

Turbine Hall, 65 Ntemi Piliso street, Newtown	
P.O. Box 61542 Johannesburg 2107	
Tel:	(011) 688 1796
Enq: Email:	Gcina Ndela gcina.ndela@jwater.co.za

REQUEST FOR TENDER

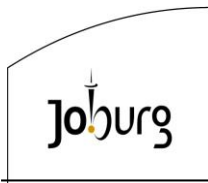
NOTE: HARD COPY TENDER DOCUMENTS ARE AVAILABLE AT A COST OF R350.00 PER SET. DOCUMENTS DOWNLOADED FROM THE ETENDER PORTAL IS AT NO COST BUT MUST COMPLY WITH SUBMISSION REQUIREMENTS.

IMPORTANT NOTICE

N.B. NO TENDER DOCUMENTS TRANSMITTED BY FAX WILL BE ADMISSIBLE

CIDB requirements:	Tenderers should have a CIDB grading of 7CE or higher.		
Closing of tenders:	No tenders will be accepted after closing time of 10:30 on the closing date. Please ensure that tenders are submitted in a sealed envelope, clearly marked with the reference number JW14301 and addressed to the Supply Chain Management unit (SCMU), Johannesburg Water. Tenders are to be deposited in the Tender Box situated at the entrance to No. 65 Ntemi Piliso street, Turbine Hall on or before the closing time and date, being 10:30 on 03 May 2022 Under no circumstances must documents be handed to an employee of Johannesburg Water or handed in at the Supply Chain Management Unit. Tender documents via courier services must also be deposited in the Tender Box and not handed to an employee of Johannesburg Water. NB: Tender documents which are not in sealed envelopes or which are not placed in the Tender Box will be rejected. Johannesburg Water will not accept responsibility for tender documents which are not deposited in the Tender Box.		
Point scoring system	The 90/10 point scoring system will be applicable to this tender, i.e. 90 points for Price and 10 points for Preferential procurement (B-BBEE).		
Briefing Session	<i>A Virtual Non-Compulsory Briefing Session will be held on Microsoft Teams</i> <i>Click here to join the meeting</i> <i>Technical queries must be directed to Mr. Ngobizitha Ndimande on 011 688 6573 or ngobizitha.ndimande@jwater.co.za All general queries must be directed to Gcina Ndela on 011 688 1796 or gcina.ndela@jwater.co.za</i>		
Late tenders:	Tender documents received after the closing time and date will not be accepted under any circumstances.		
Opening of Tenders:	Due to impact of Covid 19, there will be No tender opening. All bids received will be published on Johannesburg Water.		
Selection Process:	The selection process will be subject to the Supply Chain Management Policy of Johannesburg Water. Johannesburg Water will not necessarily accept the lowest or any tender and reserves the right to withdraw a tender without furnishing reasons.		
JOHANNESBURG WATER (SOC) Ltd SUPPORTS B-BBEE			
	JW14301: LINBRO WATER UPGRADE		
	CLOSING DATE: 03 May 2022 at 10:30		
Name of tenderer:		CIDB CRS Number	
Contact person:		CSD No:	
Cellphone no:		SARS Tax Compliance Pin(tenders)	
E-mail:		Fax No:	
Tel. No:			

NB: Only tender documents obtained legally will be considered.



CHECK-LIST FOR TENDER SUBMISSION

The Tenderer is to indicate in the check-boxes provided that they have completed the required section of the tender document. Completion of this check-list will assist the Tenderer in ensuring that they have attended to all the required items for submission with this tender. **Additionally, it is an absolute requirement that tenderers comply with National Treasury's CSD registration as well as SARS tax compliance requirements – refer T2.2.4 below.**

