumps.
- Pumps shall be "quiet" in operation and free from vibration.
- Casings unless otherwise stated shall be of the best quality closed grained cast iron, capable of with-standing all pressures that may be produced due to normal operating pressure surges.
- Pumps shall be mounted on base plates or suction stools manufactured of cast iron. The pumps shall be accurately aligned and located by dowels or machined spigots. Holes shall be provided in the base plates or stools for foundation bolts.
- The pump shafts shall be of adequate size to avoid the possibility of fatigue failure and shall be shock and corrosion resistant.
- The pump shafts and elements shall be adequately designed to assume a rigid support of the impeller and to rotate without whip, vibration, or undue deflection at all operating speeds and under all operating conditions. Pump shaft material shall be dependent on application with preferred materials being EN8, EN19, C-40, S.S 410, S.S 314, S.S 316
- Exposed shafting, drive pulleys and belts are to be completely protected by galvanized steel guards, securely fixed and supported. The guards shall be of approved design and manufacture.
- The coupling between the pump and motor shall be as specified by pump manufacturer.
- Approved guards shall be fitted over all moving parts.
- The impellers shall be designed to give a non-overloading characteristic over the range of duties stated. The preferred material for all impellers is bronze, if costs are a factor cast iron can be utilized.
- Where pumps work in parallel, curves for solo and parallel operation shall be submitted.

- All pumps where practical shall be of the same manufactures and design
- All pumps shall be complete with motor, gearbox, bearings, and couplings, pressure gauge on the pumps delivery and vacuum gauge on the pump section.
- The head/quantity characteristic of any pump shall be stable at all rates of flow between closed valve and open valve and shall be steep enough to permit satisfactory operation in parallel under all conditions specified.
- The pump efficiency shall be well maintained over the whole of the specified duty range, even if this necessitates the use of a larger motor to provide the peak power demand.
- The NPSH requirements of the pumps, based on the 2% output drop criterion shall be at least 1 m less than the NPSH available at every working condition.
- Water velocities in the suction branches of a pump shall not exceed 3.5 m/s and the discharge branch 3.5 m/s when the pump is operating within its specified duty range. Within this working range there shall be no discernible noise due to hydraulic turbulence or cavitation within either the pump or its associated pipework and valves. Where discharge velocities exceed 3.5 m/s at run out condition in the duty range the use of profiled taper pipes will be permitted. These taper pipes shall be specifically designed to progressively reduce velocity with profiled internal contours which contain no steps or acute angle from which turbulence or cavitation can occur. These taper pipes shall be considered as part of the pump and be included in all performance calculations and tests.
- The pump shall have a non-overloading performance characteristic and its efficiency shall be high at the duty point and remain at a reasonably high level over the duty range of the pumping system. Rotating assemblies of pumps shall be statically and dynamically balanced and shall be designed so that the first critical speed of the pump and its drive is at least 50% greater than the maximum operating speed.
- Each centrifugal pump shall be provided with air release valve and pipe. Air/gas release pipe mounted at the top of the pump delivery branch of not less than 25 mm diameter. The pipework shall be arranged with crosses and tees and plugs at each section to permit rotating of each leg of the pipework. An automatic air release valve shall be fitted into the air/gas release pipework at a position convenient for maintenance.
- Suction Arrangements

The suction bend leading to the eye of the impeller shall:

- Be of best quality close-grained cast iron.
- Be tested to the same pressure as the pump casing.
- Be fixed to the pump casing and horizontal suction pipe with bolts and nuts.
- The suction arrangements shall avoid turbulence in the suction pipework and present a good flow pattern at the entrance to the impeller.
- The suction pipework shall not be less in diameter than the eye of the impeller.

10.2 Pump motor

The pump motor shall operate on 400 V, 50 Hz, 3 phase ac, IE3 type. Motors shall conform to SANS 1561 – 1: 2006 and SANS 1804 – 2:2007.

- Motors shall be rated S1 – Continuous Duty.
- Motors shall have a Service Factor (S.F.) of 1.15 for frame sizes 63 to 280S/M and 1.0 for frame sizes 315S/M and above.
- Motors shall have a minimum Ingress Protection rating of IP55 unless otherwise specified.
- Motors with a frame size of 100L or larger shall be equipped with adequate lifting facilities such as eye bolts.
- Motors must be rated 380 Volt, 3-Phase, 50 Hertz.

- Motors shall be capable of operating continuously at their nominated full load ratings, notwithstanding variations of ±10% from the designed voltage, or ±2% from the designated frequency of the supply, i.e., Zone B operation in accordance with IEC.
- Motors will have a Class H insulation with a Class B temperature rise (80K).
- Motor frame size 225S/M and larger shall allow for top and side mounted terminal boxes.
- Motors frame size 225S/M and larger shall be fitted with re-greaseable bearings and end shields with suitable grease relief system.
- Motors rated 250kW and larger shall be fitted with winding Temperature Detectors type PT100, two per phase (2/Phase), terminated in an auxiliary terminal box.
- Motors Rated 250 kW and larger shall be fitted with Bearing Temperature Detectors type PT100, one per bearing (1/Bearing), terminated in an auxiliary terminal box.
- Motors frame size 225S/M and larger shall be fitted with Winding Temperature Detectors type PTC Thermistor, one per phase (1/Phase).
- Motors shall be suitable for Direct-On-Line (D.O.L) and Variable Speed Drive (V.S.D.) starting.
- Motors frame size 315 and 355 shall have an insulated NDE end-shield or bearing and shall be fitted with a drive-end Earthing brush.
- Motors frame size 225S/M and larger shall be fitted with Anti-Condensation Heaters, terminated in an auxiliary terminal box (110V / 220V).
- Motors are to be painted with a corrosive resistant paint systems (epoxy) and RAL colour to be confirmed by eThekwini Engineer.
- All motors shall be fitted with an Earthing stud in the terminal box, motors frame size 160 and larger shall be fitted with an additional external earth stud.
- Motors shall be fitted with stainless steel nameplates and must include the following information:

    - Name of manufacturer.
    - Country of manufacture.
    - Serial number.
    - Frame size.
    - Class of insulation.
    - Rated output in kW.
    - Rated voltage.
    - Rated current.
    - Rated speed.
    - DE & NDE bearing details.
    - Re-greasing intervals, volumes, and type of grease.
    - Ingress Protection rating – IP__.
    - Weight in kilograms.
    - Service Factor.
    - SABS "approved" mark.
    - SANS 1804 – 1 & 2 and Permit Number.
    - Efficiency Rating – IE code.
    - Power Factor and Efficiency
    - All motors shall be dynamically balanced with half keys.

- All motors are to have an open keyway.
- Motors frame size 280S/M and larger are to be fitted with labyrinth type seals.
- Motors shall have a bearing design life of 50,000 hours for standard applications, subject to load details.
- Motors fitted with roller bearings shall be fitted with a suitable shaft locking device.
- Bearings are to be SKF, FAG or a suitable manufacturer approved brand.
- Motor noise limits must comply with the latest SANS/IEC 60034-9 requirements.
- All motors shall have a minimum warranty of thirty-six (36) months from date of delivery or thirty (30) months from date of commissioning against faulty materials and or workmanship, whichever is sooner.

10.3 Submersible Pumps

Classification

- Electrical submersible drainage pump
- Protection class: IP 68

Electrical motor

- Squirrel cage induction motor, insulation class: H (IEC 85)

Motor protection

- Thermal contacts in the stator opening temperature 140°C, air valve.
- DOL, star/delta or soft starter suitable.

Cable – Sub Cab

- 380-575V: 4G6mm2, 20 m (66 ft.) or 8AWG/4, 53 ft.

Limitations

- Max. Submersion depth: 20 m (66 ft.)
- Max. liquid temperature: 40 °C (104 °F)
- Allowed pH range: 5 - 8
- Maximum liquid density: 1100 kg/m3 (68 lbs./ft3)

Shaft seals

- Cartridge seal: pre-assembled double mechanical seal running in an oil compartment
- Material lower seal: silicon carbide - silicon carbide
- Material upper seal: tungsten carbide - tungsten carbide

Bearings

- Ball bearings with C3 clearance

Discharge connection

- 4-6˝ hose, ISO-G or NPT

Materials

- Casted parts: Aluminum
- Outer casing: Stainless steel
- Stator housing: Aluminum
- Motor shaft: Stainless steel
- Impeller and suction cover: Hard-IronTM
- Diffusers: Nitrile rubber

- Screws and nuts: Stainless steel
- O-rings: Nitrile rubber

Accessories
- Level regulator - Zinc anodes

Free standing units are acceptable and the pump shall stand on a suitable suction pedestal with clear passageways, mounted on the lower casing.

The pump shall be capable of running dry without damage.

Discharge shall be by means of heavy duty flexible synthetic hose (HELIFLEX or equivalent) or an automatic quick coupling device connected to the rigid pipework.

The pump shall have either radial or mixed flow impellers. The radial pumps shall be fitted with renewable diffusers, whereas mixed flow pumps shall be fitted with guide vanes cast integral with the stage casings.

The impellers shall be of a suitable material for the application. The discharge connection shall incorporate a check valve.

The shaft and shaft sleeves shall consist of stainless steel of an approved quality. Bearing bushes shall be of high quality zinc-free bronze.

A pressure gauge is required on the delivery side ONLY.

11. MATERIALS HANDLING EQUIPMENT

11.1 SCOPE

This standard specification covers the requirements for materials handling equipment normally used for the moving of raw materials, waste etc.

11.2 BELT CONVEYORS

11.2.1 General

All conveyors and their components, in the plant or area concerned, shall be thoroughly rationalised and standardised. The variety and different sizes of the drive components, motors, pulleys and shafts, bearings, belting, chutes, idlers and electrical power systems, shall be reduced to a minimum. For rationalisation purposes, equipment may be selected which is larger than necessary, in the interest of improved interchangeability, improved availability and longer life. All major components, assemblies and major sub-assemblies shall be clearly numbered on drawings and in manuals and be clearly numbered before and after installation on site. The conveyor duties shall be as specified in the project specification or shall be rated for particular application for which it is intended in that part of the process.

11.2.2 Conveyor Design

The general design and selection of conveyor layout and components shall be based on a minimum life of equipment of at least 10 years. Provision shall also be made in the general layouts and capacity of the belt for additions to the original plant which may take place in the future. The calculated life shall include a full allowance for shock and service factors and be based on full load operation during the

following numbers of hours per annum: -

HOURS PER ANNUM: W x D x H

W, D & H shall be as defined in the project specification or else as is required for the application and denote the number of working weeks per annum (W), average number of working days per week (D) and the average number of working hours per day (H). The capacity of a belt is expressed in metric tons per hour and denotes the average tonnage per hour.

- The conveyor design capacity (CDC), shall be calculated as follows : CDC = SSC x K1 (t/h)

Where:

SSC = Maximum anticipated flow rate, in tons per hour
K1 = Load design factor (normally 1, 66 unless otherwise stated)

- The conveyor belt sizing capacity (BSC 1) shall be calculated as follows :- BSC 1 = SSC x K2 (t/h)

Where:

K2 = Belt sizing factor (normally 1, 66 unless otherwise stated)

- The conveyor belt sizing capacity of all tripper belts shall be calculated as follows : BSC 2 = SCC x K2 x K3 (t/h)

Where:

K3 = Tripper belt sizing factor (normally 1, 33 unless otherwise specified)

The final belt velocity quoted by the Contractor and used in the overall design of the conveyor shall allow for the predicted amount of coupling and motor slip and rated full load and shall allow for full thickness lagging on the drive pulleys. The minimum belt speed shall in all cases be one metre per second and the maximum 3, 5 metres per second.

11.2.3 Commissioning of Conveyor Systems

The Contractor shall accurately record all commissioning test data which may serve later as a performance standard for the given conveyor.

Prior to any tests, the Contractor shall ensure that all lubrication has been completed and all safety features are in full working order.

Load tests may commence once the belt is running and the belt has run on no load for sufficient time to check on possible overheating of bearings, motors etc.

During the first part of any test, the skirt rubbers shall be lifted clear of the belt for the initial operation.

Additional test running shall be done with the skirt rubber properly adjusted.

Straining of the belt shall be the Contractor's responsibility. This straining shall be achieved via small adjustments of several idlers in the relevant area.

The measured full load belt speed shall be within 5% of the design value.

The measured motor gear box and/or fluid coupling temperatures, must be below the manufacturer's prescribed maximum levels.

The measured maximum tracking error of the belt, under full load conditions, must be within 40mm of the conveyor centre lines. All pulleys and idlers shall be correctly aligned and the full belt shall be in contact with every idler roller.

All pulleys and idlers shall be horizontal and at right angles to the conveyor centre line. The use of off-set and skew idlers for realignment shall be avoided.

After commissioning, the take-up mass (for gravity take-ups) or normal running belt force (for automatic take-ups), shall be measured by the Contractor. The above measurement shall be witnessed by the Engineer.

The certified mass in kilograms or force in kilo newtons shall be stencilled on the take-up carriage in 100mm high lettering.

11.2.4 Supporting Steelwork

The conveyor main structure shall be designed that it can safely withstand all conditions of belt-tension. Conveyor stringers shall be fabricated from standard channels and shall be installed with the flange toes facing outwards.

Decking plates shall be provided in the following areas:-

- From the tail pulley to 3m beyond the end of the loading chute skirt board
- For 3m at the discharge pulley
- For 3m at all intermediate loading points
- For 2m on each side of the vertical center line through the vertical gravity take-up pulley

Decking plates shall be made of mild steel, thicker than 2,5mm, unless otherwise specified. Refer to the Standard Specification on Painting for surface treatment. Safety guards and all other safety precautions shall comply fully with the South African Mines and Works Act and Regulations, as well as BS 2890.

Suitable guards shall be provided for the following:

- All pulleys
- All drive components, including anti-runback and couplings.
- All take-up mechanisms
- Gravity take-up and counter-weight boxes
- All other moving parts

All safety guards shall be of open mesh construction and shall be easily removable. Mesh guards shall be with 18mm openings and shall be at least 3mm thick.

Unperforated guards shall be fitted around all fluid couplings and shall contain any splashing oil in the event of a fusible plug blowing.

11.2.5 Chutes

Chutes shall be designed in such a way that the material shall be deposited onto the receiving belt in accordance with the following conditions:

- The material must be flowing in the same direction as the receiving belt.
- The horizontal speed shall closely match that of the receiving belt.
- The major part of the load impact shall be on chute-components and not on the belt
- The chute shall ensure central loading of the belt at maximum and low feed rates.
- Spillage shall be reduced to an absolute minimum.

All chutes feeding onto conveyor belts shall have dead boxes wherever the flow directions change, or where their use can lead to a reduction of liner wear or improved guidance of the flowing material.

Removable lip liners shall be provided at the wearing edges. All chutes are to be lined and shall have removable sides to facilitate the liner replacement.

All bearings shall be located outside chute side-plates.

Chute layouts shall be submitted to the Engineer for approval before final layout design commences.

Chute side-plates shall have the following minimum thickness: -

- 8mm : for belt width of 900mm and less
- 100mm : for belt width of over 900mm all chute-plates shall be properly stiffened and supported.

The inside of all chutes shall be easily accessible for maintenance, cleaning and inspection purposes.

11.2.6 Belting

Conveyor belts with synthetic carcasses shall conform to the following:

SABS 1173 or BS 490 Part 1

All synthetic carcasses shall be either nylon and/or polyester wraps.

The permanent growth plus elastic-stretch at belt tensions, Tu/10, shall be less than 2, 5% of Lt, where: Lt = conveyor centre distance in m, and Tu = ultimate or breaking strength of belt carcass in kilo newton per metre. The quality of rubber used for covers shall be suitable for conveying the applicable material.

11.2.7 Conveyor Pulleys

All pulleys shall be lagged, unless specified otherwise. Lagging shall be done by the Contractor before delivery to site. Lagging shall have the following thicknesses:

- For pulleys of 800mm diameter and under : 10mm
- For pulleys over 800mm and under 1200mm diameter : 12mm

The rubber lagging shall have a diamond pattern grooved for drive pulleys and shall be plain or un-grooved for non-drive pulleys.

"Slide-lag" lagging shall have a minimum thickness of 10mmm for all pulley diameters.

11.2.8 Belt Cleaning

Suitable belt cleaning systems shall be provided on all conveyors. The Contractor shall submit full particulars of the proposed systems for the Engineer's approval.

The cleaning system shall clean all slimes and solids from the return belt on both sides, and shall be as near as possible to the head or discharge pulley on the outside belt surface.

The belt cleaning system shall be so designed and installed that easy maintenance and inspection access to all components are provided.

11.2.9 Idlers

All rollers of a multi-roll idler set shall be identical and fully interchangeable. The Contractor shall, before manufacturing commences, submit to the Engineer for approval, drawings of all idler sets indicating main dimensions, wall thickness, and bearing and seal details.

All idler rollers shall be so designed and constructed that they cannot be dislodged during normal operation and that they can be easily removed for repair work. They will be suitable for a 24 hour per day operation, when exposed to all weather conditions and dusty atmosphere, while carrying wet, sticky or dry abrasive material. All idler rollers shall be of the factory "greased for life" type. All bearings shall be sealed on machined surfaces.

Deep-groove ball bearings are acceptable.

As an alternative, modified taper roller bearings, having specifically profiled rollers and races, which permit angles of shaft deflection which are higher than those acceptable for normal taper roller bearings, may be offered.

Troughing idlers shall be of the rigid frame type. They shall have three rollers for belt widths of under 1200mm. The standard troughing angle shall be 35°. Idlers shall be spaced so that manufacturer's load ratings are not exceeded when the conveyor carries the design capacity. Troughing idlers shall be spaced so that the maximum permissible belt sag is not exceeded.

Return idlers shall be spaced at intervals, preferably equal to a multiple of the troughing idler spacing, but not greater than 4000mm.

Straining idlers shall be installed ahead of the tail, take-up and intermediate drive pulleys.

11.3 SCREW CONVEYORS

Where screw conveyors are specified or required, it shall be provided with an inlet hopper feeder and an outlet chute.

The hopper feeder shall be adequately sized for the duty of the capacity of the screw conveyor.

The wearing plates of the hopper feeder shall be suitable for the abrasion properties of the material being handled. This will also apply to the discharge chute.

Removable inspection plates shall be provided on the conveyor casing at regular intervals.

Shaft deflection shall be minimised by positioning guide bearings along the shaft length at the intervals as specified by the manufacturer.

These bearings shall be adequately protected against the material to be conveyed and shall be factory grease-packed and sealed. Adequate provision shall be made in the shaft design to remove the intermediate supporting bearings.

Careful consideration must be given to the material used for the construction of the worm and casing. The abrasion and corrosion properties of the material being handled must be taken into account, and if necessary, special lining material must be applied.

The screw conveyor shall in all cases slope towards the discharge chute.

Water connections, via a shut-off valve, shall be provided at 1,2m intervals on the conveyor casing. A 25mm water supply must be connected to each of these connectors to flush the conveyor in the case of a power failure or after prolonged use.

11.4 HANDLING OF INCOMING MATERIALS INSIDE BUILDINGS

A suitably designed trolley shall be provided on site for the handling of chemicals and other fluids stored in 200l drum containers. These trolleys shall be designed in such a way that a single person can load and remove the container on a level surface. Small, suitable trolleys to load bags of dry powder chemicals, shall be provided and shall be fitted with castor wheels. Each of these trolleys shall be designed to carry a load of at least 300kg at a time. These trolleys will only be used for on and off-loading of materials being stored on Site.

12. CHLORINE SYSTEM SPECIFICATION

12.1 DESIGN

12.1.1 General

The chlorinator supplied shall be of the vacuum type design consisting of an ejector, a chlorine gas flow rate control unit, a vacuum regulator-check unit and other auxiliaries/accessories. The chlorinator system shall operate under a vacuum pressure created at the ejector so as to reduce the risk of chlorine leakage during operation. The vacuum operation of the system shall commence from downstream of the vacuum regulating valve of the chlorine gas supply.

12.1.2 Ejector

The ejector shall be water-operated and designed to resist both the corrosive effect of moist chlorine and the erosion from high water velocity. The ejector shall generate the required vacuum pressure for the chlorinator and to allow mixing of chlorine gas with water. The ejector shall be able to overcome the back pressure at downstream of the system in meeting the maximum chlorine dosage requirement as specified in the Particular Specification. Head losses of pipes and fittings shall be considered when sizing the ejector and the booster pump, if required, for the water supply system. The ejector may be mounted inside the chlorine gas flow rate control unit or separately mounted in other location approved by the Engineer.

12.1.3 Chlorine Gas Flow Rate Control Unit

The chlorine gas flow rate shall be adjustable by changing the position of a variable orifice at the chlorine gas flow rate control unit. The displacement of the orifice shall be linearly proportional to chlorine gas flow rate. Unless otherwise specified, the gas feed rate shall be controlled either manually through a knob on the panel of the control unit or automatically by a 4-20 mA d.c. signal sent out from a controller. The selection of manual or automatic control shall be facilitated by means of a selector switch on the panel of the control unit. The chlorine gas flow rate once set shall remain stable irrespective of variations

in inlet chlorine gas pressure and inlet water pressure. The chlorine gas flow rate shall be indicated by a linearly scaled rotameter of scale length not less than 150 mm. The scale units shall be in kg/day with scale marking to BS 3693 and resolution to 5% of range. Unless otherwise specified, a vacuum break valve shall be provided to safeguard excessive vacuum developed in the system by admitting air to the control unit.

12.2 Vacuum Regulator-Check Unit

The vacuum regulator-check unit shall consist of a vacuum regulating valve, a pressure check valve and a pressure relief valve. The vacuum regulating valve shall be of the spring-loaded type such that a normal operating vacuum must be present before it will open and shall be automatically shut off on loss of vacuum. The pressure check valve shall be designed to prevent positive pressure chlorine gas from passing through when the vacuum regulating valve fails to shut off on loss of vacuum. In the extremely unlikely event that the pressure check valve also fails and passes gas on loss of vacuum, the pressure relief valve shall permit relief of the chlorine gas to the vent, which is connected to the chlorine absorber.

Unless otherwise specified, the vacuum regulator-check unit can be either mounted with the chlorine gas flow rate control unit or separately close to the source of chlorine gas supply.

12.2.1 Additional Requirements for Liquid Draw-off System

A low temperature alarm switch and electrically operated actuator shall be provided for the vacuum regulator-check unit. The actuator shall shut off the vacuum regulator-check unit on detection of low temperature, high/low water bath level or shutdown of chlorine evaporator.

Where specified or required, a gas heater shall be provided to prevent liquefied chlorine gas entering the vacuum regulating valve. It shall be designed to ensure proper operation and function of the vacuum regulating valve in a tropical climate with a maximum relative humidity of 100% and an ambient temperature ranging from 0C to 40 C.

Unless otherwise approved, an additional pressure reducing/regulating valve shall be provided ahead of the vacuum regulator-check unit for reducing the chlorine pressure in steps so as to ensure smooth operation of the vacuum regulator-check unit to meet the required maximum gas throughput without a big pressure drop. A chlorine pressure gauge shall be provided after the pressure reducing/regulating valve.

13. CONSTRUCTION

13.1 General

The control equipment and components of the chlorinator shall be housed in an enclosure with a degree of protection of IP65 to IEC 60529 for protection against corrosive chlorine gas. All materials shall be fully corrosion resistant to chlorine, including the high concentration of chlorine due to leakage. Metal

parts normally in contact with chlorine shall be of silver-plated, Hastelloy C or equivalent. External metallic parts such as nameplates, bolts and nuts shall be of stainless-steel grade 316. Parts not designed to be in contact with chlorine shall be totally enclosed with a degree of protection of IP54 to IEC 60529.

13.1.1 Ejector

The ejector shall be capable of withstanding the chlorinator inlet water pressure and suitable for dosing the required chlorine concentration as specified in the Particular Specification. A check valve shall be provided together with the ejector to prevent any back flow of water from the ejector into the chlorine gas flow rate control unit. The check valve shall be made of similar corrosion resistant material as for the ejector.

13.1.2 Chlorine Gas Flow Rate Control Unit

The chlorine gas flow rate control unit shall be designed for modular construction. Its components shall be housed in an enclosure of fibre reinforced plastic and shall be readily accessible for cleaning, inspection and maintenance without disturbing the adjacent parts.

13.1.3 Pipes and Fittings for Chlorine Gas Vacuum Lines

UPVC/PTFE pipes and fittings shall be used for chlorine gas vacuum lines, Valves and Accessories for Chlorination Plant.

13.2 ACCURACY

The system accuracy shall be within 4% of indicated flow rate. The sensitivity shall be within 0.5% of the full scale. When selected for automatic control, the gas feed rate shall be linear with the control signal and the dead band at any point shall not exceed 3% of the dosage applied.

13.3 AUXILIARIES/ACCESSORIES

The following auxiliaries/accessories shall be provided with the chlorinator to form a complete system:-

- Chlorine gas filter/strainer at source of chlorine gas supply to the chlorinator.
- Water strainer for ejector, where specified or required.
- Vacuum gauges at the gas inlet to the chlorine gas flow rate control unit and ejector gas suction for indication of vacuum pressures. The vacuum gauges shall be supplied by the same manufacturer of the chlorinator to ensure compatibility and quality. The vacuum gauges may form an integral part of the chlorine gas flow rate control unit or separately mounted in other locations approved by the Engineer.
- Water pressure gauge shall be provided at ejector water inlet for indication of water pressure. The pressure gauge shall comply with BS EN 837 or equivalent.
- Two individual switches or one combined switch for determining the high and low vacuum pressure at the gas vacuum line shall be provided between the vacuum regulator-check unit and chlorine gas flow rate control unit. The switch shall be of a type manufactured for chlorine applications. Each switch shall be of the changeover type rated at 2A 220V a.c. 50 Hz and 3A 24V d.c. and complete with an isolation valve. The low vacuum switch shall be wired for initiation of the "Vacuum Failed" alarm on the control panel on loss of vacuum, which shall trip at approximately 100 mm water vacuum. The high vacuum switch shall trip at approximately 750 mm water vacuum, which shall be wired for initiation of the "Gas Supply Failed" alarm on the control panel.
- Sufficient length of chlorine gas piping and fittings for connection.
- Leak detection system with alarm system audible from a distance of at least 500 meters.

Consumables sufficient for one year of continuous operation shall be supplied. Hand tools recommended for use with the chlorinator shall be supplied in sheet steel box in duplicate sets.

14. Electrical Installation

Works shall comply in every respect with the latest relevant rules and regulations including following:

- Occupational Safety and Health Act (OSH Act)
- The South African Bureau of Standards Code of Practice SANS 10142
- Normal requirements laid down by Local Electricity Supplier.
- The latest requirements of the IEC 60 529.
- All rules and regulations issued by local and other authorities having jurisdiction over the contract.

14.1 Electrical Panels

Codes and Standards

- SANS 1091: 2012 National colour standards for paint
- SANS 10142-1: 2017 The wiring of premises: Low voltage installations
- SANS 60269-2: 2016 Low voltage fuses: Supplementary requirements for fuses for use by authorized persons
- SANS 60439-1: 2004 Low voltage switchgear and control gear assemblies: Type tested and partially type tested assemblies.
- SANS 60529: 2013 Degrees of protection provided by enclosures (IP code)
- SANS 60947-3: 2016 Low voltage switchgear and control gear: Switches, disconnectors, switch disconnectors and fuse-combination units

The electrical panels shall be supplied by a supplier to be approved by the Engineer. Before the fabrication of the electrical panels, the contractor shall supply the schematic diagram to the Engineer for approval. The electrical panels shall include all electrical switch gear, control and monitoring installations including all connections, Earthing and lightning protection, no- flow switches. Control panels to include level control system.

The MCC Panel and all associated electrical equipment offered must be rated to cater for a maximum ambient temperature of 50°C. The incoming switch, control equipment, distribution equipment and starters shall be housed in separate metal enclosed panels.
With the starter main isolator in the OFF position there shall be no live wires entering the starter cubicle.

With the incoming main switch in the OFF position there shall be no live wiring entering the entire panel. Live incoming cable terminals are to be in separate panels to outgoing terminations and are to be effectively shrouded against inadvertent contact. Equipment shall have adequate current carrying capacity and shall be labelled corresponding to line and schematic diagrams.
An earth bar shall be fitted, to which all non-current carrying metal parts are bonded.

Panels shall not be moved onto site until finishing trade work has been completed in the room where the panels are to be installed. The supplier shall allow in his pricing for storage under suitable conditions until delivery for motors above 22kW, soft starting must be adopted and where applicable, variable speed drives.

Shop Drawings

Three copies of shop drawings shall be submitted to the Engineer for approval, two weeks in advance of manufacture.

Shop drawings shall include at least:

- Substantiation of the short circuit capabilities of the bus bar support system in the form of authority test reports.
- Substantiation of the full load rating of the bus bars.
- Time - current characteristics of the protective devices including, fuses, circuit breakers, and protective relays.
- Front and side elevations of equipment and component layout.
- Construction, dust proofing, vermin proofing, cable access and cable termination details.
- Power single line diagrams drawn to the IEC system.
- Control schematic diagrams drawn to the IEC system.
- Cable termination diagrams.
- Component schedules cross referenced to drawings and equipment.
- Component layout drawings showing the position and designation of all components.

Installation Drawings

Three copies of installation drawings shall be submitted to the Engineer for approval two weeks in advance of manufacture. The drawings shall include at least:

- Adjacent trenches, penetrations, walls, cable trays and other equipment.
- Surrounding space available for access and maintenance.
- Cable routing and cable entry details.
- Details of supports required, other than those built into the control panel.
- Details of cable trench covers.
- Drawings to be submitted in electronic format AutoCAD (.dwg).

14.2 Variable Speed Drive

This section provides the technical specifications for the supply and installation of a variable speed drive (VSD) capable of running a 30kW motor coupled to a pump. The VSD shall comply with the relevant

European or South African standards, as applicable. The VSD shall be of the type that converts AC input voltage and frequency to a variable voltage and frequency output to control the speed and torque of the motor.

The VSD shall have the following features and characteristics:

- Input voltage: 400V, 3-phase, 50Hz
- Output voltage: 0-400V, 3-phase, variable frequency
- Output power: 30kW
- Output current: 60A
- Efficiency: >95%
- Power factor: >0.95
- Harmonic distortion: <5%
- Protection class: IP54
- Cooling method: Forced air cooling
- Control mode: Vector control or V/F control
- Communication interface: RS485 or Modbus
- Display: LCD or LED
- Parameters setting: Keypad or remote control
- Protection functions: Overvoltage, under voltage, overcurrent, overload, short circuit, phase loss, over temperature, etc.
- The VSD shall be compatible with the motor and the pump specifications and requirements.
- The VSD shall be installed in a suitable location with adequate ventilation, clearance, and accessibility.
- The VSD shall be mounted on a steel base frame or a wall bracket with vibration isolators.
- The VSD shall be connected to the motor and the power supply with shielded cables of appropriate size and length.
- The VSD shall be grounded according to the manufacturer's instructions and the local regulations.
- The VSD shall be tested and commissioned by qualified personnel before operation.
- The VSD shall be provided with a user manual, a wiring diagram, and a certificate of conformity.

- Applicable standards:
    - SANS 1091: 2012 National colour standards for paint
    - SANS 10142-1: 2017 The wiring of premises: Low voltage installations
    - SANS 60269-2: 2016 Low voltage fuses: Supplementary requirements for fuses for use by authorised persons
    - SANS 60439-1: 2004 Low voltage switchgear and control gear assemblies: Type tested and partially type tested assemblies.
    - SANS 60529: 2013 Degrees of protection provided by enclosures (IP code)
    - SANS 60947-3: 2016 Low voltage switchgear and control gear: Switches, disconnectors, switch disconnectors and fuse-combination units

14.3 Cables and Terminations

All cabling shall be PVC/SWA type. All Cables to be supplied and installed shall conform to the requirements of SANS 1411, SANS 10198, SANS 1507, SANS 1574. The minimum size of conductors shall be:

- Instrumentation and control – 1, 5 mm^2
- Lighting – 2, 5 mm^2
- single phase power – 2, 5 mm^2
- 3 phase power – 2, 5 mm^2

Care should be taken that servings and sheathings of cables are not damaged during installation. Should any part be damaged, the damage shall be made good to the entire satisfaction of the Engineer. Under no circumstances should cables be allowed to bend less than 8 times their diameter.

At all points where cables rise into the floor mounted equipment, the vertical portion of the cable shall be securely cleated to the metalwork of the equipment in a neat manner to ensure that the cables are properly supported and that no undue strain is put on the cable, the cable termination or the Plant. Where vibration or expansion is a consideration, adequate precautions and vibration loops shall be made at the appropriate position.

Cables entering cubicles provided with sealed covers of timber or sheet steel shall be accommodated by drilling or dividing the covers with clearance holes as necessary to allow the cable to pass through and be terminated at glands or gland plates provided within such cubicles, so that the covers when replaced prevent entry of dust, vermin and insects. For indoor use, the cable glands shall be of the adjustable type, equal or similar to the Pratley gland and shall be suitable for use with PVC/SWA cables complying with the latest edition of SABS 1507.

Selection of Cable Runs

The route and arrangement of all cables and the position of equipment and wiring points shall be marked out on site by the Contractor and agreed by the Engineer before any work is put in hand. Where cable routes have been agreed, the Contractor shall be entirely responsible for measuring the lengths of cable to be ordered and ensuring that the cables are supplied in the correct length. All cables shall be armoured. Cable warning tapes shall be laid immediately over the line of the cables buried in the ground and at 300 mm below ground level. Cable route markers shall be supplied at every 30 m along cable runs and at changes of direction.

Armoured cables other than those laid in the ground shall be suspended on cable racks, cable tray, cleats or cable hangers supplied under this Contract which shall be arranged for bolting to steelwork, brickwork or concrete as required. All non-armoured cables shall be protected by conduit. Where cables are run on open surfaces and exposed to the sun a metal shield shall be fitted over them. Similarly where cables are run up walls they shall be suitably mechanically protected to a height of 2m above ground or floor level.

Low Voltage Cables Laying

The Contractor shall provide and install the cables, plastic marker strip, sand above and below the cables and cable cleats. Cables shall be laid directly in trenches and a plastic marker strip shall be positioned 150 mm below the ground surface in all cases. Where cables pass through walls, floors, etc. the Contractor shall provide a suitable sleeve through which the cable may pass. Under roads or hard surface uPVC ducts shall be provided and after the cables have been installed the sleeve and ducts shall be made watertight and vermin proof in a manner to suit site conditions.

14.3.1 Low Voltage Equipment

All Module Cases Circuit Breakers (MCCB's) shall comply with SANS 156.

Earthing

The system of earthling and the earthling of all equipment and apparatus shall be carried out strictly in accordance with the requirements of the supply authority and SANS 10142

15. PROGRAMMABLE LOGIC CONTROLER

This section provides the technical specifications for the supply and installation of a PLC for a wastewater treatment plant that controls the inlet screen, inlet flow, four mixers, six pumps, two geared sedimentation motors, chlorination system and outflow meters. The PLC is intended to automate the control and monitoring of the treatment process, optimize the water quality and efficiency, and ensure the safety and reliability of the plant.

15.1 Scope of Work

The scope of work includes the following tasks:

- Designing and implementing a PLC-based control system that regulates the flow, pressure and quality of water throughout the treatment process.
- Programming the PLC using ladder logic, function block diagram (FBD) or structured text (ST) language, according to the process requirements and logic expressions.
- Installing and wiring the PLC and its associated input/output (I/O) devices, such as sensors, actuators, switches, relays, etc.
- Testing and commissioning the PLC and verifying its functionality and performance.
- Providing training and documentation for the operation and maintenance of the PLC.

15.2 Technical Requirements

The technical requirements for the PLC are as follows:

- The PLC should come with at east 5.7-inch color touchscreen display, 30 digital inputs, 30 relay outputs, 4 analog inputs, 4 analog outputs, 4 high-speed inputs, 4 high-speed outputs, RS232/RS485 communication port, Ethernet port, USB port and SD card slot.
- The PLC should have a memory capacity of at least 512 KB for application logic and 12 MB for fonts and images.
- The PLC should have a scan time of less than 10 m/s for 1K of typical application code.
- The PLC should support various communication protocols, such as Modbus RTU/TCP, CAN open, SNMP, FTP, etc.
- The PLC should have a built-in web server that allows remote access and control via any web browser.

- The PLC should have a built-in alarm management system that can send email or SMS notifications in case of any abnormality or fault in the process.
- The PLC should comply with relevant European or South African standards, such as IEC 61131-3 for programming languages, IEC 61010-1 for safety requirements, IEC 61326-1 for electromagnetic compatibility (EMC), etc.

The PLC system will control the following processes:

- Inlet screen: The PLC will monitor and control the operation of the inlet screen, which removes large solids from the incoming wastewater. The PLC will also provide alarms and interlocks for screen blockage, overload, and failure.
- Inlet flow: The PLC will measure the flow rate of the incoming wastewater using a flow meter. The PLC will also provide data logging and reporting functions for the inlet flow.
- Mixers: The PLC will control the operation of four mixers, which are used to aerate and mix the wastewater in the biological treatment tanks. The PLC will adjust the speed and direction of the mixers according to the dissolved oxygen level and pH value of the wastewater. The PLC will also provide alarms and interlocks for mixer overload, failure, and low oxygen level.
- Pumps: The PLC will control the operation of six pumps, which are used to transfer the wastewater between different stages of the treatment process. The PLC will start and stop the pumps according to the level sensors and timers. The PLC will also provide alarms and interlocks for pump overload, failure, and low level.
- Geared sedimentation motors: The PLC will control the operation of two geared sedimentation motors, which are used to rotate the scrapers in the secondary clarifiers. The PLC will adjust the speed and direction of the motors according to the sludge concentration and flow rate of the wastewater. The PLC will also provide alarms and interlocks for motor overload, failure, and high sludge level.

- Chlorination system: The PLC will control the operation of the chlorination system, which is used to disinfect the treated wastewater before discharge. The PLC will regulate the dosage of chlorine according to the residual chlorine level and flow rate of the wastewater. The PLC will also provide alarms and interlocks for chlorine leakage, low chlorine level, and high chlorine level.
- Outflow meters: The PLC will measure and record the flow rate and volume of the treated wastewater discharged from the plant using two outflow meters. The PLC will also provide data logging and reporting functions for the outflow meters.

The PLC system will comply with the following relevant standards:

- EN 61131-3: Programmable controllers - Part 3: Programming languages
- EN 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
- EN 61000-6-2: Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- EN 61000-6-4: Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
- SANS 10142-1: The wiring of premises - Part 1: Low-voltage installations

15.3 Instrument Cables

Single phase power cables shall be laid from the appropriate distribution switchboard to level transmitters. Where cables are run vertically up walls a durable steel protection shield shall be supplied by the Contractor and fitted to a height of 1800 mm above ground level or higher as may be warranted in any particular case. Ducts for cables running across reservoir roofs shall be 50 mm galvanised mild steel with screwed barrel joints. Strong ropes shall be installed in each duct as it is laid for drawing through cables.

16. LIGHTING AND SMALL POWER

Lighting and small power distribution boards shall comply with the relevant parts of SANS. They shall be complete with incoming isolation switches and circuit breakers as required. The distribution boards shall generally be three phase and neutral type (TP & N). Enclosures shall have a minimum protection of IP 54. The following SANS Codes will be applicable:

- SANS 475: Luminaires for interior lighting, street lighting and floodlighting – Performance requirements.
- SANS 1464: Safety of luminaires Part 22: Luminaires for emergency lighting
- SANS 10114-1: Interior lighting Part 1: Artificial lighting of interiors.
- SANS 10114-2: Interior lighting Part 2: Emergency lighting SANS 10389-1-3: Exterior lighting Part 1-3.
- SANS 61547: Equipment for general lighting purposes – EMC immunity requirements.
- SANS 62560: Self-ballasted LED lamps for general lighting services by voltage > 50V – Safety specifications.
- SANS 62031: LED modules for general lighting – Safety specifications.
- SANS 60598: Luminaires - Part 1: General requirements and tests.
- SANS 1662: Self ballasted LED Tubular lamps for general lighting services > 50V – Safety requirements.

- SANS 62612: Self ballasted LED lamps for general lighting services with supply voltages >50V - Performance requirements.