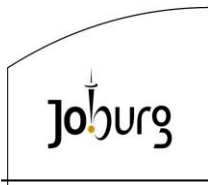
Ref	Description	Completed		For office use		
		Yes	No	Yes	No	Comments
Cover	Name of tenderer					
	Contact person					
	Telephone/Fax number					
	CIDB CRS Number					
T2.1	T2.2.2 Complete the Certificate of Authority					
	Submit Valid SARS Tax Compliance status Pin for Tenders					
	Confirm Proof of CSD Registration - submission of MA ----- Number					
	Valid and certified copy of construction sector BBBEE certificate/ Affidavit for construction sector					
	Consortium / JV agreement with all signatories and breakdown of each members contribution / role					
	Complete and sign JW 10 – Preference Points claim form					
T2.2.4	Complete and sign JW 14- Non- Collusion form					
T2.2.4	Complete and sign JW 14.1- Declaration of any potential Conflict of Interest					
T2.2.4	Complete and sign JW 14.2- past Supply Chain Management Practices Form					
	Complete and sign JW 14.3 (Declaration for Procurement above R10m)*					
	Annual Financial statements for past 3 years (AFS) *					
T2.2.4	Complete and sign JW MBD 9- Certificate of Independent bid Determination					
	Complete and sign JW6.4 - Acknowledgement of JW Volume 3 OHS Specs					
C2.2	Complete the Schedule of Rates and the Summary. Sign the Summary					
C.1.1	Complete the Form of Offer. Do not complete the Form of Acceptance					
	Sign the Form of Offer with 2 witnesses. Do not sign the Form of Acceptance					
Qualifica tions	Is your tender subject to any qualifications. If Yes, reference to such qualification/s must be indicated below: -----					

* for tenders with an estimated total value exceeding R10m (VAT included)

** for all tenders regardless of value

Signature: _____ Date _____

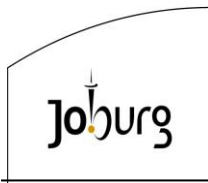
Employer:		Contractor:	
Witness:		Witness:	



CONTENTS:

Volumes	Contents	
Number	Number	Heading
Volume 1	Part 1: Tender Procedures	
	T1.1	Tender Data
	Part 2: Returnable Documents	
	T2.1	List of Returnable Documents
	T2.2	Returnable Schedules
	Part 1: Agreement and Contract Data	
	C1.1	Form of Offer and Acceptance
	C1.2	Contract Data
	C1.3	Forms of Securities
	Part 2: Pricing Data	
	C2.1	Pricing Instructions
	C2.2	Bill of Quantities
Volume 2A	Part 3: Scope of Work	
	C3	Scope of Work
Volume 2B		Particular Specifications
Volume 2A	Part 4: Site Information	
	C4	Site Information
Volume 3		Occupational Health and Safety Specification and Environmental Management Plan
Volume 4		Tender Drawings

Employer:		Contractor:	
Witness:		Witness:	



Volumes	Contents		Included (Yes / No)	To be returned (Yes / No)
Number	Number	Heading		
Volume 1	Part 1: Tender Procedures		Yes	Yes
	T1.1	Tender Data	Yes	Yes
	Part 2: Returnable Documents		Yes	Yes
	T2.1	List of Returnable Documents	Yes	Yes
	T2.2	Returnable Schedules	Yes	Yes
	Part 1: Agreement and Contract Data		Yes	Yes
	C1.1	Form of Offer and Acceptance	Yes	Yes
	C1.2	Contract Data	Yes	Yes
	C1.3	Forms of Securities	Yes	Yes
	Part 2: Pricing Data		Yes	Yes
	C2.1	Pricing Instructions	Yes	Yes
	C2.2	Bill of Quantities	Yes	Yes
	Part 3: Scope of Work		Yes	Yes
	C3	Scope of Work	Yes	Yes
		Particular Specifications	Yes	Yes
	Part 4: Site Information		Yes	Yes
	C4	Site Information	Yes	Yes
Volume 2		Occupational Health and Safety Specification and Environmental Management Plan	Yes	No
Volume 3		Tender Drawings	Yes	No

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3			
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Johannesburg Water SOC Ltd



VOLUME 1

PART 1: TENDERING PROCEDURES

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T1.1 TENDER DATA

T1.1.1 Conditions of Tender

The conditions of tender are the Standard Conditions of Tender as contained in Annex C of the CIDB Standard for Uniformity in Construction Procurement (August 2019). (See www.cidb.org.za).