16.1 Fluorescent Lighting Fixtures

16.1.1 General

Furnish and install fluorescent lighting fixtures of the types and manufacturers scheduled on the Drawings. Fixtures shall be furnished with all required accessories and trim as required for a complete installation in the ceiling type shown on the Architectural Drawings.

16.1.2 Lamps

Fluorescent fixtures shall be complete with lamps of the type, colour, wattage, and size indicated on the Lighting Fixture Schedule.

16.1.3 Ballasts

- Ballasts for use on 230 Volt systems shall be suitable and guaranteed for a voltage range of 205 Volts to 240 Volts. Ballasts for use on 400 Volt systems shall be suitable and guaranteed for a voltage range of 380 Volts to 420 Volts.
- Electronic Ballasts
- Fluorescent fixtures indicated to be provided with electronic ballasts shall be complete with parallel wired, Class "P" thermal protected, electronic ballasts certified by CE and complying with SANS limits governing EMI and RFI.
- Electronic ballasts shall comply with SANS standards for surge protection. Total harmonic distortion shall not exceed 10%. Ballast case operating temperature shall not exceed 60oC.
- Electronic ballasts shall be capable of starting at temperatures of 0oC or higher.
- Power factor shall not be less than 0.95.
- Dimming Ballasts
- Wherever fluorescent fixtures are to be dimmed, the fixture supplier shall coordinate the type of dimming ballast to be used with the dimming equipment supplier to ensure compatibility. The fluorescent lighting fixtures shall be provided with circuit interrupting lamp holders as required for the single or double lamp dimming ballasts being used.
- Low Temperature Ballasts
- Unless otherwise indicated, where fluorescent lighting fixtures are installed in unheated areas of the building(s) or parking garages, or where installed outdoors, the fixtures

shall be provided with the appropriate ballasts with a minimum Sound rating as recommended by the manufacturers.

- Low Leakage Ballasts
- Where fluorescent fixtures are installed on isolated power circuits, low leakage ballast suitable for isolated power use shall be provided.

16.1.4 Louvers

Lighting fixture louvers shall be pre-anodized aluminium semi-specular low-iridescent parabolic louvers. Louver shall be securely fastened with T-hinges and spring-loaded cam latches. The louver should be capable of hinging and latching from either side. All steel parts, excluding fasteners, shall be painted after fabrication. Pre-coat finishes shall not be acceptable.

16.1.5 Guards

Fluorescent strip fixtures with exposed bare lamps shall be provided with guards as required by safety codes.

16.1.6 Other

Fluorescent fixtures in continuous rows shall be supplied with all fixture couplings, close nipples and/or other accessories recommended by the manufacturer for continuous row installation. Light fittings shall comply with all relevant British Standards. Fluorescent tube fittings shall be of the switch start type complete with all separate control gear for each lamp and be complete with a capacitor to ensure that the power factor is a minimum of 0.9.

The fittings shall have a high;

16.2 Led Lighting Fixtures

16.2.1 General

Furnish and install LED lighting fixtures of the types and manufacturers scheduled on the Drawings. Fixtures shall be furnished with all required accessories and trim for a complete installation in the ceiling type shown on the Architectural Drawings.

16.2.2 Lamps

LED fixtures shall be complete with lamps of the type, colour, wattage, and size indicated on the Luminaire Schedule, or as specified by the lighting fixture manufacturer. Unless otherwise noted, all lamps shall be Cool white.

16.2.3 Minimum requirements

- The minimum lamp life should be equal or greater than 30 000 hours.
- The Colour Rendering Index (CRI) must be 80 or greater.
- Power factor must be greater than 0.9.
- Test reports from an approved and accredited test laboratory must be submitted when called for.
- Alternate fixture manufacturers shall submit computer generated illumination calculations and files to the engineer for approval.

16.2.4 Luminaire Markings

All products shall be marked according to SANS 62031 as follows:

- Lamp rating in Watts
- Lamp life in hours
- Colour Correlated Temperature (CCT) or colour name.
- Colour Rending Index (CRI)
- Initial lamp life output
- Energy Efficiency Marking /label per SANS codes.

16.3 Area And Floodlighting Fixtures

- Area and Floodlighting fixtures have been selected for specific features, beam characteristics and style. Alternate fixtures will be considered for approval based upon compliance with procedures as described below.
- Alternate fixture manufacturers shall submit computer generated illumination calculations and files to the engineer for approval.
- Floodlighting fixtures shall consist of a cast aluminum housing and housing door assembly. The housing shall contain the optical components and a removable ballast drawer assembly. The unit shall be supported by cast aluminum, adjustable mounting bracket. The unit shall contain no weep or drain holes. A filtered vent hole into the fitter chamber shall be provided. The entire unit shall be classified as a sealed type. It shall bear an IP rating.
- Housing shall be a single piece aluminum casting, forming a watertight shell. It shall contain the electrical and optical component compartments.
- Housing door shall be cast aluminum and shall hold a tempered heat and impact resistant clear glass lens. It shall be gasketed with high temperature resistant gasket and shall be hinged to the fixture housing with a non-corrosive hinge assembly. It shall be held closed with corrosion resistant captive screws, or stainless steel, spring loaded, quick release latches.
- All gasketing material shall be high temperature resistant rubber. All areas that are gasketed shall be of metal to metal or metal to glass interface contact design, to control

gasket compression. All gasketing shall provide component compartment sealing, to prevent external atmospheric containment intrusion.

- Ballast assembly shall be a self-contained, removable tray assembly of modular design and shall contain all electrical components of the ballast. It shall have a polarized, quick disconnect, mate and lock power input plug. It shall be field interchangeable without requiring the luminaire to be removed. The ballast shall be specifically designed for the lamp type specified and at the voltage specified. Ballast shall be constant wattage autotransformer, high power factor type, with starting current less than operating current.

16.4 Submittals

Shop drawings submittals shall include, but not be limited to, the following:

- Cut sheets on all lighting fixtures with all accessories and details clearly indicated.
- Cut sheets and complete technical data on ballasts, lamps, lens, poles, etc.
- Photometric performance data.
- Computer generated illumination calculations and files to the engineer for approval.
- Additional information as required.

16.5 Installation

- All lighting fixtures shall be furnished complete with mounting accessories to suit the specific service and installation intended. The Electrical Contractor shall verify the required fixture ceiling/trim coordination prior to light fixture orders.
- Fixtures shown on the fixture schedule to be recessed shall be complete with plaster frames, mounting yokes, rod hangers, etc., and/or any other accessories required to fit the fixture to the ceiling construction.
- However, where ceiling system cannot maintain said support, provide supplemental steel support members connected to the building structure capable of carrying the weight of the fixture plus 100kg at each support without sagging. Provide the necessary supports for hangers located between structural members. Securely fasten the luminaire to the ceiling framing members. In plaster ceilings, provide threaded hanger rods secured to the main ceiling suspension structure and supplementary horizontal steel members as required, and to the luminaire housing, using two nuts at each end of rod.
- Connect each ceiling-recessed luminaire into the conduit system by means of flexible cable tie with plug top not more than 3m or less than 1.2m in length routed from an above-ceiling outlet point.

- Provide alignment clips on all pendant or ceiling mounted luminaries used in continuous rows.
- Chain-suspended lighting fixtures shall be connected to the outlet box mounted directly above the fixture using flexible metallic conduit, and the flexible metallic conduit shall be strapped to the fixture chain.
- Fixture supports shall be provided in all outlet boxes from which fixtures are suspended. Fixtures shall not be suspended by means of cover or canopy screws. Canopies shall completely cover the ceiling opening of all ceiling fixtures except lay-in fixtures in T-bar construction, and trim less fixtures.

- Where surface mounted lighting fixtures (i.e., exit lights, etc.) are installed on lay-in panels in T-bar ceiling construction, the outlet boxes shall be rigidly supported to the ceiling system using metal channels spanning perpendicular across the T-bars and securely attached to each side of the outlet box.
- Connect each fixture housing to the equipment grounding conductor by means of a crimped spade-type terminal connector secured to the housing with a self-tapping screw.
- All fixtures shall be clean at the time of acceptance of the Work and shall be properly aimed or adjustable as required. No extra will be permitted for cleaning, aiming or adjustable fixtures to meet the requirements of the Engineer at the time of acceptance of the Work.
- All lamps used during construction and prior to final inspection, shall be replaced prior to final acceptance of the building by the Owner.
- The locations indicated for outlet boxes of lighting fixtures are diagrammatic. Outlets shall be located as required to coincide with suspension hangers where they occur and with structural an architectural element of the building and shall be in accordance with the Architectural Reflected Ceiling Plan (RCP).

17. Earthing and Bonding

All non-current-carrying metal parts of the electrical installation and other services shall be properly bonded together and connected by means of a protective conductor to an efficient earth in accordance with IEE Wiring Regulations.

All connections shall be by means of an approved mechanical joint or adjustable clamp which shall be accessible and made secure with brass nuts and bolts. On no account shall plain or spring washers of ferrous metal be used.

Protective conductors shall provide earth continuity either through the conduit, armouring, lead

sheathing, copper sheathing, and steel trunking or by independent earth tapes or PVC sheathed wires, according to the system of wiring employed. Where PVC conduits or trunking systems are employed the protective conductor shall be routed within the conduit or trunking. Wherever cable armouring is used as a protective conductor, care must be taken to ensure an adequate earth bond and additional bonds to the metalwork shall be provided as required.

17.1 Main Earth Connections

Where a main earth bar is to be installed it shall be connected in a ring with the earth bar provided on the switchgear and any existing main earth ring in the building. The glands and wire armour of cables shall be connected to the switchgear earth bar or directly to the earth ring.

The main earth bar shall be formed from high conductivity, hard drawn copper bar Grade C101 to BS 1433 of not less than 31.5 mm x 6.3 mm cross-section. Any joints in the earth bar are to be brazed together using brazing alloy type CP1 to BS 1845 or pan head riveted and sweated. The bar overlap/thickness ratio shall be not less than 5.

The earth bar shall be secured to an inside wall in an accessible position. Connections to the metalwork of electrical Plant shall be made in soft drawn copper tape or equivalent sized cables. Where Plant is subject to vibration, connections shall be made using flexible conductors.

All earthing conductors and equipotential bonding cables shall have a green and yellow PVC sheath, and earth bars shall have a green/yellow marker tape applied. Reinforced concrete or sheet steel piling shall be connected to the earthing system as directed by the Engineer. Structures of steel framed buildings shall be bonded to the main earth bars.

Earth rods are to be 16 mm (5/8") diameter driven by an automatic hammer to a depth of approximately 4 metres. Spacing between rods is not to be less than the depth of the rod. Inspection pits shall be provided for each electrode to allow subsequent access for testing.

The routing, dimensioning and arrangement of all main earth bars and connections shall be detailed on the schedules and drawings. Disconnecting links for testing purposes shall be provided at the main earth bar. Where copper earth tape is buried below ground level it is to be served with PVC or double half lap wrapped with an approved grease-impregnated tape.

18. Test of the Installation

The whole installation shall be tested before being energized. The tests shall be conducted as stipulated by the Current edition of the IEE Regulations and the test results recorded and submitted to the Engineer. All electrical installations shall be handed over with a COC certificate.

2.3 Definitions

For the purposes of this specification the definitions and abbreviations given in the applicable specifications listed in 2.1 and the following definitions shall apply:

Skelp: The jointing edges of steel coils used to manufacture spiral welded pipes.

H: The cross-sectional shape of a weld at skelp

Cut and shut bend: See definition with sketches in BS 2633

3. MATERIALS

3.1 Pipes and specials

Materials used for the manufacture of pipes and specials of nominal bore up to 150 mm shall conform to SABS 62 and API 5L: steel grades up to X52, whilst that for pipes and specials of nominal bore over 150 mm shall conform to SABS 719: steel grades A, B and C, as well as API 5L: steel grades X46, X52, X56 and X60.

Flanges shall be manufactured from steel plates conforming to BS4360, or SABS 1431 grade 300W. Specials and fittings shall be manufactured from materials conforming to SABS 62 for nominal bores up to 150 mm, and to BS 534 for nominal bores over 150 mm.

3.2 Rubber joint rings

Rubber rings shall comply with SABS 974 Class F.

3.3 Jointing materials

Bolts, studs, nuts and washers for flanges shall be of materials conforming to the requirements of BS4504 unless otherwise specified. Gaskets for flanged joints shall be of compressed asbestos fibre to BS 2815 grade A, and full faced with a minimum thickness of 3 mm. For pressures up to and including 1, 6 MPa, cloth-inserted rubber may be used.

4. PLANT

The Contractor shall supply and maintain suitable tools, plant and equipment to manufacture and supply steel pipes, specials and fittings to the required standard.

5. GENERAL REQUIREMENTS

5.1 Design of pipes

The design stress for pipes subjected to the specified design pressures shall be 60% of the minimum yield stress of the steel. Unless otherwise specified in the Schedule of Quantities or on the drawings, the minimum pipe wall thickness to prevent buckling of straight piping due to internal sub-atmospheric pressures, shall not be less than the following:

Outside diameter (mm)	Minimum wall thickness (mm)
160 to 558,8	4.5
609,6 to 660,4	5
711,2 to 812,8	6
863,7 to 1092	8
1118 to 1245	10
1397 to 1620	12
1708 to 1860	14
2020 to 2220	16

5.2 Dimensional requirements

Unless otherwise specified in the Schedule of Quantities or on the drawings, all line pipes shall be of one fixed standard length between 9 metres and 19, 5 metres. Standard pipes from which samples for destructive testing have been cut may be jointed together by butt-welding to form single pipe lengths of the required standard length.

The tolerances on all other dimensions shall be in accordance with SABS 719 clause 4.1, except that for pipe outside diameters bigger than 1 250 mm it shall be +6 mm and -6 mm. The tolerances on the outside diameters of pipe ends and bodies shall be as specified for pipe diameters of 250 mm to 1 250 mm.

5.3 Fabrication

5.3.1 Welding

Welds shall comply with SABS 719, SABS 044 and BS 2633 as modified below.

a. Sections 1, 2 are excluded.

b. Section 8

In addition to clause 8.1 the following shall also apply:

All butt-welds and branch fillet welds on specials shall where considered possible (refer clause 3.2.4.2, Section 3) have an internal weld.

The weld bead of this internal weld shall not extend above the prolongation of the original inside surface of the pipe by more than 1, 0 mm. Internal reinforcement in the form of backing rings at weld seams shall not be permitted.

c. Section 10

Procedure qualification and qualifying tests shall be restricted to branch connections only. The internal weld bead/upset metal and flash on the inner surface shall not exceed 1 mm. For pipes and specials to be jointed by butt welding, the internal weld bead shall not protrude more than 1 mm into the bore of the pipe or special.

For electric resistance welded pipes, the height of upset metal and flash on the inner surface shall not exceed 1 mm. For pipes and specials to be jointed by butt welding, the internal weld bead shall be ground flush with the pipe body for a length of 200 mm from the ends to be jointed.

For pipes and specials to be coupled by flexible couplings, external weld reinforcement or upset metal and flash shall be ground flush with the pipe body for a length of 200 mm from the end to be coupled. Where automatic submerged-are welding is employed, at least one pass shall be made on the inside and at least one pass on the outside. This shall apply for double jointing of pipes in the factory as well. The number of longitudinal weld seams shall not exceed:

(a) 1 for pipes up to 1 000 mm nominal diameter;
(b) 2 for pipes larger than 1 000 mm and up to 2 220 mm nominal diameter.

For pipes to be jointed by flexible couplings the pipe manufacture is required to weld steel plates not less than 50 mm x 75 mm x 6 mm thick to each end of all pipes during the pipe manufacturing process, (i.e. before priming, lining and coating). All manual or semi-automatic welds and repair welds shall only be undertaken by welders qualified under the tests laid down in the Code of Practice for Welding SABS 044.

5.3.2 Pipes

Pipes shall be manufactured in conformity with SABS 719.

5.3.3 Specials and fittings

5.3.3.1 General

All specials and fittings shall be designed and manufactured by the Contractor in accordance with the general arrangement shown on the drawings and/or described in the Schedule of Quantities, in conformity with SABS 62 or sections 3 and 4 of BS534. In the latter case specials shall be

manipulated or fabricated by welding from pipes which have been tested to SABS 719. Detailed drawings shall be approved by the Engineer.

5.3.3.2 Bends

Bends shall either be smooth formed or segmented. The maximum angle between oblique butt-ends of segments for gusseted bends shall not exceed 22£ degrees. Cut-and-shut bends shall not be permitted. Segmented bends shall be classified as short, medium and long with radii equal to one, two or three diameters respectively. All bends shall however be of a long radii type, unless otherwise specified in the Schedule of Quantities or on the drawings.

5.3.3.3 Branch connections

Branch connections shall have barrel and branch plate thicknesses such that the maximum stress shall not be greater than that for an uncut pipe of the theoretically required minimum thickness. However, where it is more economical to provide external reinforcement in the form of saddle-type rings or utriform shoes, these forms of reinforcement shall be used to achieve the same results. The attachment of reinforcement to the pipe branches shall be by full penetration welding. Branch connections shall be as remote as possible from the seam weld on the barrel, and except where specifically indicated to the contrary on the drawings, the positioning and extent of external reinforcement is to be determined by the following methods:

(i) Saddle-type reinforcement: section 13.3 of AWWA Manual M11.

(ii) Utriform-shoe reinforcement: in accordance with "Design of Wye Branches for Steel Pipe" by H.S. Swanson and co-authors, published in the Journal of the AWWA, June 1955.
Scour valve tees are to be at right angles to the barrel of the pipe, but tangential to the circumference at the invert of the pipe. The flanges are to be aligned to suit the gradient of the pipeline as indicated on the drawings.

Unless otherwise specified complete flanged air valve and access branches shall be supplied loose with the one end profiled and prepared for welding to the pipe or special. Branches are to be pre - aligned to suit the pipeline gradient as indicated on the drawings.

5.3.3.4 Reducers

Taper pieces shall not have more than two longitudinal weld seams.

5.3.3.5 Flexible couplings

Flexible couplings shall be of the Viking-Johnson type with centre register, except where specified to the contrary in the Schedule of Quantities or on the drawings. Flexible couplings shall be supplied complete with all necessary bolts, nuts and rubber jointing rings.

5.3.3.6 Insulated joints

Insulated joints shall have their insulation material arranged as given in SABS 0121, unless otherwise specified.

5.3.3.7 Flanges

Flanges shall be of the steel-plate for welding type and shall have flat joint faces, with dimensions and joint surfaces in accordance with BS 4504 or ISO 2084, unless otherwise specified in the Schedule of Quantities or on the drawings. For flange thickness not covered in BS 4504 and for domed and conical ends the various thicknesses and methods shall be calculated in accordance with section 3 and where applicable manufactured in accordance with the remainder of BS 5500. Back surfaces may be left machined.

All flanges shall be suitable for field welding to pipes and specials and shall conform to BS 2633, section 7, with preparation of plate flanges as shown in figure 41 ("slip-on") for pipes and specials up to 100 mm N.B. and figure 39 or 40 ("bore and fillet") for pipes and specials 125 mm N.B. and larger. Unless otherwise specified, jointing material i.e. bolts, nuts and washers, in conformity with BS4504 shall be supplied by others.

6. MARKING OF PIPES AND SPECIALS

All pipes and specials shall be clearly hard stamped alongside a longitudinal or spiral weld on one end of the pipe with the following:

(a) Grade and thickness of steel;
(b) Serial number of the pipe or specials;
(c) Nominal diameter;
(d) Hydraulic test pressure.

The applicable drilling table shall be stamped on the periphery of all flanges. Bends shall have their centre plane marked with two small punch marks close to both ends to facilitate correct positioning in laying.

7. STORAGE, HANDLING AND TRANSPORT

Pipes and specials shall be protected against damage at all stages from manufacture to delivery. The ends of all pipes and specials shall be protected against denting. Pipes shall be transported and stacked in a manner such as to prevent deformation of the pipe body in excess of 2 percent of the diameter. Dents causing a protrusion in excess of 3 mm into the interior of the pipe shall be repaired by cutting out. The Contractor shall be responsible for dispatching and transporting of the pipes to site and off-loading.

Suitable access along the pipeline route will be provided unless otherwise specified.
Access for delivery on site might be restricted by poor weather conditions and the Contractor shall make due allowance for such disruption. Unless otherwise specified the pipes shall be off-loaded adjacent to the laying position, and placed on sandbags or other approved protective supports.

As indicated on the drawings, the Contractor shall stack the pipes, specials and fittings at the top or bottom of very steep inclines from where the pipeline construction Contractor will transport them to their destination as required. He will furthermore provide in the rates for his delivery trucks to be hauled/towed up the steep inclines along the pipeline route where necessary.

8. INSPECTION AND METHODS OF TEST

8.1 General

Factory inspection, supervision of tests, and adjudication of test records shall be carried out by an independent Inspectorate appointed by the Employer to act on behalf of the Engineer. Tests and inspections shall be carried out at the manufacturer's works at his expense. He shall provide all necessary testing facilities, labour, instruments, equipment and samples that might be required, free of charge. The Inspectorate shall be afforded every facility during the course of manufacture and testing to enable the inspection to be carried out effectively. All test samples shall be selected by the appointed inspectors, and all instruments used for testing purposes shall be approved by the inspectors and if in their opinion any instrument should require calibration, such instruments shall be calibrated at the expense of the Contractor, by the SABS or other such body as may be approved by the Inspectorate. No mechanical working or straining of pipes and specials shall be allowed after testing and inspection.

8.2 Non-destructive inspection

8.2.1 Visual inspection

All finished pipes and specials shall be visually examined and shall be free of injurious defects as defined in API 5L section 10.7. In addition welds on specials shall be inspected by the application of a penetrant-dye on the inside of the welds. No trace of the dye should appear on the outside.

8.2.2 Ultrasonic inspection to API 5L

Pipes shall be made by an approved welding process and 100 percent of all longitudinal or spiral welds on straight pipes shall be checked with an approved ultrasonic method capable of continuous and uninterrupted inspection of the weld seam in accordance with API 5L, sections 9.14, 9.15, 9.16, and 9.17, except that the equipment shall be checked with an applicable reference standard at least twice every working turn.

8.2.3 Radiographic inspection to API 1104

(a) Longitudinal welds: All electric fusion welded pipes shall be inspected by radiological methods for a distance of 200 mm from each pipe end.

(b) Spiral welds: All electric fusion welded pipes shall be inspected by audiological methods for a distance of 100 mm from each end of each length of pipe and of the complete "H" at all skelp and welds, including 150 mm of the spiral welds in both directions away from the intersection points of the skelp and welds.

(c) Circumferential butt welds and welds on specials: 100 percent of the weld length shall be examined. When consistently acceptable results are obtained, the number of welds to be so tested may be reduced by mutual agreement between the Engineer, Inspectorate and Contractor.

(d) Repairs

(i) Straight piping - 100 percent of the total length of all repairs shall be examined radiographically. Where repairs are made before ultrasonic inspection, and such repairs pass ultrasonic inspection, no further radiographic inspection of same is required.

(ii) Specials - 100 percent of all repairs shall be examined radiographically.

(e) Pipes for rail, road and river crossings: 100 percent of the total length of all welds shall be examined radiographically.

8.2.4 Hydrostatic testing

All pipes shall be hydrostatically tested to a pressure such as to produce a circumferential tensile stress in the steel not less than 90 percent of the minimum yield stress of the steel, or 9 MPa, whichever is the lesser. Each individual straight pipe shall be subjected to a hydrostatic test in accordance with the methods described in API 5L section 5. Leaks or sweats shall be considered injurious defects. Should it not be possible to hydrostatically test straight piping and/or specials, a liquid penetrant test shall be done on all welds over and above the non-destructive tests specified above. This will only be applicable with the prior written approval of the Engineer.

8.2.5 Liquid penetrant testing

Where requested by the Inspectorate, liquid penetrant testing shall be done in accordance with BS 4416.

8.2.6 Magnetic particle testing

Where requested by the Inspectorate, magnetic particle testing shall be done in accordance with ASME Boiler and Pressure Vessel Code, Section V, Article 7.

8.3 Repair of injurious defects

Injurious defects found by non-destructive testing of welds, visual examination, hydrostatic testing or determined by any other means to exceed the limitations in API 5L section 10.7 shall be repaired in accordance with API 5L sections 10.8 and 10.9, but subject always to the requirements of this specification.

8.4 Destructive testing

8.4.1 Tests

Destructive tests shall be performed in accordance with SABS 719 clause 7.2 on the first pipe and thereafter on one of every 500 subsequent pipes.

8.4.2

Sampling and compliance with the specification.
This shall be performed in accordance with SABS 719 clause 6.

9. MEASUREMENT AND PAYMENT

Measurement and payment shall be per linear metre of straight pipe fabricated, supplied and delivered to site. Measurement and payment of specials and fittings shall be per the number of each special and fitting fabricated, supplied and delivered to site. Where pipe linings and coatings are applied prior to delivery, the rates for pipes, specials and fittings shall include for all such linings and coatings as required under Departmental Specification DWS 1131, unless otherwise specified in the Schedule of Quantities.

PARTICULAR SPECIFICATION: PE

THE CLIENT'S PRE-CONSTRUCTION AND HEALTH PLAN

PE1 INTRODUCTION

PE1.1 Purpose and Scope

This document describes the procedure upon which the COMPANY shall comply with the requirements set out in the client's Health and Safety Specification.

This document defines the Management System that is implemented by the COMPANY for the management of Health and Safety on the project, which includes ensuring subcontractor compliance with the same standards. The aim of this document is to present the safety aspects that will be controlled and managed on the project.

PE1.2 Reference Documents

- Occupational Health and Safety Act, (Act No. 85 of 1993)
- Compensation for Occupational Injury and Diseases Act.
- Client Health and Safety Specification.
- Construction Regulations 2003.
- The Construction Kit. (CD)

PE1.3 Definitions

The following definitions will apply to the Safety Management Plan, acronyms given hereunder shall apply:

Construction / Building Work

(as defined by the Occupational Health and Safety Act: Construction Regulations 2003):

Means any work in connection with –

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

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

c) The construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or

d) The moving of earth, clearing of land or making of an excavation or work on any similar type of work.

Hazard Identification and Risk Assessment and Risk Control (HRA):

Means a documented plan, which identifies hazards, assesses the risks and detailing the control measures and safe working procedures, which are to be used to mitigate and control the occurrence of hazards and risks during construction or operation phases.

Site

Means the area in the possession of the Contractor for the construction of the works. Where there is no demarcated boundary it will include all adjacent areas, which are reasonably required for the activities for the Contractor, and approved for such use by the Engineer and/or client.

The Act

Means, unless the context indicates otherwise, the Occupational Health and Safety Act, 1993 (ACT NO. 85 of 1993) and Regulations promulgated there under. **(OHSA)**

Hazard

Means a source of or exposure to danger (source which may cause injury or damage to persons, or property)

Risk

Means the probability or likelihood that a hazard can result in injury or damage.

Contractor's Responsible Person / s

Means any person appointed in writing by the Contractor to supervise construction or building work. The appointment shall be as required by the OHSA which shall stipulate health and safety responsibilities, area of responsibility and the proposed duration of the project.

Hazardous Chemical Substance (HCS)

Means any toxic, harmful, corrosive, and irritant or asphyxiate substance, or a mixture or substances for which an occupational exposure limit is prescribed, or an occupational exposure limit is not prescribed, but which creates a hazard to health.

Construction Plant (TEM)

Encompasses all types of plant including but not limiting to, cranes, piling frames, boring machines, and excavators, dewatering equipment and road vehicles with or without lifting equipment.

Contractor

Means "subcontractor".

Health and Safety Program

Encompasses the COMPANY safety planning spreadsheet.

Health and Safety Plan (HSP)

The content of this document which will be made available on site for inspection by an inspector, Technical Officer, Agent, subcontractor, employee, registered employee organisation, health and safety representative, or member of the health and safety committee.

Health and Safety File

Describes the safety file holding all records on health and safety for the project, which shall be available at all, times for evaluation, and copy of which will be forwarded to the client upon completion of the project.

PE1.4 Responsibilities

(a) Notification of Intention to Commence Construction Work

The Provincial Director of the Department of Labour shall be notified by the appointed safety consultant to the COMPANY, immediately upon receipt of the Letter of Acceptance of project commencement in accordance with the following requirements:

- The demolition of a structure exceeding a height of 3 meters; or
- The use of explosives to perform construction work; or
- The dismantling of fixed plant at a height greater than 3 meters; or
- The work exceeds 30 days or will involve more than 300 person days of construction
  work; and
- Includes excavation work deeper than 1 meter; or
- Includes working at a height greater than 3 meters above ground or a landing.

A copy of the notification letter to the Provincial Director shall be forwarded to client for their records and shall be made available to an Inspector, Project Engineer or employee.

(b) Assignment of Contractor's Responsible Persons to Supervise Health and Safety on Site.

The Contracts Manager and Site Agent shall ensure copies of all the appointment letters of the responsible persons appointed on site will be made available to the client and that all legal appointments shall be conducted in accordance with the requirements set out in the **OHSA** and Client specifications. The above shall also be imposed upon all subcontractors.

(c) Safety Officer Appointment

A part--time Health and Safety consultant shall be appointed upon commencement of the project. The safety officers shall be tasked with monthly inspections of the site, the results of which shall be forwarded to the client or his appointed representative.

(d) Risk Assessment Competent Person

The Project Manager shall appoint a competent person in writing at commencement of the project to control the risk assessment process on site. A copy of the risk assessment appointment is attached with duties and responsibilities defined.

(Annexure E)

(e) Competency for Contractor's Responsible Persons

The Project Manager acknowledges that all management personnel (responsible for health and safety) shall undergo a half-day Health and Safety Management Course, which is to be arranged and conducted by the appointed safety consultant prior to commencement of activities on site.

(f) Health and Safety Representatives

At least one (1) Health and Safety Representative shall be nominated, elected and trained to carry out his / her functions in his / her area of responsibility. This will include areas where less than fifty (50) employees are engaged in activity. Employees elected shall be designated in writing for a specific area and period of time.

The designated persons shall conduct monthly inspections within their area of responsibility, the records shall be kept for auditing and that deviations recorded are reported to the responsible supervisor within the designated persons area so that appropriate action can be taken.

The designated person/s shall be permitted to participate in the Health and Safety Committee Meetings.

PE1.5 Objectives and targets

- Compliance with the COMPANY Health and Safety Policy.
- Everyone is responsible for organising accident prevention at his or her own level on site.
- Safety training is important.
- Prevention.
- Working safely ensures your job.
- The COMPANY management commits itself to the objectives and targets.
- Disabling Injury Frequency Rate (DIFR) of 2.0 or less.
- 90% compliance on monthly Health and Safety Audits.

- Compliance with the legal requirements set out in the Occupational Health and Safety Act, Act 85 of 1993, (OHSA) and Regulations.
- Compliance with the Client's Safety Specification for Construction.

PE1.6 Planning and Procedure

The procedures to be used for the project are to be in accordance with the Safety Manual in use in the COMPANY under the guidance of the appointed safety consultant. The sub-headings covered under the Safety Manual are as follows:

- Administration
- Appointments
- Safety Committees
- Registers, checklists and permits
- Incident Management
- Emergency Planning
- Contractors
- Risk Assessments
- Audits
- Hazardous substance control
- Training
- Mining Requirements
- Roads Requirements
- Planning

PE1.6 Implementation of the Occupational Health and Safety Specification

The COMPANY is committed to implementing client specific safety specification on the project and is committed see that this forms an integral part of the project. It is our intention to make this specification part of other Contractors and Suppliers operating procedures.

PE1.7 Application of the Health and Safety Specification

(g) **Compensation of Occupational Injuries and Diseases Act, Act No. 130 of 1993 (COIDA)**

The letter of good standing will be available on site for reference purposes as proof of good standing. The COMPANY shall ensure all Contractors also comply with the above requirements defined in the COIDA.

(h) **Occupational Health and Safety Policy**

The COMPANY Health and Safety Policy is attached for reference purposes.

(Annexure A)

(i) **Hazard Identification Risk Assessment**

The Contract Manager shall ensure the Site Agent shall prior to the commencement of any construction work perform Hazard Identification, and the assessed risks shall form part of the health and safety plan applied on site.

A copy of the HRA shall be made available for viewing to the client.

The Site Agent shall ensure that all HRA's conducted will be conveyed to all personnel and contractors through the site training program and that these training sessions will be presented by the competent person regarding the hazard and related work procedures before any work commences.

The HRA Team that will be established will comprise members as follows:

- Health and Safety Representative(s),
- Health and Safety Committee Member(s)
- Management Representative / Site Agent

Attached in the form of **Annexure C and D**, the Hazardous Task Identification and (HTI) and format of the Risk Assessment (RA) is included.

Method statements form part of the Risk Process and will conducted in accordance with the Risk Process described above.

Based on the activities carried out on all projects Hazard Investigation and Risk Assessments (HRA's) will be done. Examples of which are:

- Site Establishment
- Demolition works
- Excavation
- Concrete works
- Lifting operations
- Hand held tools
- Motorised Equipment

(j) Health and Safety Committee

The Project shall convene a health and safety committee meeting monthly. All members required to be in attendance shall be notified of such meeting by means of a formal agenda.

The Site Agent shall ensure an attendance register and minutes are kept for auditing purposes, and that a copy of the minutes be circulated to all members in attendance well before convening the next meeting and within 7 days, a copy of the minutes will be forwarded to the project engineer.

Members of the committee shall include the following and are not limited to:

- Safety Consultant. (When available)
- Contractor's site representative. (Supervisory level)
- Contractor's site representatives. (Operating level)
- Project Engineer nominated representative. (Co-opted status)

(k) Health and Safety Training

Training of personnel is a legal requirement and a necessity and is acknowledges as such. The Training Planning Matrix shall be provided upon request.

Induction Training

Induction training shall be attended with the Client as well as the The COMPANY Induction program requirements and records of attendance kept to prove the same.

The COMPANY Induction format is attached for reference purposes. **(Annexure E)**

Awareness Training

Weekly awareness training shall be conducted using the **COMPANY Toolbox Talk** documents, which shall be conducted by the site supervisors. **(Annexure F)**

Competency

Training identified through the Risk Assessment Process and conducted through this process shall be kept on file as proof of competency and training. (This may include operators)

First Aid and Health & Safety Representative Training

All safety representatives elected and designated, including first aiders, shall be trained should they not already be in possession of a valid certificate of training proving competence.

General Record Keeping

The Site Agent shall ensure that all the Health and Safety records, required by both the Occupational Health and Safety Act, 85 of 1993 and Regulations are kept for reference purposes and auditing.

Further to the requirements set out above, the Site Agent will also maintain records that may be defined through the risk assessment process, for auditing purposes.

In accordance with the requirements set out in the Construction Regulations 2003 and the requirement set out in Client Specification the Site Agent shall ensure that a copy of all Health and Safety records generated during the course of construction, be handed over to the Project Engineer upon completion of construction.

Statistics

The Site Agent shall ensure injury and incident records (Near Hits, First Aid, Medical cases, Disabling Lost Time Incidents), training etc. referred to above are kept on site. All documents shall be made available to the client for inspection including the Department of Labour's Inspectors as required by the Occupational Health and Safety Act, 85 of 1993.

The statistics formula as listed below shall be adhered to.

DIFR (Disabling Injury Frequency Rate) $\frac{\text{DI's x 1 000 000}}{\text{Man-hours}}$

DISR (Disabling Injury Severity Rate) $\frac{\text{Days Lost x 1 000}}{\text{Man-hours}}$

General Inspection, Monitoring and Reporting

The COMPANY shall comply with the requirements set out by the client. We have attached a safety management plan upon which the dates of inspections and training and awareness will be entered, conducted and monitored.

The COMPANY shall keep all records of inspections and investigations undertaken during the contract for the specified legal period as defined in the OHSA and Regulations.

Internal Audits

Internal audits shall be conducted a minimum once per month by the project engineer, as well as the appointed safety consultant. The Results shall be tabled and discussed at the Health and Safety Committee meetings. The Audits to be conducted by the appointed safety consultant shall be conducted on the audit schedule attached as per **Annexure G.** Records of the audits shall be forwarded to the Project Engineer and shall be filed on site for reference purposes.

(l) Incentives

No incentive scheme is being identified unless required by the client.

(m) Penalties

Non-compliance with the client safety specifications can result in work stoppages and possible expulsion from site until the problem has been remedied including costs.

(n) Emergency Procedures

The Site Agent shall make available to the Project Engineer a detailed Emergency Plan to tie into the evacuation plan already in place on the client's premises.

First Aid Box and Contents

The Site Agent shall ensure that all working areas area adequately provided with first aid attendants whether there are fifty (50) employees or less engaged on the contract. The First Aid attendant shall be trained in accordance with the requirements set out in the OHSA with recognised and accredited service providers as defined above.

Proof of training attended (certificate) shall be attached to the written acceptance of appointment. It will be the first aid attendant's responsibility to ensure the contents of the first aid boxes are monitored and inspections recorded on the contents of the first aid box register.

The first aid box shall be adequately stocked by The COMPANY at all times and will be accessible to all.

Accident and Incident Reporting and Investigation

Should accident investigation need to be conducted, the Project Manager shall appoint a competent person in writing to conduct the said investigation. The procedure to be followed will be in accordance with the OHSA requirement on the Annexure 1 – Recording and Investigation of Incident form.

The Site Agent shall ensure that the results of all investigations are communicated to the employees engaged through incident recall and prescribed meetings. The Site Agent shall ensure that the investigations are kept for record purposes in accordance with the prescribed requirements set out in the OHSA and the company specific procedures.

Should there be an incident, the Project Engineer shall be notified within 48-hours if required by the client, of the occurrence. It is acknowledged that the client reserves the right to participate in all investigations into accidents or incidents.

Hazards and Potentially Hazardous Situations

The Site Agent shall ensure that all other contractors or contractors are warned of hazardous or potentially hazardous situations, which may prevent them from effectively performing their duties, which includes the placement of adequate warning signs.

(o) Personal Protective Equipment and Clothing

The COMPANY shall comply with OHSA requirements to provide PPE.

The Site Agent shall through the Risk Assessment process identify the specific PPE needs per activity and then issue the PPE accordingly. (Reference to the OHSA General Safety Regulation 2 – Employer to provide Personal Protective Equipment)

Should PPE be lost or stolen, then the employee will be issued with a new set of PPE. Should PPE be worn out or damaged, the user shall return the worn or damaged PPE and will be issued with a replacement set. Training in the use of this shall be provided. Overalls and hardhats shall be identifiable. (Principal Contractor different from the contractors). PPE shall be provided to visitors as well.

(p) Safety Signage

The Site Agent in conjunction with the appointed safety consultant shall assess the Health and Safety Signage requirement in conjunction with the Risk Assessments conducted and will place the signage at strategic positions on the site works.

The COMPANY shall also maintain the signage to ensure its effectiveness at all times and under all conditions. Signage, which cannot be repaired, shall be replaced.

(q) Permits

- The COMPANY shall ensure that access to site works is restricted to construction personnel.
- All attempts will be made to restrict spectator access.
- Access to the site shall be by the Project Engineers (Clients) authorisation on the prescribed form. (Permits and ID cards shall be issued by the client)
- Special permits for hot work and isolation permits shall be applied for to the Project Engineer prior to commencing with the activity.

(r) Contractors and Suppliers

The Site Agent shall enter into an Agreement with Mandatary in terms of Section 37(2) of the Occupational Health and Safety Act, 85 of 1993, with all contractors appointed by The COMPANY is entered into. The Contracts Manager will ensure the contractors are issued with the Client Safety Specification where reasonably practicable including any the COMPANY contractor pack for the project, should they not be contained in the Client Safety Specification.

The COMPANY shall assist and ensure the contractors engaged comply with all of these requirements and adhere to the requirements set out in the OHSA. Contractors will be stopped from working in the event of unsafe conditions and activities being observed. All contractors shall be covered by the COMPANY Safety Plan and will be issued the same.