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

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

T1.1.2 Tender Data

The clause numbers in the Tender Data refer to the corresponding clause numbers in the Conditions of Tender.

The additional Conditions of Tender are:

Clause number	Tender Data
C.1.1	The Employer is, Johannesburg Water (SOC) Limited
C.1.2	The tender documents issued by the Employer comprise: Volume 1: Part 1: Tendering Procedures T1.1 Tender Notice and Invitation to Tender T1.2 Tender Data Part 2: Returnable Documents T2.1 List of Returnable Documents T2.2 Returnable Schedules, including the Enterprise Declaration Affidavit which may be bound in a separate volume Volume 1: Part 1: Agreement and Contract Data C1.1 Form of Offer and Acceptance C1.2 Contract Data C1.3 Forms of Securities Part 2: Pricing Data C2.1 Pricing Instructions C2.2 Schedule of Rates Volume 2A Part 3: Scope of Work C3.1 Scope of Work C3.2 Particular Specifications Part 4: Site Information C4 Site Information Volumes 2B: Generic Specifications Volume 3: Occupational Health, Safety and Environmental Specification and Environmental Management Plan Volume 4: Tender Drawings

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Clause number	Tender Data
C.1.4	The Employer's agent is: Contact person : Mr K Govender Company name : UWP Consulting (Pty) Ltd Address : Block 1, Suite 201, Monument Office Park, 79 Steenbok Ave, Telephone : Monument Park, Pretoria, 0181. Facsimile : 012 424 9700 E-mail address : kubeng@uwp.co.za
C.2.1	Eligibility criteria and requirements CIDB registration and grading: 1) It is Estimated that tenderers must have CIDB contractor Grading designation of 7CE or higher. 2) Joint ventures are eligible to submit tenders provided that: i) every member of the joint venture is registered with the CIDB; ii) The combined contractor grading designation calculated in accordance with the CIDB Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 7CE or higher class of construction work.
C.2.7	The arrangements for a clarification meeting are as stated in the Tender Notice and Invitation to Tender.
C.2.8	Replace the contents of the clause with the following: "Request clarification of the tender documents, if necessary, by notifying the Employer's Official indicated in the Tender Notice and Invitation to Tender in writing at least seven working days before the closing time stated in the foregoing notice and clause C.2.15."
C.2.9	Add the following to the clause: "Be aware that the extent of insurance to be provided by the employer (if any) might not be for the full cover required in terms of the conditions of contract identified in the contract data. The tenderer is advised to seek qualified advice regarding insurance.."
C.2.10.5	Add the following to the clause: "If no offer is made for an item, a line must be drawn through the space in black ink. All prices and details must be legible / readable to ensure the tender will be considered for adjudication."
C.2.11	In instances where errors are made during the completion of the tender document, bidders are required to authenticate each and every alteration by the authorized signatory by inserting either his/her initial or signature next to the alteration Where alterations are made in respect of the pricing component (i.e. errors made on the Bill of Quantity), the pricing schedule or the Form of Offer, such alteration must be authenticated by the authorized signatory by inserting either his/her initial or signature next to the alteration. Corrections may not be made using correction fluid, correction tape or the like.
C.2.12	Replace Contents Alternative offers will not be permitted.