(s) Health and Safety in Practice

Excavations

The Site Agent shall ensure that all activities involving excavations, shoring, dewatering or drainage, a safe working procedure is submitted to the project engineer for approval

prior to work commencing. Excavation work exceeding the specified depth as stipulated in the OHSA regulations, shall comply with the following requirements:

a) The excavations are inspected before the shift starts, after heavy rain (inclement weather) and after any major condition which may affect the excavations stability and the findings are to be recorded and kept;
b) All excavations regardless of the depth shall be adequately barricaded to prevent persons falling into the excavation;
c) The safe working procedure shall be communicated to all employees who may be effected by the work; and
d) The safe working procedures shall be enforced and maintained by the appointed excavation supervisor at all times.
e) For high-risk activities, all personnel working in the excavation shall be attached by means of a lifeline.
f) Material excavated shall be removed from the point of excavation.
g) Ensure stability of adjoining structures.

Demolition

No demolition work is being envisaged on this project.

Explosives and Blasting

No blasting activities are envisaged on this project.

Stacking of Materials and Housekeeping

The Site Agent shall ensure that all stacking will be supervised by a person competent to supervise over the activities, and that clearly defined and allocated storage areas are provided for and identified, and that materials being stored within this area are stacked in accordance with sound stacking principles of sort-by-sort, access to be maintained, level surface, and the height will not exceed three times the base width. Housekeeping shall be maintained in accordance with the client requirements at all times.

(t) Hazardous Chemical Substances

The Site Agent shall ensure the necessary training and information regarding the use and storage of HCS is provided, and that the use and storage of HCS is carried out as prescribed by the HCS Regulations. Furthermore, the Site Agent shall ensure that all chemicals brought to site have a Material Safety Data Sheet (MSDS) and the users are made aware of the Occupational hazards and precautions that need to be taken when using the chemical. The First Aider shall be made aware of the MSDS and how to treat HCS incidents appropriately. Access to all HCS records shall be afforded to the project engineer at all times.

Fuel / Diesel

- Bulk storage areas shall be demarcated, secured and sign posted with the relevant warning pictograms.
- Bulk storage areas shall be bounded.
- Re-fuelling shall be conducted in designated re-fuelling areas only.
- Spill-kits shall be available at all times in these designated areas.
- The surface of the bounded areas and walls shall be of impermeable material.
- The bounded area shall be sloped towards a collection pit.

Asbestos

No asbestos is to be used on this Project.

(u) Plant and Machinery

Construction Plant

- All plant shall comply with the OHS Act requirements in relation to operation and maintenance thereof.
- Service and maintenance of the vehicles shall be of a high standard at all times.
- All plant shall subject to design be fitted with back-up alarms and audible indicating devices.
- The COMPANY shall ensure that all construction plants moving parts are adequately protected.
- Pre-start inspections shall be conducted on all motorised equipment daily, deviations of such inspections shall be recorded.
- Construction plant identified for use shall be operated by a trained and authorised operator.

- All construction plant shall be operated under the direct supervision of a person competent to identify potential hazards in the work he is conducting.
- Work involving the use of construction plant shall be conducted in accordance with an approved Risk Assessment.
- The Site Agent shall ensure all operators are equipped with the necessary PPE namely; safety shoes, overall, safety glasses, and gloves.
- Plant shall be fitted with an extinguisher where practicable.
- Washing shall be conducted in the designated washing areas.

The COMPANY shall ensure the all equipment moving to and from site is adequately secured, and that all contractors abide by this requirement.

Transport of Personnel

- Safe vehicular transport shall be provided for personnel working on the project to the workplace, which shall include proper seating, side restraints and cover.
- No personnel shall be permitted to travel on any plant or equipment on the site works.
- Road safety principles shall be adhered to on and off site.

Vessels under Pressure (VuP) or Gas Bottles

The COMPANY shall ensure they comply at all times with the requirements of Vessels under Pressure Regulations, with specific reference to the following:

- Ensuring all Equipment owned and hired-in Vessels under pressure, comply with the 36-month pressure vessel inspection, and a certificate of testing is available on site.
- Ensuring that all personnel who shall use this equipment are competent and trained.
- Ensuring the users of this equipment are issued with the required PPE.
- Ensuring the area is adequately identified as a noise area and warnings are posted.
- Ensuring daily pre-start inspections are carried out on all the equipment and the findings recorded.
- Ensuring the correct fire prevention and fighting equipment is available at all times.
- Noise levels where possible shall be kept within reasonable operating norms.

Fire Equipment

The Site Agent shall ensure the following all fire equipment to be used on site comply with the following:

- Extinguishers shall be placed in positions to ensure fast and easy access is maintained at all times.
- Placement of all extinguishers shall be depicted with the required pictograms.
- Extinguishers shall be serviced once annually, and after discharge or visible signs of depressurisation.
- The Site Agent shall ensure all employees are adequately trained in the safe use of the extinguishers.
- The Site Agent shall ensure a person is appointed to inspect the extinguishers on a monthly basis and the results of which are to be entered into a register designed for that purpose.

Hired Plant and Machinery

The Site Agent shall ensure the following criteria is adhered to when considering hired plant and machinery:

- Only approved hire companies shall supply equipment to the site.
- Hired plant shall be checked for safety compliance prior to being accepted for use on site.
- Should hired equipment be accompanied by an operator, The COMPANY shall ensure that the operators' competency be verified and the operator undergo an induction training session.
- The Site Agent shall ensure the operators of hired plant attend weekly toolbox talks in conjunction with The COMPANY site personnel.
- The Site Agent shall ensure that all operators are equipped with the required PPE before commencing work on site.

Scaffolding / Working at heights / Fall Protection

Work involving scaffolding and work at heights shall comply with the requirements set out in the Construction regulations 2003 pertaining to these activities with reference to the SABS 085 code of practice. Fall protection planning shall be done in conjunction with the risk assessment process. All scaffold shall be erected under the control of a person trained and appointed to conduct such scaffold erection.

Falsework / Formwork for Structures

Work involving scaffolding and work at heights shall comply with the requirements set out in the Construction regulations 2003 pertaining to these activities with reference to the SABS 085 code of practice.

Lifting Machinery and Tackle

The Site Agent shall ensure that the use of Lifting Machinery and Tackle is done in accordance with the requirements of the Regulations, which include but is not limited to the following:

- Lifting machinery and tackle to be used on site shall be marked with the Maximum Mass Load (MML), which is the safe limit in which the equipment may be used.
- Inspections on Lifting Machines and Lifting Tackle shall be inspected once per month on the register provided and the findings recorded.
- Daily pre-start checks shall also be conducted on all Lifting Machinery and Tackle.
- Records shall be kept of all lifting machinery and tackle inspections and Load Tests.
- Load tests shall be conducted a minimum of once per annum, and a certificate of compliance shall be kept on record.
- A valid logbook shall be maintained for all lifting machinery, which will comply with a minimum six-monthly service and maintenance.
- Lifting machinery shall be operated under supervision at all times with a trained banksmen who shall inspect all tackle before each lift.
- All lifting equipment operators shall be trained once every two years and a copy of such training shall be attached to the appointment, which is to be made on site.
- The Operators shall be tested for medical fitness.

Ladders and Ladder Work

The following requirements shall be complied with regarding Ladders and Ladder work:

- Ladders shall be clearly numbered, and inspected on the register provided.
- A competent person shall be identified and appointed as the ladder inspector.
- Where aluminium ladders cannot be used, then wooden ladders shall be straight grained, unpainted to allow for proper inspection of the grain for cracking.
- Ladders shall be secured at the top and chocked at the base to prevent slipping.
- Where chocking of the base is not possible, then the user shall ensure that the ladder is held in position by another employee when ascending the ladder.
- Ladders shall be inspected a minimum once per month by the person appointed as the ladder inspector.
- Proper storage shall be provided for all ladders when not in use.

General Machinery

In accordance with General Machinery Regulation 2(1), The COMPANY shall:

- Ensure a competent person be appointed as defined in the above clause from the Occupational Health and Safety Act, 85 of 1993 and Regulations, to service and maintain all machinery in use on site.
- The COMPANY shall appoint additional competent persons to assist the competent person mentioned above in accordance with General Machinery Regulation 2(7)(a), as and when required.
- The COMPANY shall ensure that records are maintained of all services conducted.

Lighting and Power

The Site Agent shall ensure lighting circuits and power circuits are fitted with suitable earth leakage systems in accordance with the client, which will include the following activities:

- Earth leakage system will be tested monthly.
- Malfunctions shall be repaired immediately or replaced.
- Lighting shall be so positioned as not to interfere with construction activities.

Portable Electrical Tools / Explosive Power Tools

The Site Agent shall ensure the following procedure is adhered to regarding Portable Electrical Tools and Explosive Powered tools:

- Minimum compliance with legislation.
- Only competent persons shall be permitted to conduct routine and monthly inspections on the equipment.
- Persons competent to inspect the equipment shall be appointed in writing.
- Persons who are trained to operate such equipment shall be appointed and shall be the only authorised person to operate the equipment.
- The Site Agent shall ensure operation of the equipment is in accordance with the approved Risk Assessment and Safe Working Procedure set out.
- All users shall undergo regular awareness training to ensure compliance.
- The Site Agent shall ensure the required PPE and clothing is provided and maintained.

(v) Public Health and Safety

In the interests of public safety, The COMPANY shall ensure that all persons who may be affected by the work being conducted on site are informed and kept aware of the dangers, which may arise from the work being conducted on site. This awareness shall be in the form of posters and inductions for visitors to site and warning signs.

(w) Night Work

Night work shall only be conducted upon approval of the project engineer, with the same safety standard being applied for these activities as with day work activities.

(x) Facilities for Safe Keeping / eating areas

The COMPANY shall ensure that adequate facility is provided for the personnel on site. The area shall be provide the following:

- Sufficient seating;
- Seating under cover;
- Protected change room;
- Toilets.
- Hand wash facility.
- Potable water.

No food preparation shall be conducted on site and designated eating areas will be made to allow adequate seating. Waste bins shall be strategically placed and cleared regularly.

ANNEXURE A (Safety Policy)

ANNEXURE B (HTI)

HAZARDOUS TASK IDENTIFICATION (HTI)

Ser no:	INFORMATION REQUIRED	DETAILS	SIGNATURE
1	Name of contract:		
2	Date prepared:		
3	Prepared by:		
4	Name of person approving:		

Key Table	
0=	NONE
1=	LOW
2=	MEDIUM
3=	HIGH

Risk Assessment (RA) Code	LIST OF ALL STANDARD TASKS	What is the future potential that this task can cause further....								Total Score	Rating	Doc Required
		Is it a new or unusual task?	Is it a dangerous task?	Personal injury	Health risk	Impact on the environment	Property damage	Fire	Has the task caused previous injury / loss?	Yes = 3 / No = 0	0 - 7 Low risk, 8 - 17 Med risk, 18 -24 High risk	RA - Risk assessment, MST - Method statement
RA-1	Site clearing - manual labour & small tools	1	1	1	1	1	1	1	0	7	LOW RISK	MST
RA-2	Site clearing - using mechanical means									0	LOW RISK	MST
RA-3	Site establishment - PSM erection / dismantling									0	LOW RISK	MST
RA-4	Site establishment - Container store / office allfloat									0	LOW RISK	MST
RA-5	Excavations - using manual labour									0	LOW RISK	MST
RA-6	Excavations using motorised plan									0	LOW RISK	MST
RA-7	Excavations - working inside - 1.8 metres									0	LOW RISK	MST
RA-8	Excavations - working inside > 1.8 metres									0	LOW RISK	MST
RA-9	Batching plants - erection / dismantle									0	LOW RISK	MST
RA-10	Batching plants - general working and operation									0	LOW RISK	MST
RA-11	Concrete mixing - using manual labour									0	LOW RISK	MST
RA-12	Concrete mixing - using mechanical means									0	LOW RISK	MST
RA-13	Concrete pours - using lifting machinery (Cranes etc)									0	LOW RISK	MST
RA-14	Concrete pours - using motorised plant (dumpers etc)									0	LOW RISK	MST
RA-15	Concrete pours - using mechanical pump									0	LOW RISK	MST
RA-16	Lifting Equipment - Tower crane erection / dismantle									0	LOW RISK	MST
RA-17	Lifting Equipment - Tower crane operation									0	LOW RISK	MST
RA-18	Lifting Equipment - Mobile crane operation									0	LOW RISK	MST
RA-19	Lifting Equipment - Telescopic handler operation									0	LOW RISK	MST
RA-20	Lifting Equipment - Forklift operation									0	LOW RISK	MST
RA-21	Lifting Equipment - using lifting tackle									0	LOW RISK	MST
RA-22	Formwork - general erection / dismantling									0	LOW RISK	MST
RA-23	Formwork - lifting and placing large panels									0	LOW RISK	MST
RA-24	Formwork - work on support decks									0	LOW RISK	MST
RA-25	Scaffolding - erect / dismantle small scaffolds < 2 m									0	LOW RISK	MST
RA-26	Scaffolding - erect / dismantle large scaffolds > 2 m									0	LOW RISK	MST
RA-27	Scaffolding - use of mobile scaffolds									0	LOW RISK	MST
RA-28	Scaffolding - dismantling of scaffolding									0	LOW RISK	MST
RA-29	Demolition - using small electric breakers									0	LOW RISK	MST
RA-30	Demolition - using compressed air breakers									0	LOW RISK	MST
RA-31	Demolition - using motorised mechanical means									0	LOW RISK	MST
RA-31	Demolition - using explosives / blasting operations									0	LOW RISK	MST
RA-33	Trades - Brickwork operations									0	LOW RISK	MST
RA-34	Trades - Plastering operations									0	LOW RISK	MST
RA-35	Trades - Painting operations									0	LOW RISK	MST
RA-36	Trades - Ceiling operations									0	LOW RISK	MST
RA-37	Trades - Roofing installations									0	LOW RISK	MST
RA-38	Trades - glazing installations									0	LOW RISK	MST
RA-39	Trades - Tiling operations									0	LOW RISK	MST
RA-40	Trades - carpentry (Doors / windows)									0	LOW RISK	MST
RA-41	Trades - Metal work (Doors / windows)									0	LOW RISK	MST
RA-42	Trades - Steel erection									0	LOW RISK	MST
RA-43	Trades - plumbing									0	LOW RISK	MST

ANNEXURE C (Risk Assessment)

RISK ASSESSMENT

TASK / ACTIVITY NAME:

AREA:

Ser No.	Task Steps	Risks identified	A Probability	B Severity	C Frequency	D Risk Score	Rating	SWP Required	Immediate Action Required	Safe Working Procedure
1			4	4	6	14	HIGH RISK	✓		
2			6	6	6	18	HIGH RISK	✓		
3			4	4	6	14	HIGH RISK	✓		
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										

Methods Used to Identify Risk: Most Critical Hazards | Control Methods | RA Committee

Most Critical Hazards		Control Methods		RA Committee	
Engineering Risk Out	☐ Fatigue	☐ PPE Selection	☐ Codes of Practice	☐	Name: Sign:
Use of Specialized PPE	☐ Speed	☐ PPE Issue Records	☐ Supervisory Controls	☐	
Introduce Specialized Controls	☐ Engine Failure	☐ Signs at Area of Use	☐ Training of Personnel	☐	
Training	☐	☐ Safety Talks	☐ Training Records	☐	
	☐	☐ Safe Work Procedures	☐	☐	Approved: Sign:
	☐	☐	☐	☐	
	☐	☐	☐	☐	

A Probability an accident may occur		B Severity		C Hazard Frequency		D Risk Score / Criticality	
6	Inevitable	6	Fatal and Permanent Dis	6	Arises every shift	14 to 18	High Risk
4	Probable	4	DLTI (50 000 - 499 994)	4	Arises every week	8 to 13	Medium Risk
2	Highly Improbable	2	Medical Case (10 000 - 49	2	Arises every month	0 to 7	Low risk
0	No injury / loss	0	First Aid Case	0	Arises every year		

Probability	Severity 6	4	2	0	Frequency
4	24	16	8	0	6
2	12	8	4	0	4
0	10	8	4	0	2
	6	4	2	0	0

Probability	Severity 6	4	2	0	Frequency
4	24	16	8	0	6
2	12	10	8	4	4
0	10	8	4	2	2
	6	4	2	0	0

DG

ANNEXURE D (Safety Induction)

SAFETY INDUCTION	

OHS Act 85 of 1993 Sections 8 & 14

Requirements:

Every employer is required to take all reasonable measures to ensure that the requirements of the OHS Act, and regulations are observed. The general duties of employees are to carry out lawful instructions and to obey the Company's safety rules and procedures prepared in accordance with the provisions of the Act and Regulations. For this process to begin and to be formalized it is necessary for all employees to be formally inducted into the safety procedures and the completion thereof, formally acknowledged by both employer and employee.

ITEM COVERED	DONE YES/NO	REMARKS
Explain Company Policy / Site Safety Rules Provide copies of same		
Explain Section 14 of the Act		
Explain the use of Personal protective Equipment and procedures. Re: Issueing and maintenance		
Explain the meaning of symbolic signs		
Explain the procedure in the event of injury		
Explain the use of facilities and toilets		
Explain the danger of moving machinery. (DUMPER, MIXER, SKILLSAW, GRINDER Etc.)		
Explain the danger of hazardous substances (PETROL, DIESEL, OIL, GAS, PAINT Etc.)		
Explain specific Job Duties and Requirements		
Introduce : Supervisor, safety Representatives, First Aider		

This confirms that the above named acknowledges that he/she has been instructed in the safety items listed above and has received the necessary protective clothing / equipment to use in the performance of his/her work.

INDUCTION OFFICER / TRAINER

Signature	Designation	Date

ACCEPTANCE

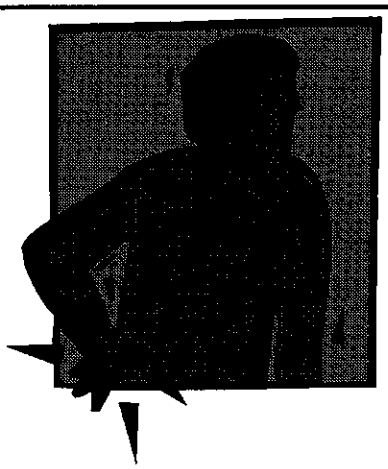
I, _____ hereby acknowledge receipt of and accept and understand the requirements of this induction.

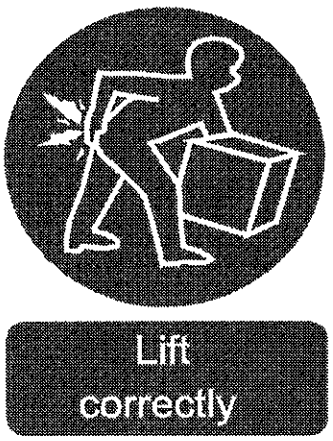
Signature	Designation	Date

	DG	

ANNEXURE E (Toolbox talks)

TOOLBOX TALKS			
TALK NO:	16	DATE:	
TALK TOPIC:	LIFTING MATERIALS BY HAND	SITE:	
TALK PRESENTED BY:			





TALK CONTENT / DISCUSSION

HOW DO I LIFT EQUIPMENT SAFELY WITHOUT INJURING MY BACK?

1. Stoop and bend the knees.
2. Keep your back straight.
3. Lift using the leg muscles.
4. Push upward with the load.
5. If the load is on a table, slide the load to the edge until you can get a firm grip under the load, and then proceed to lift as above.
6. If the load requires two or more persons to lift, then ensure the load is lifted on one side first and then the other, Ensure someone gives the command to lift so the lift occurs simultaneously.
7. Where it is practical to use a trolley, do so as it will safe guard against unnecessary injury.

ATTENDANCE

NAME:	SIGN:		NAME:	SIGN:

ANNEXURE F (Audit Schedule)

PARTICULAR SPECIFICATION PF

VALVES

PF 1 GATE VALVES

Gate Valves shall bear the official mark of SABS and be SABS approved. They shall comply with SABS 664 for waterworks pattern valves of the types, classes and sizes listed in the Schedule of Quantities and shall be provided with the following:

	Description	Specification
1	Flanges	Double flanged, to be in accordance with and drilled off-centre to SABS 1123, Table 1600, 2500 or 4000 as scheduled.
2	Spindles	Non rising, bronze or stainless steel with spindle nut either bronze or gunmetal
3	Hand wheels	Direction of rotation for opening valves shall be clockwise when viewed from the top and appropriate wording must be embossed at the top indicating direction of "close" and "open" with arrow heads
4	Tests	Valves to be subjected to "closed end" and "open end" pressure tests to one and half times the working pressure. Valve body shall be tested to twice working pressure. Under all the tests, no leakage to occur
5	Paint	As in PF4
6	Other	• Type B gunmetal trim • Valves should permit repacking of the gland whilst valve is under pressure • Factory test certificates to be provided with each valve • Rates in the schedule of quantities to include requirements to comply with specification

PF 2 REFLUX VALVES

Reflux 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 reflux 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. Reflux valves shall comply with the requirements of SABS 144 for working pressures as required for each application, but not less than 1600 kPa working pressure.

PF 3 AIR VALVES

PF 3.1 General

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 waterworks pattern gate valves and they shall be provided with individual test certificates for each valve from the manufacturer; all valves are to be inspected, and the hydraulic tests witnessed, by an Inspector to be appointed by the Engineer, and the tendered rates for the valves shall include for making arrangements for independent inspections.

The Inspectors' fee and recoverable expenses will be for the account of the Employer, fees and expenses arising from abortive or repeat visits due to non-compliance with the specified requirements will be for the Contractor's account and will be deducted from amounts due to the Contractor.

PF 3.2 Types of Air Valves

Air Valves shall be standard types (epoxy coated flanges; stainless steel sleeve, bolts, nuts, studs etc), of the double orifice type, and shall be equal or similar to the "Vent-O-Mat" (RBX series: 50 mm diameter valves: 050 RBXc2511; 80 mm valves: 080 RBXc1601) type in which a small orifice, manufactured from Grade 316 stainless steel and having a minimum orifice size of 2,0 mm diameter, shall be capable of releasing accumulations of air at all pressures throughout the specified working pressure range and shall be drop-tight at 0,5 Bar.

The large orifice shall be suitable for admitting or expelling large quantities of air during emptying and filling of the pipeline. The opening of the valve (to atmosphere) shall be enclosed by a stainless steel mesh which has been fixed into the valve body to prevent the entry of small insects or vermin into the valve.

All welding of stainless steel shall be carried out in workshops dedicated to the fabrication of stainless steel products. Care shall be taken that the correct welding rods and approved welding procedures have been used for each application, and the Engineer shall have the right to request a certificate from the manufacturer in which the weld procedures used for the manufacture of valves supplied are stated.

All welds and weld beads, internal and external, shall be smoothed down by grinding and buffing. All stainless steel shall be pickled and passivated before the valve is assembled and tested.

PF 3.3 Testing

Each air valve is to be subjected to the following tests at the factory:

(a) First, fill the valve with water and apply the factory test pressure through the inlet of the valve. Under this condition there shall be no weeping from any part of the valve.

(b) Second, drain the valve and refill the valve with water and apply the maximum working pressure through the inlet of the valve and maintain for at least five minutes. Under this condition there shall be no loss of water from the valve.

(c) Third, gradually reduce the pressure applied under (b) above to atmospheric pressure, empty the valve and refill slowly expelling the air through the valve until it is full of water. Raise the pressure to the minimum working pressure, maintain that pressure for at least five minutes and again there shall be no loss of water from the valve.

(d) Fourth, maintain the minimum working pressure applied in (c) above, isolate the water inlet and introduce small amounts of compressed air into the valve without lowering the pressure in the valve. The lower float shall drop away from the upper float when sufficient air has accumulated in the valve. As soon as the accumulated air in the valve has discharged through the small orifice, the valve shall again close to a watertight condition. This process shall be repeated for at least five different pressures which are equally spaced between the specified minimum and maximum operating pressures, and the valve shall close automatically when all the air has escaped without any dribbling and shall have a drop-tight shut-off.

PF 3.4 Table of Particular Requirements for Air Valves

	Scheduled Items		
Nominal diameter (mm)	80	80	25/50
Class	40	25	16
Flange Size and Rating	SABS 1123 Table 4000	SABS 1123 Table 2500	SABS 1123 Table 1600
Flange Drilling	SABS 1123 Table 4000	SABS 1123 Table 2500	SABS 1123 Table 1600
Factory Test Pressure (metres head of water)	800	500	320
Field Test Pressure (metres head of water)	as for pipeline	as for pipeline	as for pipeline
Working Pressure (metres head of water) :			
(a) Maximum	400	250	160
(b) Minimum	10	10	10

PF 4 PAINTING OF VALVES

PF 4.1 The cleaning and painting of valves as specified hereunder is to be carried out at the factory prior to despatch to site.

PF 4.2 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 a Sa 2.5 finish.

PF 4.3 Internal surfaces shall then be treated with two coats of Copon Hicote 151E or other approved non-toxic epoxy resin paint to give a total minimum dry film thickness of 160 micrometres; both coats being applied within 48 hours of commencement of painting.

PF 4.4 External surfaces shall, immediately after cleaning, be treated with one of the following alternative paint systems:

(a) System 1 - for valves situated in underground chambers or exposed conditions.

Apply three coats of an approved epoxy coal tar paint to give a minimum total dry film thickness of 240 micrometres; all three coats being applied within 72 hours of commencing the first coat.

(b) System 2 - for valves situated in pump stations etc.

Apply one coat of zinc chromate primer followed by one coat of undercoat tinted where necessary, and a final coat of best quality gloss enamel. The total dry film thickness of the system shall be not less than 200 micrometres.

PF 4.5 Non-ferrous metal or stainless steel surfaces shall not be painted.

PF 4.6 After erection on site all valves shall be cleaned and the paint work refurbished where necessary to restore the condition to that at the time of leaving the factory.

PF 5 PAYMENT

The prices quoted for all valves are to include for independent factory testing of valves, which test will be witnessed by Inspectors appointed by the Engineer.

PARTICULAR SPECIFICATION: PES

ENVIRONMENTAL SPECIFICATION

PS EMP ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan and specifications are included under this section and must be adhered to in all respects. The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming. The following specifications must be adhered to in all respects:

PS EMP1

No natural vegetation, trees or crops may be damaged by the Contractor without the written approval of the Engineer. The Contractor must keep the site neat and free of refuse, etc. to prevent possible damage to crops or livestock. The Contractor's construction activities shall be performed by methods that will prevent the entrance of, or accidental spillage of solid matter, debris, contaminants and other pollutants and wastes into streams and water-courses.

Any dewatering for earthworks or structure foundations adjacent to or encroaching on streams or water-courses shall be conducted in a manner to prevent muddy or contaminated water from entering streams or water-courses by means of the construction of intercepting and bypassing ditches, barriers, ponds and other approved means. Construction activities shall be performed in a manner to keep dust nuisance to a minimum by means of the application of sufficient water or other efficient measures wherever and as often as may prove necessary.

The cost for complying with the requirements regarding protection of the environment specified above shall be included in the rates tendered in the Schedule of Quantities for the various items of work and no additional payment will be made in this regard.

The Engineer will be entitled to retain an amount of money, should a dispute between property owners and the Contractor arise. The balance of this money will be released as soon as the dispute is resolved. Should any of the above mentioned items not be complied with, the Engineer reserves the right to appoint another Contractor to rectify these matters. Costs for this work will be deducted from the payment of the Contractor for this Contract.

In order to reduce and control the release of airborne pollutants the Contractor shall ensure that:

- No fires are lit on Site to dispose of waste or for cooking.
- All loose material that could be blown about or into neighbouring properties by wind is secured.
- The spraying of formwork oils, paints and other toxic substances is limited to the application area.

PS EMP2

The Site Agent shall ensure that his team, including sub-contractors, comply with the environmental management requirements of this Contract.

PS EMP3

The Contractor may be required to submit a Construction Method Statement at the Site handover. Activities having an effect on the environment must be addressed in this Construction Method Statement. A list of possible activities is included below.

Possible activities having an effect on the Environment:

1. Collection, storage and disposal of solid waste
2. Collection, storage and disposal of liquid waste
3. Protection of indigenous plant species
4. Protection of natural water sources from liquid and solid wastes
5. Control of noise and dust
6. Security on site
7. Control of veld fires
8. Temporary storage of spoil, disposal of excess spoil and unsuitable materials and the importation of earthworks materials
9. Site clearance prior to construction
10. Felling of trees
11. Habitat restoration

12. Site reinstatement, removal of site offices and final site clearance

PS EMP4

In the event that the Contractor fails to comply with the Environmental Management Specifications, included in the Contract Documents, the following penalties will be imposed per incident:-

- Unauthorised damage or removal of trees R2500.00
- Failure to keep soil types separate during excavation and backfilling R1000.00
- Failure to provide adequate portable chemical toilets R500.00
- Failure to comply with solid waste disposal requirements R1000.00
- Failure to clean up litter at the end of each working day R1000.00
- Failure to comply with dust prevention requirements R1500.00
- Failure of Contractor and/or materials supplier to cover vehicle R500.00
- Failure to comply with noise, light or air pollution requirements R500.00
- Spillage of hazardous substances R1000.00

The Engineer will notify the Contractor of a breach of specification and supply a time period within which remedial action will need to be carried out. Should the time period elapse then the penalty will be imposed and the sum deducted from the following month's certificate.

At the time of tender the Contractor shall nominate two people who will be responsible for ensuring that the Contractor's team and sub-contractors comply with the environmental management requirements of this contract. While the positions are only part time, these staff members will be called upon from time to time to deal with any events that are not in compliance with the specifications.

SECTION 4A: SITE ESTABLISHMENT AND PRELIMINARY ACTIVITIES

4A.1 Access to Site Sound environmental principles must be followed whilst establishing access to the site. As much as possible, use should be made of the existing roads instead of creating new ones.	A.1.1 Routing a) The contractor must take into account any limitations identified and recommendations made during the environmental duties when deciding on an access route to construction site. b) The location of all underground services and servitudes must be identified and confirmed. c) Choice of access routes should take into account minimum disturbance to residents and businesses neighboring the site. A.1.3 Survey Points a) Roads or trails that are cut to provide temporary access for survey work must be minimized. b) Marking of survey points must be done with the Engineer's approval. c) Vegetation clearing must be kept to a minimum during survey operations	**Monitor** Engineer (E)/ Environmental Control Officer (ECO) E Engineer (E)/ Environmental Control Officer (ECO) **Monitor** N/A N/A N/A	**Frequency** Prior to moving onto site. Prior to moving onto site. Prior to moving onto site N/A
4A.2. Setting up Construction Camp Careful planning of the construction camp can ensure that time and costs associated with environmental management and rehabilitation are reduced	A.2.1 Layout a) Choice of site for the Contractor's camp requires the Engineer's permission and must take into account location of local residents and /or ecologically sensitive areas, including flood zones and slip/unstable zones. A site plan must be submitted to the Engineer for approval. b) The construction camp may not be situated on a floodplain or on slopes greater than 1:3. c) If the Contactor chooses to locate the campsite on private land, he must get prior written permission from both the Engineer and the landowner. d) In most cases, on-site accommodation will not be required. The construction camp can thus be comprised of: - Site office - Ablution facilities - Designated first aid areas - Eating areas - Staff lockers and showers (where water and waterborne are available)	E/ECO E/ECO E E	During surveys and preliminary investigations and prior to moving onto side. During surveys and preliminary investigations. During surveys and preliminary investigations. During site setup

	- Storage areas - Batching plant (if required) - Refueling areas (if required) - Maintenance areas (if required) - Crushers (if required)		
	e) Cut and fill must be avoided where possible during the set up of the construction camp.	E	During site setup.
	f) The size of the construction camp should be minimized (especially where natural vegetation or grassland has had to be cleared for its construction).	E/ECO	During site setup.
	g) Adequate parking must be provided for site staff and visitors.	E ECO	During site setup.
	h) The constructor must attend to drainage of the campsite to avoid standing water/or sheet erosion.		On a weekly basis.
	A.2.2 Ablutions	ECO	During site setup.
	a) Temporary chemical toilets must be provided by a company that has been approved by the Engineer. The toilets must be available for all site staff, both at the campsite, and on the site agreed by the Engineer. Toilets should be no closer than 50m from any of the two natural watercourses.	ECO **Monitor**	Ongoing **Frequency**
	b) The construction of "long drop" toilets is forbidden.	ECO	Ongoing.
	c) Under no circumstances may open areas or the surrounding bush used as a toilet facility.		
	A.2.3 Provision for Camp Waste Disposal	ECO	During site set-up and ongoing.
	a) Bins and / or skips shall be provided at convenient intervals for disposal of waste within the construction camp.	ECO	Ongoing.
	b) Bins should have liner bags for efficient control and safe disposal of waste.		During site set-up and ongoing.
	c) Recycling and the provision of separate waste receptacles for different types of waste should be encouraged.		
4A.3. Establishing Storage Access Storage areas can be hazardous, unsightly and	A.3.1 General Substances and Materials	**Monitor**	**Frequency**
	a) Choice of location for storage areas must take into account prevailing winds, distance to water bodies and general on-site topography.	ECO	During site set-up.
	b) Storage areas must be designated, demarcated and fenced if necessary.	ECO	During site set-up.

can cause environmental pollution if not designed and managed carefully.	c) Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by children/animal etc.	ECO	During site set-up.
	d) Fire prevention facilities must be present at all storage facilities.	ECO	
	e) If electrical equipment for substations is stored on site a firebreak will be around the storage area.	N/A	During site set-up.
	f) Burning of fire breaks is to be carefully planned and managed with the assistance of the nearest Fire Department	N/A	N/A
	A.3.2 Hazardous Substances and Materials		N/A
	a) Definition of hazardous substances/materials are those that are potentially: poisonous, flammable, carcinogenic or toxic.		
	b) Some examples of hazardous substances/materials: - Diesel, petroleum oil, bituminous products - Cement - Solvent based paints - Lubricants - Explosives - Drilling fluids - Pesticides, herbicides - LPG		
	c) Material Safety Data Sheets (MSDSs) shall be readily available on site for al chemicals and hazardous substances to be used on site. Where possible and available. MSDSs should additionally include information on ecological impacts and measures to minimize negative environment impacts during accidental release or escapes.	E/ECO	Ongoing
	d) Hazardous storage and refueling areas must be bunded with an impermeable liner to protect groundwater quality. The Contractor shall submit a method statement to the Engineer for approval.	E/ECO	During site set-up.
	e) Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.	ECO	During site set-up.
	f) Storage areas containing hazardous substances/ materials must be clearly signed.	ECO	During site set-up.
	g) It is very important tha the proximity of houses, schools etc is taken into account when deciding on storage areas for hazardous substances.	ECO	During surveys and preliminary investigations.
		ECO	When moving onto site or as

	h) Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area. i) Staff dealing with these materials/substances must be aware of their potential impacts and follow the appropriate safety measures. j) Contractors shall submit a method statement and plans for the storage of hazardous materials and emergency procedures.	ECO	the relevant materials arrive onsite. During staff induction and ongoing as necessary. Prior to establishment of storage area.
4A.4. Materials Management Sourcing Materials must be sourced in a legal and sustainable way to prevent off-site environmental degradation.	A.4.1 Sources of Materials a) Contractors shall prepare a source statement indicating the sources of all material (including topsoil, sands, natural gravel, crushed stone, asphalt, clay liners etc), and submit these to the Engineer for approval prior to commencement of any work. b) Where possible, a signed document from the supplier of natural materials should be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation. c) Where materials are borrowed (mined), proof must be provided of authorization to utilize these material from the landowner /mineral rights owner and the Department of Mineral and Energy.	**Monitor** E/ECO ECO ECO	**Frequency** On award of contract On receipt of natural materials. On receipt of borrowed materials.
4A.5 Education of Site Staff on General an Environmental Conduct These points need to be made clear to all staff on site before the project begins.	A.5.1 Environmental Education and Awareness Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal fro this training to the ECO for approval. Topics covered include: - What is meant by "environment". - Why the environment needs to be protected and conserved. - How construction activities can impact on the environment. - What can be done to mitigate against such impacts. - Awareness of emergency and spills response provisions. - Social responsibility during construction e.g. being considerate to local residents	**Monitor** ECO ECO	**Frequency** During staff induction and ongoing. **Frequency**

	It is the Contractor's responsibility to provide the site foreman with no less than 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.	ECO	Prior to moving onto site. Ongoing.
	a) Translators are to be used where necessary.	ECO	Ongoing.
	b) The Engineer/ environmental control officer should be on hand to explain more difficult/ technical issues and to answer questions.	ECO	Ongoing.
	c) The use of pictures and real-life examples is encouraged as these tend to be more easily remembered.	ECO	Ongoing.
	d) Use should be made of environmental awareness posters on site.	ECO	During staff induction, followed by ongoing monitoring.
	e) Construction workers should be made aware that they are not to make excessive noise (e.g. Shouting / hooting) when site is near commercial residential areas.	ECO	Induction, ongoing monitoring.
	f) The need for a "clean site" policy also needs to be explained to the construction workers.	ECO	
	A.5.2 <u>Workers Conduct on Site</u> A general regard to the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: a) No alcohol/drugs to be present on site. b) No firearms allowed onsite or in vehicles transporting staff to/ from site, (unless used by security personnel). c) Prevent excessive noise. d) Prevent unsocial behavior. e) Bringing pets onto the site is forbidden. f) No harvesting of firewood from the site or form the areas adjacent to it. g) Construction staff are to make use of the facilities provided for them, as opposed to ad-hoc alternatives.		During staff induction, followed by ongoing monitoring.

	(e.g. fires for cooking; the use of surroundings bush as a toilet facility are forbidden). h) Trespassing on private /commercial properties adjoining the site is forbidden. i) Driving under the influence of alcohol is prohibited. j) Other than pre-approved security staff, no workers shall be permitted to live on site.		
4A.6. Dust/ AIR Pollution Establishment of the camp site, and related temporary works can reduce air quality	a) Vehicles traveling along the access roads must adhere to speed limits to avoid creating excessive dust. b) Camp construction / haulage road construction – areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust. c) The Contractor must make alternative arrangements (other than fires) for cooking and /or heating requirements. LPG gas cookers may be used provided that all safety regulations are followed.	**Monitor** ECO ECO E	**Frequency** Ongoing. Ongoing- more frequently during dry and wind conditions. Ongoing.
4A.7. Soil Erosion The description of vegetation during preliminary activities on site greatly increases the risk of erosion.	a) The time that stripped areas are left open to exposure should be minimized wherever possible. Care should be taken to ensure that lead times are not excessive. b) Wind screening and stormwater control should be undertaken to prevent soil loss from the site. c) Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set up phase i.e. topsoil is to be conserved while providing access to the site and setting up the camp.	**Monitor** E E ECO	**Frequency** During surveys and preliminary investigations. During site set-up. During site set-up.
4A.8. Stormwater Serious financial and environmental impacts can be caused by unmanaged stormwater	a) To prevent stormwater damage, the increase on stormwater run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossing (sitting and return period etc.) b) During site establishment, stormwater culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the Engineer. (e.g. due to demolition work). c) Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.	E E ECO	During surveys and preliminary investigations. During site set-up. During site set-up.