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Clause number	Tender Data
C.2.13.2	Add the following to the clause: a) The following parts of the issued documents MUST be returned with the tender offer: Tendering Procedures Returnable Documents Agreement and Contract Data Pricing Data Scope of Work Site Information Generic Specifications b) Acknowledgement that the Tenderer has familiarized themselves with the following issued documents MUST be Completed and Signed. Occupational Health, Safety and Environmental Specification and Environmental Management Plan Tender Drawings Tenderers who complete and sign the acknowledgement of the documents outlines in b) will Not be eliminated for not returning the respective documents.
C.2.13.3	Each tender offer shall be submitted as an original. Tenderers are also requested to submit a soft copy in a USB or CD (Tenderers who do not submit a soft copy will not be disqualified)
C.2.13.5	The Employer's address for delivery of tender offers and identification details to be shown on the Tenderer's offer package are: Location of tender box: Ground Floor Entrance Physical address: Turbine Hall, 65 Ntemi Piliso street, Newtown PO Box 61542 Johannesburg 2107 Identification details: Tender reference number, Title of Tender and the closing date and time of the tender, <i>as well as the Tenderer's name, his Authorised Representative's name, postal address and telephonic contact numbers.</i>
C.2.13.6 & C.3.5	A two-envelope procedure will not be followed.
C.2.13.10	Add Clause Accept that the Bill of Quantities will be issued by the Employer in ELECTRONIC FORMAT ONLY. Tenderers are advised to complete the Bill of Quantities electronically, print the Bill of Quantities in its entirety and append then to the relevant section (for documents procured from the Employer's office; DO NOT DISMANTLE and submit document as annexure or returnable). Tenderers WILL NOT BE PENALISED for completing the document by black pen/ink The Tenderer remains responsible to ensure that all pages are incorporated and that formulas are correct.
C.2.15.1	The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.
C.2.16	The tender offer validity period is 90 days.

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Clause number	Tender Data
C.2.16.1	Add the following to the clause : "If the tender validity expires on a Saturday, Sunday or public holiday, the Tender Offer shall remain valid and open for acceptance until the closure of business on the following working day."
C.2.19	The Tenderer must provide access during working hours to his premises for inspections on request.
C.2.23	The Tenderer is required to submit with his tender: Valid SARS Compliance status Pin for by the South African Revenue Services. Proof of CSD registration i.e. MA xxxxxxxx number or CSD summary report a Certificate of Contractor Registration issued by the CIDB. where the tendered amount inclusive of VAT exceeds R 10 million: Submit audited annual financial statement for the past 3 years (Sets), or for the period since establishment if established during the last 3 years, if required by law to prepare annual financial statements for auditing; If the bidder is not required by law to prepare annual financial statements for auditing, they are required to furnish their Annual Financial Statements for the past three years (Sets) or since their establishment if established during the past three years. a certificate certifying that the tenderer has no undisputed commitments for municipal services or other service provider in respect of which payment is overdue for more than 30 days; particulars of any contracts awarded to the tenderer by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract; a statement indicating whether any portion of the goods or services are expected to be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality or municipal entity is expected to be transferred out of the Republic. Bidder is required to submit municipal statement/account (not older than three months and not overdue for more than 90 days) or a valid lease agreement (for both the bidder/company and for the directors). Note: Three years (sets) of annual financial statements must be signed by the Director for companies in in terms of Section 30. (3) (c) of the Companies Act of 2008 and include an auditor's report, if the statements are audited. Three years (sets) of annual financial statements for Close Corporations must be signed by or on behalf of a member holding a member's interest of at least 51%, or members together holding members' interests of at least 51%, in the corporation in terms of Section 58 (3) of the Close Corporations Act of 1984. Where a tenderer satisfies CIDB contractor grading designation requirements through joint venture formation, such tenderers are required to submit the following for each joint venture partner: Certificates of Contractor Registration in respect of each partner Valid SARS Compliance status Pin issued by the South African Revenue Services Proof of CSD registration i.e. MA xxxxxxxx number or CSD summary report. where the tendered amount inclusive of VAT exceeds R 10 million: Each joint venture partner is required to submit audited annual financial statement for 3 years (Sets), or for the period since establishment if established during the last 3 years, if required by law to prepare annual financial statements for auditing Each joint venture partner if not required by law to prepare annual financial statements for auditing, is required to furnish their Annual Financial Statements for the past three years (Sets) or since their establishment if established during the past three years. Each joint venture partner is required to submit municipal statement/account (not older than three months and not overdue for more than 90 days) or a valid lease agreement (for both the bidder/company and for the directors).
C.2.24	Add the following new clause:

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Clause number	Tender Data
	Canvassing and obtaining of additional information by tenderers Accept that no Tenderer shall make any attempt either directly or indirectly to canvass any of the Employers officials or the Employer's agent in respect of his tender, after the opening of the tenders but prior to the Employer arriving at a decision thereon. No Tenderer shall make any attempt to obtain particulars of any relevant information, other than that disclosed at the opening of tenders."
C.2.25	Add the following new clause: Prohibitions on awards to persons in service of the state Accept that the Employer is prohibited to award a tender to a person - a) who is in the service of the state; or b) if that person is not a natural person, of which any director, manager, principal shareholder or stakeholder is a person in the service of the state; or c) a person who is an advisor or consultant contracted with the municipality or municipal entity. "In the service of the state" means to be - i) a member of:- • any municipal council; • any provincial legislature; or • the National Assembly or the National Council of Provinces; ii) a member of the board of directors of any municipal entity; iii) an official of any municipality or municipal entity; iv) an employee of any national or provincial department; v) provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999); vi) a member of the accounting authority of any national or provincial public entity; or vii) an employee of Parliament or a provincial legislature." In order to give effect to the above, the questionnaire for the declaration of interests in the tender of persons in service of state in Section T2.1 must be completed.
C.2.26	Add the following new clause: Awards to close family members of persons in the service of the state "Accept that the notes to the Employer's annual financial statements must disclose particulars of any award of more than R 2 000 to a person who is a spouse, child or parent of a person in the service of the state (defined in clause C.2.25), or has been in the service of the state in the previous twelve months, including a) the name of that person; b) the capacity in which that person is in the service of the state; and "in the service of the state" means to be— (a) a member of— (i) any municipal council; (ii) any provincial legislature; or (iii) the National Assembly or the National Council of Provinces; (b) a member of the board of directors of any municipal entity; (c) an official of any municipality or municipal entity; (d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No. 1 of 1999); (e) an executive member of the accounting authority of any national or provincial public entity; or (f) an employee of Parliament or a provincial legislature;

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Clause number	Tender Data
	c) the amount of the award. In order to give effect to the above, the questionnaire for the declaration of interests in the tender of persons in service of state in part T2 – Returnable Documents must be completed in full and signed.”
C.2.27	Add the following new clause: Tax Compliance In the case of a Joint Venture/Consortium the tax Compliance status Pin must be submitted for each member of the Joint Venture/Consortium.”
C.2.28	Add the following new clause: Tenderers will be afforded a period of three (3) days to complete the following returnable documents (JW6.4, JW6.5, Certificate of Authority, JW 3, JW 10 (MBD 6.1), JW 14, JW 14.1, JW 14.2, JW 14.3, JW MBD 9) in instances where such forms are incomplete.
C 2.29	Add the following new clause: Shortlisted Tenderers will be afforded a period of three (3) days to submit outstanding municipal statement/account (not older than three months and not overdue for more than 90 days) or a valid lease agreement (for both the bidder/company and for the directors).
C.3.1.1	Replace the contents of the clause with the following: “Respond to a request for clarification received up to five calendar days before the tender closing time stated in the tender data and notify all Tenderers who drew procurement documents”
C.3.4.2	<u>subject to Covid 19 protocols and restrictions. Johannesburg Water will publish all received bids at JW website.</u>
C 3.9	Replace Existing Clause Arithmetical errors 3.9.1 Correction of arithmetic errors shall be done after determining the <i>Highest Ranking bidder</i> based on the score obtained for price and scores obtained for preferential procurement. 3.9.2 JW undertakes to check the highest scoring bid for arithmetical errors and correcting them as follows: 3.9.2.1 Construction related tenders 3.9.2.1.1 JW shall check for arithmetic errors using the following sequence: 3.9.2.1.2 3.9.2.1.1.1 Check the amount in words against the amount in figures on the <i>Form of Offer</i> , 3.9.2.1.1.2 Check the <i>Form of Offer</i> against the <i>Summary Schedule Total</i> , 3.9.2.1.1.3 Check the <i>Section Sub-Totals</i> per section against the <i>Summary Total</i> for summation errors, 3.9.2.1.1.4 Check the <i>Section Sub-Totals</i> in the <i>Summary Schedule</i> against <i>Section Sub-Totals</i> in the <i>Bill of Quantities</i> . 3.9.2.1.1.5 Check the <i>Section Sub-Totals</i> against the Item Totals for summation errors. 3.9.2.1.1.6 Check the <i>Item Totals</i> against the product of the <i>Item Rate</i> and the Quantity Provided. 3.9.2.2 In respect of the Form of Offer, where there is a discrepancy between the amounts in figures and the amount in words, the amount in words shall govern. The amount in figure will be adjusted to correspond with the amount in words 3.9.2.3 If a bill of quantities or price schedule applies arithmetic errors will be treated as follows: 3.9.2.3.1 Where there is an error in the <i>Total</i> 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 <i>Item Prices</i>