4A.9. Water Quality Incorrect disposal of substances and materials and polluted run-off can have serious negative effects on groundwater quality.	a) Storage areas that contain hazardous substances must be bounded with an approved impermeable liner.	**Monitor** E	**Frequency** During site set-up.
	b) Spills in bounded areas must be cleaned up, removed and disposed of safely from the bounded area as soon after detection as possible to minimize pollution risk and reduced bounded capacity.	E/ECO	During site set-up and as often as possible on an ongoing basis.
	c) A designated, bounded area is to be set aside for vehicles washing and maintenance. Materials caught in this bounded area must be disposed of to a suitable waste site or as directed by the Engineer.	E/ECO	During site set-up.
	d) Provision should be made during site set up for all polluted runoff to be treated to the Engineer's approval before discharged into the stormwater system (This will be required for the duration of the project).	E/ECO	During site set-up, to be monitored weekly.
4A.10. Conservation of the Natural Environment The wetland and Indigenous forest in the project area require particular attention	A.10.1 Fauna and Flora	**Monitor**	**Frequency**
	a) No indigenous vegetation/trees may be cleared/removed without prior permission from the ECO.	N/A	N/A.
	b) The forest and wetland in the area need to be protected. The ECO must mark limits around the forest and wetland before the Contractor any work in the vicinity of the forest.	E/ECO	During site set-up.
	c) Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material).	ECO	Ongoing in campsite, haulage areas.
	d) Disturbance to birds, animals and reptiles and their habitats should be minimized wherever possible.	E/ECO	
	A.10.2 Sensitive Habitats		During surveys and preliminary investigations and ongoing.
	A thirty-meter buffer zone (or a suitable width) from the edges of the wetland should be determined by a wetland ecologist and demarcated by the contractor. No development activity is to occur within the buffer zone. Temporary bonnox type fencing should be used and should be moved in phases as the construction progresses from one area to the next.	N/A	N/A`.
4A.11. Set up of Waste Management Procedures	a) The excavation and use of rubbish pits on site is forbidden.	ECO	Ongoing.
	b) Burning of waste is forbidden.	ECO	Ongoing.
	c) A fenced area must be allocated for waste sorting an disposal.	ECO	During site set-up.
		ECO	

	d) Individual skips for different types of waste (e.g. "household" type refuse, building rubble, etc) should be provided.		During site set-up.
4A.12. SOCIAL impacts – Visual & Noise It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do say can cause disruption to work and increase costs in the form of delays.	A.12.1 Public Participation a) During the set up phase of the project, the Contractor needs to make contact with those people that are Interested or Affected by the development (I&AP's). b) These people will usually have been identified by the environmental consultant that was assigned to the project. If this wasn't the case, the I&AP's can be identified as those who either: - Live close to the site - Work close by to the site - Will have their services /infrastructure affected by the project - Have a general interest in the project - The Councilor for the ward in which the construction is taking place A.12.2. Noise Impact a) Construction vehicles are to be fitted with standard silencers prior to the beginning of construction. b) Equipment that is fitted with noise reduction facilities (e.g. Side flaps, silencers etc) will be sued as per operating instructions and maintained properly during site operations. A.12.3 Visual Impacts a) Storage facilities, elevated tanks and other temporary structures onsite should be located such that they have as little impact on local residents as possible. b) In areas where the visual environment is particularly important (e.g. along commercial/ tourism routes), the site may require screening in the form of shade cloth or other suitable materials prior to the beginning of construction. c) Special attention should be given to the screening of highly reflective materials on site.	**Monitor** E ECO ECO ECO E/ECO E/ECO ECO	**Frequency** Prior to moving onto site. Prior to moving onto site Prior to moving onto site. Ongoing. During surveys and preliminary investigations and site set-up. During surveys and preliminary investigations and site set-up. During site set-up.
4A.13. Cultural Environment	Prior to the commencement of construction, all staff need to know what possible archaeological or historical objects of value may look like, and to notify the Engineer / Contractor should such an item be uncovered	ECO	During site set-up and ongoing.

4A.14. Security and Safety	A.14.1 Fencing	**Monitor**	**Frequency**
	a) Securing the site in order to reduce the opportunity of criminal activity in the locality of the construction site.	E	During site set-up.
	b) The sites should be fenced and manned to control the access of people.	E	During site set-up.
	c) Potential hazardous areas such as trenches are to be demarcated and clearly marked.	ECO	During site set-up.
	A.14.2 Lighting		
	Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local resident or businesses.	E/ECO	During site set-up.
	A.14.3 Risks Associated with Material on Site		
	a) Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site/ local residents.	ECO	Ongoing.
	b) Flammable materials should be stored as far as possible from adjacent residents/b businesses.	ECO	Ongoing.
	c) Firefighting equipment should be present onsite at all times as per OHSA.	ECO	Ongoing.
	d) Obstruction to drivers' line of site due to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.	ECO	Ongoing.
	e) No materials are to be stored in unstable or high risk areas such as in floodplains or on steep slopes.	ECO	Ongoing.
	f) All I&AP's should be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are: - Stinging of power lines - Blasting - Earthworks/earthmoving machinery on steep slopes above houses/infrastructure - Risk to residences along haulage roads/ access routes	ECO	24hrs prior to the activity in question

SECITON 4B: MANAGEMENT OF CONTRUCTION ACTIVITIES AND WORKFORCE

4B.1. Access to Site	B.1.1 Haulage Roads	**Monitor**	**Frequency**
	a) Contactors shall ensure that all side and miter drains and scour check walls on access and haul roads are functioning properly and are well maintained.	E	Weekly and after heavy rains
	B.1.2 Maintenance of Access		
	a) Contractor should ensure that access roads are maintained in good condition by attending to potholes, corrugations and stormwater damage as soon as these develop.	E	Weekly inspection.
	b) If necessary, staff must be employed to clean surfaced roads adjacent tot construction sites where materials have been split.	ECO	When necessary.
	c) Unnecessary compaction of soils by heavy vehicles must be avoided; construction vehicles must be restricted to demarcated access, haulage routes and turning areas.	ECO	Ongoing.
	d) Cognizance of vehicles weight/ dimensions must be taken when using access constructed out of certain materials. E.g. paved surface/ cobbler entranceways.	E	Ongoing.
4B.2. Maintenance of Construction Camp	B.2.1 Surfaces	**Monitor**	**Frequency**
	a) The Contractor must monitor and manage drainage of the camp site. To avoid soil erosion.	E	Ongoing.
	b) Run-off from the campsite must not discharge into neighbors' properties.	E	Ongoing.
	B.2.2 Ablution		
	a) Chemical toilets are to be maintained in a clean state and should be moved to ensure that they adequately service the work areas.	ECO	Weekly inspection.
	b) The Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility.	ECO	Weekly inspection.
	B.2.3 Camp Waste Disposal		
	a) The Contractor shall ensure that all litter is collected from the work and camp areas daily.	ECO	Ongoing.
	b) Bins and/or skips should be emptied regularly and waste should be disposed of at a registered landfill site. Waybills for all such disposals are to be kept by the Contractor for review by the Engineer /ECO.	ECO	Weekly.

	c) A registered chemical waste company is to be used to remove waste from chemical toilet on site.	ECO	Ongoing.
	B.2.4 Eating Areas	**Monitor**	**Frequency**
	a) Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	ECO	Daily
	b) All litter throughout the site should be picked up and placed in the bins provided.	ECO	Daily.
	B.2.5 Housekeeping		
	a) The Contractor shall ensure that his camp and working areas are kept clean and tidy at all times	E/ECO	Weekly monitoring
4B.3. Staff Conduct	B.3.1 Environmental Education and Awareness	**Monitor**	**Frequency**
	a) The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO and /or a translator should be called to the site to further explain aspects of environmental or social behavior that are unclear.	E/ECO	Ongoing monitoring.
	B.3.2 Worker Conduct on Site		
	a) The rules explained in the worker conduct section (see section A.5.2 of this EMP), must be followed at all times.	ECO	Ongoing.
4B.4. Dust/ Air Pollution	a) Vehicles traveling to and from the construction site must adhere to speed limits so as to avoid producing excessive dust.	**Monitor** E	**Frequency** Ongoing.
Main causes of air pollution are dust from vehicle movements and stockpiles, vehicle emissions and fires	b) A speed limit of 30km/hr. must be adhered to on all dirt roads.	E	Ongoing.
	c) Access and other cleared surfaces must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust.	E	Ongoing.
	d) Where dust is unavoidable in residential or commercial areas, screening will be required utilizing wooden supports and shade cloth.	E	As directed by Engineer.
	e) Vehicles and machinery are to be kept in good working order and to, meet manufactured specification fro safety, fuel consumption etc.	ECO	Ongoing.
		E	

	f) Should excessive emissions be observed, the Contractor is to have the equipment seen to as soon as possible. g) No fires are allowed on site except for burning of firebreak. h) Stockpiles may cause dust and so must be managed in by the guidelines in Materials Management in section B.9.1	E E	As directed by the Engineer. Ongoing Ongoing.
4B. 5 Soil Erosion	B.5.1 Topsoil Stripping and Stockpiling Once an area has been cleared of vegetation, the top layer (nominally 150mm) of soil should be removed and stockpiled in a designated area. B.5.2 Exposed Surfaces The full length of the works shall not be stripped of vegetation prior to commencing other activities. The time that stripped areas are exposed shall be minimized wherever possible. a) Top-soiling and revegetation shall commence immediately after the completion of an activity and at an agreed distance behind any particular work front. b) Stormwater control (See B6) and wind screening should be undertaken to prevent soil loss from the site. c) Side tipping of spoil and excavated materials shall not be permitted – all spoil material shall be disposed of as directed by the Engineer. d) Battering of all banks shall be such that cut and fill embankments are no steeper than previous natural slopes unless otherwise permitted by the Engineer. Cut and fill embankments steeper than previous ground levels shall be re-vegetated immediately on completion of trimming or shall be protected against erosion using bioengineered stabilization measures. Deep-rooted vegetation such as Vetiver grass is effective to stabilize steeper embankments,	**Monitor** ECO E/ECO ECO E E ECO	**Frequency** Ongoing. Ongoing. As each activity is completed. Ongoing. Ongoing. As the cut and fill activity is completed.
	e) All embankments, unless otherwise directed by the Engineer, shall be protected by an off drain to prevent from cascading down the face the embankment and causing erosion.	**Monitor** E	**Frequency** Immediately after the creating of the embankment/ stripping of vegetation.

4B.6. Stormwater Measures in this section are aimed at reducing the erosive potential of stormwater	B.6.1 General Principles: a) The Contractor shall not in any way modify nor damage the banks or bed of streams, rivers, wetlands, other open water bodies and drainage lines adjacent to or within the designated area, unless required as part of the construction project specification. Where such disturbance is unavoidable, modification of water bodies should be kept to a minimum in terms of: - Removal of riparian vegetation - Opening up of the stream channel b) Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site. i.e.: these materials must not be placed in stormwater channels, drainage lines or rivers. c) There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. d) The use of high velocity stormwater pipelines should be avoided in favor of open, high friction, semi-permeable channels wherever feasible e) A number of smaller stormwater outfall points should be constructed rather than a few large outfall points. f) Stormwater outfalls should be designed to reduce flow velocity and avoid stream-bank and soil erosion.	**Monitor** ECO E E/ECO E/ECO E/ECO E/ECO	**Frequency** Ongoing. Monitoring throughout the duration of the project. Monthly checking As directed by Engineer As directed by Engineer
	B.6.2 Stormwater Detention Ponds a) Detention ponds should be vegetated either with wetland vegetation or grass from the Revegetation Specification. The detention ponds must not block the water flow, but should encourage spreading of the flow over wider areas to reduce velocity and encouraged infiltration. b) Peak stormwater discharge from the site/area should not be increased with development of the site/area. Stormwater should be detained on site through the use of stormwater detention ponds wherever possible. A series of detention ponds may be required where flow volumes are high. B6.3 Un channeled Flow a) During construction unchanneled flow must be controlled to avoid erosion. Where large areas of soil are left exposed, rows of straw/hay or bundles of cut vegetation should be dug into the soil in contours to slow surface wash and capture eroded soil. The spacing between rows will be dependent on slope.	**Monitor** ECO E/ECO E/ECO	**Frequency** On completion of detention ponds As directed by Engineer and ongoing monitoring As surfaces become exposed

	b) Where surface run-off is contracted (e.g. along exposed roadways/tracks), flow should be slowed by contouring with hay bales or bundled vegetation generated during site clearance operation. If the area must be used for construction vehicles, berms may be used instead. The berms must at least 30cm high and well compacted. The berms should channel concentrated flow into detention ponds or areas protected with hay bales for flow reduction and sediments capture.	**Monitor** E/ECO	**Frequency** Ongoing
4B.7. Water Quality Soil erosion and sediment is detrimental to water quality. Mismanagement of polluted run-off from vehicle and plant washing and wind dispersal of dry materials into rivers and watercourses are detrimental to water quality.	a) Mixing /decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these should then be disposed of to a suitable waste site. b) Every effort should be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site. c) Care must be taken to ensure that run-off from vehicle or plant washing does not enter the groundwater. Wash water must be passed through a three-chamber SOG trap prior to being discharged as effluent to a regular municipal sewer. d) Site staff not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the construction or related activities. Municipal water (or another source approved by the Engineer) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting etc. e) Emergency contact numbers in should be listed and openly displayed in order to speedily deal with spillages and contamination of aquatic environments should it occur.	**Monitor** ECO ECO ECO ECO E/ECO	**Frequency** Regular monitoring. Regular monitoring. Regular monitoring Regular monitoring. As the need arises
4B.8. Conservation of Natural Environment The patch of forests specifically identified in the EMP should be avoided altogether. The buffer needs to be	<u>B.8.1 Fauna and Flora</u> As the work front progresses the Contractor is to check that any vegetation clearing has the prior permission of the ECO. a) Only trees that have NOT been marked beforehand are to be removed. b) Gathering of firewood, fruit, medicinal plants, crops, or any other natural material on site or in areas adjacent to the site is prohibited. c) The hunting of birds and animals on site and in surrounding areas is forbidden.	**Monitor** E N/A ECO ECO	**Frequency** Ongoing. N/A Ongoing. Ongoing.

upheld at all cost.	d) Snares and traps on site and in surrounding areas are forbidden.	ECO	Ongoing
	e) Immediate revegetation of stripped areas and removal of aliens by weeding must take place. This significantly reduces the amount of time and money that must be spent on alien plant management during rehabilitation.	ECO	Ongoing.
	f) Alien vegetation encroachment onto the site as a result of construction activities must be controlled during construction.	ECO	Twice – monthly monitoring.
		Monitor	**Frequency**
	g) Where possible, cleared indigenous vegetation should be kept in a nursery for use at a later stage in the rehabilitation process.	N/A	N/A
4B.9. Materials Management	B.9.1 Stockpile Management	**Monitor**	**Frequency**
	a) Stockpiles should not be situated such that they obstruct natural water pathways.	E/ECO	Location as directed by the Engineer.
	b) Stockpiles should not exceed 2m in height unless otherwise permitted by the Engineer.	E	
	c) If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.	ECO	As this becomes necessary.
	d) Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.	ECO	Monthly monitoring
	9.2 Handling of Hazardous Materials		
	a) All concrete mixing must take place on a designated, impermeable surface.	ECO	Ongoing monitoring.
	b) No vehicles transporting concrete to the site may be washed on site.	ECO	Ongoing monitoring.
	c) No vehicles transporting, placing or compacting asphalt or any other bituminous product may be washed on site.	ECO	Monthly
	d) Lime and other powders must not be mixed during excessively windy conditions.	ECO	
	e) All substances required for vehicle maintenance and repair must be in sealed containers until they can be disposed or /removed from the site.	ECO	Ongoing monitoring.

	f) Hazardous substances / material are to be transported in sealed containers or bags.	E/ECO	Ongoing monitoring.
	g) Spraying of herbicides/ pesticides should not take place under windy conditions and must comply with OHSA specs and other chemical handling laws	ECO	Ongoing monitoring
	h) The emergency numbers should be consulted should any accident /spillages of hazardous substances and /or materials take place. The Contractor is to outline a method statement for the dealing of accidents /spillages of hazardous materials. This statement must be handed to the Engineer as well as to DWAF should the incident occur near to a body of water.	ECO	Ongoing monitoring
4B.10. Waste Management Definition: "Refuse" refers to all construction waste (such as rubble, asphalt milling, cement, bags, waste cement, timber, cans, other containers, wire and nails) household and office waste	B.10.1 On-Site Waste Management	**Monitor**	**Frequency**
	a) Refuse must be placed in the designated skips/ bins, which must be regularly emptied. These should remain within demarcated areas and should be designed to prevent reuse from being blown out by wind.	ECO	Ongoing monitoring
	b) In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.	ECO	Ongoing monitoring
	c) Littering on site is forbidden and the site shall be cleared of litter at the end of each working day.	ECO	Ongoing monitoring
	d) Recycling is to be encouraged by providing separate receptacles for different types of waste and making sure that staff are of their uses.	ECO	Ongoing monitoring.
	10.2 Waste disposal **Non-hazardous Waste**		
	All waste must be removed from the site and transported to a landfill site which must be identified prior to commencement of work.	ECO	Checked at each site meeting.
	a) Waybills proving disposal at each shall be provided for the Engineer's inspection.	E/ECO	Ongoing monitoring
	b) Construction rubble shall be disposed off in pre-agreed, demarcated spoil dumps that have been approved by the Engineer, or at disposal sites.	ECO	Monitored weekly and at the start of builders' holidays.
	c) Waste from chemical toilets should be disposed of regularly and in a responsible and in a responsible manner by a registered waste contractor. Care must be taken to avoid contamination of soils and water, pollution and nuisance to adjoining areas.	ECO	Ongoing

	Hazardous Waste a) Hazardous waste disposal must be carried out by an approved waste Contractor. Waybills for this should be provided. b) A sump (earth or other) must be created for concrete waste. This is to be de-slugged regularly and the cement waste is to be removed to a tip site as approved by the engineer and ECO.	E/ECO ECO	During establishment and ongoing Ongoing
4B.11. Social Impacts Regular communication between the Contractor and Interested and Affected Parties (I&AP's) is important for the duration of the contract	B.11.1 Disruption of Infrastructure and Services a) Contractor's activities and movement of staff to be restricted to designated construction areas. b) Should the construction staff be approached by members of the public or other stakeholders, they should assist them in locating the Engineer or Contractor, or provide a number on which they may contact the Engineer or Contractor. c) The conduct of the construction staff when dealing with the public or other stakeholder shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from site by the Engineer. d) Disruption of access for local residents must be minimized and must have the Engineer's permission. e) The Contractor is to inform neighbors in writing of disruptive activities at least 24 hours beforehand. This can take place by way of leaflets placed in the postboxes giving the Engineer and Contractor's details or other methods approved by the Engineer. B.11.2 Visual Impacts a) Lighting on the construction site should be pointed downwards and away from oncoming traffic and nearby houses. b) The site must be kept clean to minimize the visual impact of the site c) If screening is being used, this must be moved and re-erected as the work front progresses. B.11.3 Noise	**Monitor** E E/ECO E E E/ECO ECO ECO ECO ECO E/ECO	**Frequency** Ongoing. Ongoing. Ongoing. Ongoing. At least 24 hrs prior to the activity taking place. Ongoing. Ongoing- weekly monitoring. Ongoing. Ongoing.

	a) Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors. b) Notice of particularly noisy activities must be given to residents/ businesses adjacent to the construction site. Example of these include: - Noise generated by jackhammers - Blasting - Drilling - Dewatering pumps c) Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract.	E/ECO	At least 24 hrs prior to the activity taking place.
	B.11.4 Communication with Interested and Affected Parties (I&AP's) a) The Engineer and Contractor are responsible for ongoing communication with those people that are interested in /affected by the project. b) A complaint register should be housed at the site office. This should be in carbon copy format, with numbered pages. The Contractor must account for any missing pages. This register is to be tabled during monthly site meetings. c) I&AP's need to be made aware of the existence of the complaints book and the methods of communication available to them. d) Queries and complaints are to be handled by: - Documenting details of such communications - Submitting these for inclusion in complaints register. - Brining issues to Engineer's attention immediately - Taking remedial action as per Engineer's instruction e) Selected staff are to be made available for formal consultation with I&AP's in order to: - Explain construction process - Answer questions	**Monitor** E/ECO ECO E/ECO ECO ECO	**Frequency** Monthly Monthly Ongoing. Ongoing Ongoing on a monthly basis and when required
4B12. Cultural Environment	a) Possible items of historical or archaeological value include old stone foundations, tools, clayware, jewellery, remains, fossils etc. b) Should something of this nature be uncovered, the Research and Professional Services Division of AMAFA should be contacted and work should be stopped immediately. AMAFA's head office is in Ulundi and their office in Pietermaritzburg will address any queries within KZN.	E/ECO	As required.

	The facilitator should be contacted on telephone no. 033-3946543, fax 033-3426097.		

SECTION 4C: POST CONSTRUCTION ACTIVITIES

4C.1. Construction Camp	a) All structures comprising the construction camp are to be removed from site.	**Monitor** E	**Frequency** Project completion
	b) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint etc. and these should be cleaned up.	E	Project completion
	c) All hardened surfaces within the construction camp area should be ripped, all imported material removed, and the area shall be top-soiled as regressed using the guidelines set out in the revegetation specification that form part of this document.	E	Project completion
	d) The Contractor must arrange the cancellation of all temporary services.	E	Project completion
4C.2 Vegetation	a) All areas that have be disturbed by construction activities (including the construction camp area) must be cleared of alien vegetation.	E	Project completion
	b) Open areas are to be re-planted	E	Project completion
	c) All vegetation that has been cleared during construction is to be removed from site or used as much as per the revegetation specification, (except for seeding alien vegetation).	E	Project completion
	d) The Contractor is to water and maintain all planted vegetation until the end of the defects liability period and is to submit a method statement regarding this to the Engineer.	E	Project completion
4C.3 Land Rehabilitation	a) All surfaces hardened due to construction activities are to be ripped and imported materials thereon removed.	ECO	Project completion
	b) All rubble is to be removed from the site to and approved disposal site or approved by the Engineer. Burying of rubble onsite is prohibited.	ECO	Project completion
	c) The site is to be cleared of all litter.	ECO	Project completion
	d) Surfaces are to be checked for waste products form activities such as concreting or asphalting and cleared in a manner approved by the Engineer.	ECO	Project completion Project completion
	e) All embankments are to be trimmed, shaped and replanted to the satisfaction of the Engineer.	E/ECO	
	f) Borrow pits are to be closed and rehabilitated in accordance with the DME-approved management plan for each borrow pit. The Contractor shall liaise with the Engineer regarding these requirements.	E	Project completion
	g) The Contractor is to check that all watercourses are fee from building rubble, spoil materials and waste materials.	ECO	Project completion.

		Monitor	Frequency
4C.4 Material and Infrastructure	a) Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.	E	Project completion
	b) All residual stockpiles must be removed to spoil or spread onsite as directed by the Engineer.	E	Project completion
	c) All leftover building materials must be returned to spoil or spread on site as directed by the Engineer.	ECO	Project completion
	d) The Contractor must repair any damage that the construction works has caused to neighboring properties.	E	Project completion
4C.5 General	a) The Engineer, ECO and the Contractor need to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer.	E/ECO	On completion of the construction & maintenance phases
	b) Temporary roads must be closed and access across these blocked.	E/ECO	On completion of construction
	c) Access or haulage roads that were built across watercourses must be rehabilitated by removing temporary bridges and any other materials placed in / or near to watercourses. Revegetation of banks or streambeds must be as necessary to stabilize these and must be approved by the Engineer.	E/ECO	On completion of construction
	d) All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer.	E/ECO	On completion of construction

SECTION 5. CONCLUSIONS AND RECOMMENDATIONS

The sensitive environment along the pipe line route is the patch of indigenous forest located at the start area of the project. This forest need to be avoided by all means. Other construction impacts are minimal and of low significance. Should the EMP be adequately implemented, potential impacts could be further reduced. The concluding recommendations are:

- Contractors need to follow the environmental management plan;
- The development need to benefit the community in a tangible manner, and therefore, attempts need to be made to integrate community needs and aspirations into the implementation processes of the development;
- The contractor need to show concerns for health in general and the health safety of the employees in particular;
- Where appropriate, the contractor must use local Labour as much as possible;
- In terms of the National Environmental Management Act 107 of 1989 everybody is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally acceptable manner;
- Furthermore in terms of the Nation Environmental Management Act 107 of 1998 the cost of repair for any environmental damage shall be borne by the person responsible for the damage.

UGU DISTRICT MUNICIPALITY

CONTRACT: UGU-07-1661-2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

PART C3
ENGINEER'S QUALITY MANAGEMENT SPECIFICATION

1. INTRODUCTION

Vangisa Projects (Pty) LTD subscribes to a Quality Management System accredited by a number of certification bodies including ISO 9001.

This document/specification summarises the Quality Control Procedures used by Vangisa Projects in the Quality Assurance and Control on site works. These procedures are to be used by Engineer's Representative Staff (i.e. ER and his assistants) and the Contractor's staff on the following commonly encountered sites;

- Pipelines
  - UPVC Pipelines
  - Steel Pipelines
  - Concrete Pipelines
- Water Retaining Structures

The procedures have been developed as "intellectual" property of Vangisa Projects sand may only be used on sites managed by Vangisa Projects. Any other use is subject to consent/agreement with Vangisa Projects.

All references to approval by ER require that the Contractor (via the Site Agent) initiates the necessary request for approval). In addition the Contractor will be required to maintain a copy of all records as required by this Specification.

The application of the procedures will be agreed as appropriate between the Contractor's Site Agent and the Engineer (or his Representative) at the commencement of construction activities,

It will be deemed that the Contractor has incorporated in his completion period and pricing, the necessary requirements to comply with this Specification fully.

1.1 Elements of Site Quality Assurance

The elements of Site Quality Assurance comprise the following:

- general elements that apply to all sites and
- site specific elements that are specific to sites and may be dependent on the type of construction.

2. GENERAL ELEMENTS APPLICABLE TO ALL SITES

2.1 Construction Quality Control Organization

This section presents the requirements of key site personnel involved on construction sites, i.e. Engineer's Representative (ER) staff and Contractor's staff. The following quality assurance procedures for site quality assurance personnel should be followed:

2.1.1 Engineer's Quality Assurance Personnel

The following ER staff appointments' procedure should be followed to ensure the right superintendence on contracts:

Item	Activity	Remarks	Responsible Party	Approval by
1	Appointment of Engineer for contracts	Stated in contract data	Engineer	Employer
2	Supervision staffing arrangements	Proposed prior to construction work	Engineer	Employer
3	Site staff	Proposal for site personnel including CV's	Engineer	Employer
4	Roles	Delegation of powers by Engineer	Engineer	Engineer

The site staff will comprise the Engineer's Representative (ER) and ER's assistants (Field Officers):

(a) Engineer's Representative (ER)

The ER is the primary point of contact for the Engineer on all construction management issues. The ER will monitor and approve each contractor's quality submittal to ensure that the project is meeting the specifications and requirements. The ER will manage the implementation of the CQAP at the project sites with assistance from Field Officers appointed by the Engineer.

(b) ER Assistants/Field Officers (FO's)

Field Officers (FOs) are responsible to the ER and support the ER's management of the CQAP. The FOs will monitor the day-to-day activities of the contractor. This includes ensuring that contractors comply with the drawings and specifications, applicable SABS standards, good workmanship, and the CQC requirements. As part of this effort, FOs will:

- conduct independent inspections to verify the quality of the work;
- participate in contractor inspections;
- review test and inspection reports; and
- ensure that the required documentation is submitted.

The FOs will be alert to detect, record, and report any deviation from the contract documents, including calling any deficient item to the attention of the ER and the contractors' Site Agents. The FOs will keep accurate and detailed records of the contractor's performance and progress, delivery of materials, and other pertinent matters, including the daily inspection report.

2.2 Contractor's Quality Assurance Personnel

The contractors are responsible for the quality control of their constructed work product as well as the necessary inspections and tests required to ensure that their work complies with the contract documents.

2.2.1 Contractor's Site Staff

The contractors' Site Agents are the primary point of contact for the Contractors on all construction management issues. The Site Agents must be full-time on site for the contractors. The Site Agents must have full authority to institute any and all actions necessary for the successful implementation of the CQC program to ensure compliance with the drawings and technical specifications.

The following procedures apply with respect to appointment of the contractor's key personnel:

Aspect	Remarks	Approval By	When
Appointment of Site Agent	As per tender for quality based evaluated tenders	Engineer	Prior to commencement of construction
Appointment of Site Forepersons	As per tender for quality based evaluated tenders	Engineer	Prior to commencement of construction

2.3 Site Establishment

The Engineer's Representative shall inspect and approve/disapprove contractor's site establishment using Quality Procedure Form QC 01.

2.4 General

For all projects the ER must undertake the following general items as appropriate:

1	Confirm "Permission to Occupy" has been received from the relevant authority.
2	"Handover of Site" to Contractor to be confirmed in writing.
3	Inspect and approve Site Establishment (Form QC 01).
4	Setup Site Files/Filing System.
5	Ensure a copy of the Contract Document is retained on Site by the Contractor.
6	Ensure a full set/s of approved drawings is/are retained on Site by the Contractor.
7	Maintain a Drawing Register.
8	Ensure a copy of the latest Contract Program is clearly displayed on Site.

9	Establish Quality Assurance Procedures and carry out inspections as and when required.
10	Issue Site Instructions as and when required.
11	Ensure Safety File, including Dept. of Labour notification, is up to date and on Site and all relevant regulations, including issuing of PPE, are strictly adhered to.
12	Ensure all relevant information is recorded in a daily Site Diary and counter signed.
13	Hold regular Work Meetings with the Contractor.
14	Hold regular Site Meetings with the Client, Professional Team and the Contractor.
15	Maintain a copy of the Environmental Record of Decision on Site

3. SITE SPECIFIC QUALITY ASSURANCE PROCEDURES

Quality assurance inspections and testing will be used to verify the adequacy and effectiveness of the contractor's quality control program. The Engineer's Quality Assurance Personnel detailed above will provide inspection and supervision within the scope of work, which includes monitoring of the following construction activities:

- Manufacture of materials
- Transporting and off-loading and storage of construction materials
- Inspection of construction activities, including:
    - Pipework
        - Steel
        - uPVC
        - Concrete
    - Reinforced Concrete Reservoirs
    - Pump stations (mechanical & electrical installations)

The Contractor will be required to formally request for inspection for any activity which he deems to be complete before proceeding to the next stage of the whole operation. Formal requests must be filled in the relevant ***QC*** Form.

Contractor Deficiency Correction

When material, performed work or installation is found to be deficient and/or does not meet the project specifications, the Engineer's QA personnel will assure deficiency correction is implemented. In addition to results of an inspection being recorded on the relevant **QC Form,** in the event of inspection failure, the Engineer's QA personnel will fill in **Form QC 008** "Failure Report", to record the deficiencies. A copy of this report will be handed over to the Contractor's Site Agent. The Contractor will implement corrective actions to remedy work that is not in accordance with the drawings and specifications. The corrective actions will include removal and replacement of deficient work using methods approved by the ER. Removal must be done in a manner that does not disturb work that meets QC/QA criteria; otherwise, the disturbed material must also be removed and replaced. Replacement must be done in accordance with the corresponding technical specifications. Replacement will be subjected to the same scope of QC/QA inspection and testing as the original work. If the

replacement work is not in accordance with the drawings and specifications, the replacement work will be removed, replaced, re inspected and re-tested.

Activities which specifically require approval before the next stage can proceed are as detailed in this section.

3.1 Pipework

The following procedures will be used for pipework quality assurance:

3.1.1 uPVC Pipework

The ER is responsible for ensuring the following quality assurance procedure is followed, ***as a minimum***:

1	Inspect & Approve Setting Out (Form QC 001).
2	Inspect & Approve Pipeline Trenches (Form QC 002).
3	Inspect & Approve Pipeline Bedding (Form QC 003).
4	Inspect & Approve Pipe Installation – PVC (Form QC 004B).
5	Inspect & Approve Pipeline Pressure Testing (Form QC 006).
6	Inspect & Approve Backfilling to Trenches (Form QC 007).

Copies of the Vangisa Projects's forms are available for inspection at the offices of Vangisa Projects.

3.1.2 Steel Pipework

The ER is responsible for ensuring the following quality assurance procedure is followed, ***as a minimum***:

1	Inspect & Approve Setting Out (Form QC 001).
2	Inspect & Approve Pipeline Trenches (Form QC 002).
3	Inspect & Approve Pipeline Bedding (Form QC 003).
4	Inspect & Approve Pipe Installation – Steel (Form QC 004A).
5	Inspect & Approve Welding of Pipes (Form QC 005).
6	Inspect & Approve Pipeline Pressure Testing (Form QC 006).
7	Inspect & Approve Backfilling to Trenches (Form QC 007).

Copies of the Vangisa Projects's forms are available for inspection at the offices of Vangisa Projects.

3.2 Reinforced Concrete Works

The ER is responsible for ensuring the following quality assurance procedure is followed, ***as a minimum***:

1	Inspect & Approve Setting Out (Form QC 001).
2	Inspect & Approve Excavations (Form QC 008).
3	Inspect & Approve Backfilling to Excavations (Form QC 009).
4	Inspect & Approve Excavations prior to Blinding (Form QC 010).
5	Inspect & Approve Cast Concrete (Form QC 016).
6	Inspect & Approve Structure prior to Concreting (Form QC 015).
7	Inspect & Approve Cast Concrete (Form QC 016).
8	Inspect & Approve Backfilling to Excavations (Form QC 009).

Copies of the Vangisa Projects' forms are available for inspection at the offices of Vangisa Projects.

3.3 Building Works

The ER is responsible for ensuring the following quality assurance procedure is followed, ***as a minimum***:

1	Inspect & Approve Setting Out (Form QC 001).
2	Inspect & Approve Excavations (Form QC 008).
3	Inspect & Approve Backfilling to Excavations (Form QC 009).
4	Inspect & Approve Excavations prior to Blinding (Form QC 010).
5	Inspect & Approve Cast Concrete (Form QC 016).
6	Inspect & Approve Foundations prior to Concreting (Form QC 011).
7	Inspect & Approve Cast Concrete (Form QC 016).
8	Inspect & Approve Sub Structure Brickwork (Form QC 012).
9	Inspect & Approve Foundations prior to Surface Bed Concreting (Form QC 013).
10	Inspect & Approve Cast Concrete (Form QC 016).
11	Inspect & Approve Superstructure Brickwork (Form QC 014).
12	Ensure relevant Certificates are received/issued for the roof structure.

Copies of the Vangisa Projects's forms are available for inspection at the offices of Vangisa Projects.

3.4 Roadworks

The ER is responsible for ensuring the following quality assurance procedure is followed, ***as a minimum***:

1	Inspect & Approve Setting Out (Form QC 001).
2	Inspect & Approve Excavations (Form QC 008).
3	Inspect & Approve Backfilling to Excavations (Form QC 009).
4	Inspect & Approve Excavations prior to Blinding (Form QC 010).
5	Inspect & Approve Earthworks (Form QC 017).
6	Inspect & Approve Subgrade Construction (Form QC 018).
7	Inspect & Approve Pavement Layerworks/Subbase (Form QC 019).
8	Inspect & Approve Base Construction (Form QC 020).
9	Inspect & Approve Culvert Construction (Form QC 021).
10	Inspect & Approve Headwalls and Wi8ng Walls (Form QC 022).
11	Inspect & Approve Subsoil Drainage (Form QC 023).
12	Record Site Measurement (Form QC 025)

Copies of the Vangisa Projects's forms are available for inspection at the offices of Vangisa Projects.

4 DOCUMENTATION

4.1 Overview

An effective CQA Plan depends largely on recognition of all construction activities that should be monitored and on assigning responsibilities for the monitoring of each activity. This is most effectively accomplished and verified by the documentation of quality assurance activities. The ER will document that quality assurance requirements have been addressed and satisfied. The ER will provide the Engineer with signed descriptive remarks, data sheets, and inspection reports to verify that monitoring activities have been carried out. The ER will also maintain, at the job site, a complete file of Drawings and Technical Specifications, a CQA Plan, test procedures, daily diaries, and other pertinent documents.

4.2 Daily Site Diary

A daily construction site diary will be prepared and signed by each Site Agent and the ER. The diary will include a summary of the contractor's daily construction activities. At a minimum, the daily construction diary will include the following information:

- Date, project name, location, and other identification
- Description of weather conditions, including temperature, cloud cover, and rainfall
- Reports on any meetings held and their results
- Record of visitors to site

- Locations of construction underway during that day
- Equipment and personnel working in each activity, including subcontractors
- Descriptions of work being inspected
- Decisions made regarding approval of units of material or of work, and corrective actions to be taken
- Description of problems or delays and resolution
- Communications with contractor staff
- Construction activities completed and/or in progress
- Signature of the diary preparer

The daily site diary will be routed on a daily basis to the project QC/QA files and will be maintained as part of the permanent project record.

4.3 Control of Quality Records

The ER verifies QA record accuracy and maintains copies of all quality-related documentation. This includes, but may not be limited to:

- Daily construction QA records;
- Inspection reports;
- Non-conformance (Failure) reports;
- Material receiving reports; and
- Monitoring and test data.

These records will be stored in files maintained in the project document control files. All original documents pertaining to QC information will be maintained in the project file located at the site. All records shall be available for inspection and audit, at any time, by the Engineer and the Employer.

UGU DISTRICT MUNICIPALITY

CONTRACT: UGU – 07- 1661 - 2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

PART C4: SITE INFORMATION

INDEX

PART C4: SITE INFORMATION

C4.1 LOCALITY PLAN

The Locality of the site is as per the attached Locality Plan.

C4.2 CONDITIONS ON SITE

A brief description of the site conditions is given under this section.

C4.2.1 Nature of Ground and Subsoil Conditions

No subsoil investigations have been undertaken along the pipeline route. No responsibility is accepted for any conclusions drawn by Tenderers from the results and information supplied (if any) and Tenderers must satisfy themselves as to the nature of materials to be excavated under this contract.

Geotechnical investigations will be undertaken during construction and after completion of bulk earthworks. The Tenderer must allow a period of 2 weeks from the date of completion of bulk earthworks for these investigations and the production of a geotechnical report by the appointed geotechnical Engineer.

C4.2.2 Weather Conditions

The following general weather conditions are prevalent on site

Site Conditions	Specific Details
Altitude above sea level	Maximum 230 m
Ambient temperatures	Maximum : 39°C Minimum : 4°C 24 hour Average Max : 30°C
Maximum relative humidity	100%
Environmental atmosphere	Humid with high salt content, severely corrosive.
Lightning	Severe

C4.2.3 Limitations

The following limitations characterise the site of the pipeline construction:

- Where the pipeline transverses privately owned land, the contractor's activities will be limited to a 15m wide strip along the pipeline route. Any additional space utilisation is to be agreed with the Engineer during construction.
- The Ugu DM will arrange for the right to access the site on privately owned land.
- The contractor will be required to compensate for land and crop damage, prior to commencement of work.

- The pipeline is to be laid in close proximity to existing residences. The contractor's methodology for constructing the new pipeline should therefore ensure that no (or minimum) disruption of the activities of residents result from his construction activities.

- It maybe imperative that the contractor constructs access tracks during the construction period, which will be rehabilitated after the contract. The costs of provision of the access tracks will be deemed to be included in the rates of scheduled items.

CONTRACT: UGU -07-1661-2024

UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS

PART C5: DRAWINGS

INDEX

1 PART C5: DRAWINGS

The drawings issued to tenders as part of the tender documents must be regarded as provisional and preliminary for the tenderer's benefit to generally assess the scope of work. The drawings are issued as a separate book of drawings. The work shall be carried out in accordance with the latest available revision of the drawings approved for construction (AFC)

At commencement of the contract, the Engineer shall deliver to the Contractor copies of the AFC drawings and any instructions required for the commencement of the works. From time to time thereafter during the progress of the works, the Engineer may issue further drawings for construction purposes as may be necessary for adequate construction, completion and defects correction of the works. All drawings and specifications and copies thereof remain the property of the Employer, and the Contractor shall return all drawings and copies thereof to the Employer at the completion of the contract. Tender drawings are issued separately and are listed hereunder:

LIST OF DRAWINGS:

DRAWING DETAILS		TITLE
Element of Contract	**Drawing N°**	**Description**
UPGRADE OF HARDING SEWER RETICULATION SYSTEM & REFURBISHMENT OF THE WASTEWATER TREATMENT WORKS		Locality Map
	1703/ENG001	Project Layout Plan
	1703/ENG002	Sewerline Line 1(CBD) (Sheet 1 of 3)
	1703/ENG003	Sewerline Line 1(CBD) (Sheet 2 of 3)
	1703/ENG004	Sewerline Line 1(CBD) (Sheet 3 of 3)
	1703/ENG005	Sewerline Line 2(CBD) (Sheet 1 of 2)
	1703/ENG006	Sewerline Line 2(CBD) (Sheet 2 of 2)
	1703/ENG007	Sewerline Line 3(CBD) (Sheet 1 of 4)
	1703/ENG008	Sewerline Line 3(CBD) (Sheet 2 of 4)
	1703/ENG009	Sewerline Line 3(CBD) (Sheet 3 of 4)
	1703/ENG010	Sewerline Line 3(CBD) (Sheet 4 of 4)
	1703/ENG011	Bulk Sewerline (Sheet 2 of 4)
	1703/ENG012	Bulk Sewerline (Sheet 3 of 4)
	1703/ENG013	Bulk Sewerline (Sheet 3 of 4)
	1703/ENG014	Bulk Sewerline (Sheet 4 of 4)
	1703/ENG016	Typical Detail