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Part	T1	T2	C1	C2	C3	C4



Clause number	Tender Data
	(and their <i>Rates</i> if <i>Bills of Quantities</i> apply) to achieve the <i>Tendered Total</i> of the prices. 3.9.2.4 Where there is an error in the <i>Line Item Total</i> resulting from the product of the <i>Item Rate</i> and the <i>Quantity</i>, the <i>Line Item Total</i> shall govern and the <i>Item Rate</i> shall be corrected. 3.9.2.5 Where there is an obvious misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, and the unit rate shall be corrected. 3.9.2.6 Where there is an obviously gross misplacement of the decimal point in the <i>Line Item Total</i>, the <i>Line Item Total</i> as quoted shall govern, and the Item Rate shall be corrected taking into consideration any risks associated with implementing such corrections 3.9.2.7 Clarification session(s) shall be held with Tenderer where errors are highlighted and corrections made are explained. Tenderer is afforded an opportunity to give additional input, accept or reject corrections made. 3.9.2.7.1 In the event that Tenderer accepts corrections made. JW to proceed with evaluation. 3.9.2.7.2 In the event that Tender rejects the correction(s) made, JW should review the Tenderer's motivation and risks associated with proposed change. 3.9.2.8 Risk related to the Arithmetic Corrections shall be assessed. Where risks are identified, tenderers shall provide JW with any other material or information that has a bearing on the tender offer, the tenderer's commercial position (including joint venture agreements), quotations preferencing arrangements or samples of materials considered necessary by JW for the purpose of a full and fair risk assessment 3.9.2.9 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 JW request, or fails to attend any meeting in which it has been formally invited to clarify any issue, the tender offer will be regarded as non-responsive.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



F.3.11.
1

Pre-qualification

Description	Remark (Y/N)
Has the Tenderer completed and signed the Special Condition Schedule JW6.1?	
Has the tenderer met the local content threshold as stipulated in MBD 6.2 <i>Note: Bidders who fails to meet the local content threshold as stipulated in MBD 6.2 will be disqualified immediately. Bidders who meet the local content threshold as stipulated in MBD 6.2 will be evaluated further.</i>	

Tenderers who **FAIL** to complete and sign schedule JW6.1 will not be evaluated further.

Part B

Functionality

Description	Complied	
1. Contracts Manager - Has minimum requirements been met for both Qualifications and Experience?	Yes	No
2. Site agent - Has minimum requirements been met for both Qualifications and Experience?	Yes	No
3. OHS Officer - Has minimum requirements been met for both Qualifications and Experience?	Yes	No
4. Has the Tenderer met minimum experience requirements with respect to specific aspects of the project / comparable projects – Has been met.?	Yes	No

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Criteria No.	Criteria		Documentary Evidence	Has the Criteria Been Met (Yes or No)
1	Qualification and Registration of key staff (assigned personnel) in relation to the scope of work	Contracts Manager	Copies of certified qualifications of Contracts Manager See T2.1.9	
		Site Agent	Copies of certified qualifications of Site Agent See T2.1.9	
		Safety Officer	Copies of certified qualifications of Safety Officer See T2.1.9	
2	Experience of key staff (assigned personnel) in relation to the scope of work	Contracts Manager	CV of Contracts Manager detailing his/her work experience in relation for all key personnel See T2.1.9	
		Site Agent	CV of Site Agent detailing his/her work experience in relation for all key personnel See T2.1.9	
		Safety Officer	CV of Safety Officer detailing his/her work experience in relation for all key personnel See T2.1.9	
3	Experience with respect to specific aspects of the project / comparable projects	Tenderer has provided references and Practical / completion certificates confirming that it has successfully completed two (2). project of a steel pipeline minimum diameter DN800mm.	Record of completed steel pipeline projects as per format given on section T2.1.6 or on the client' letterhead accompanied with completion certificate / final approval certificate and supported with contactable references as per format given in T2.1.7 or	

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Minimum Qualifications, Registration status and Experience of Key Personnel

Designation	Minimum Qualification	Registration	Minimum Experience	
Contracts Manager	BSc/BEng/B.Tech (Civil or Mechanical)	Pr.Tech Eng. or Pr.Eng	8 Years (All Projects) post minimum qualification	
Site Agent	National Diploma in Engineering (Civil or Mechanical)	N/A	3 bulk water projects.(Welded Steel:≥ 800mm diameter)	
Safety Officer	National Diploma (Safety Management)	SACPCMP (proof of application of registration will be accepted) or proof of receipt of Application by SACPCMP?	2 Years (All Projects)	
	or			
	National Diploma (Environmental Health / Environmental Science / Environmental Management)	SACPCMP (proof of application of registration will be accepted) or proof of receipt of Application by SACPCMP?	4 Years (All Projects)	
	or			
	SAMTRAC/SHEOMTRAC/ SHEMTRAC/ MESHTRAC / NEBOSH / Safety Officers Course	SACPCMP (proof of application of registration will be accepted) or proof of receipt of Application by SACPCMP?	4 Years (All Projects)	

Acronyms

SACPCMP: South African Council for the Project and Construction Management Professions

SAMTRAC: Safety Management Training Course

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NEBOSH: National Examination Board in Occupational Safety and Health

SHEOMTRAC: Safety Health Environmental Occupational Management Training Course

SHEMTRAC: Safety Health Environmental Management Training Course

MESHTRAC: Management Environmental Safety Health Training Course

The scoring of the Experience of Tenderer will be as follows

Minimum Experience: Tenderer must have completed at least 2 related projects (Steel welded Pipeline).

Tenderer's experience with respect to the installation of welded steel pipes of diameter 800 mm ND.

Tenderer's experience

Tenderer has provided references and Practical / completion certificates confirming that it has successfully completed two (2). project of a steel pipeline minimum diameter DN800mm.

C.3.13.1 Add to the existing clause:

Tender offers will only be accepted if:

- the tenderer submits a valid SARS tax Compliance status Pin for tenders issued by the South African Revenue Services or has made arrangements to meet outstanding tax obligations;
- Proof of CSD registration ie MA xxxxx number;
- the tenderer submits a letter of intent from an approved insurer undertaking to provide the Performance Guarantee to the format included in Part T2.2.22 of this procurement document
- the tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation;
- the tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector;
- the tenderer has not:
 - abused the Employer's Supply Chain Management System; or
 - failed to perform on any previous contract and has been given a written notice to this effect;
- the tenderer has completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the Employer or potentially compromise the tender process and persons in the employ of the state are permitted to submit tenders or participate in the contract;
- the tenderer is registered and in good standing with the compensation fund or with a licensed compensation insurer;
- the Employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations,

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



	2003, issued in terms of the Occupational Health and Safety Act, 1993, the necessary competencies and resources to carry out the work safely; and j) the tenderer: i) has sufficiently substantiated his experience in this type work; has the required and experienced key personnel; and
C.3.17	The number of paper copies of the signed contract to be provided by the Employer is one.
	There are no additional conditions of tender.

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (13)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 and T2.2 Returnable Documents

Johannesburg Water (SOC) Ltd



VOLUME 1

RETURNABLE DOCUMENTS AND SCHEDULES

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (14)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 and T2.2 List of Returnable Documents

T2.1 LIST OF RETURNABLE DOCUMENTS

The tenderer must complete the following returnable documents:

<u>Document</u>	<u>Page</u>
1. Returnable Schedules required only for tender evaluation purposes	
T2.1.1 Record of addenda to tender documents	RD.5
T2.1.2 Certificate of Authority	RD.6
T2.1.3 Compulsory Enterprise Questionnaire	RD.11
T2.1.4 Preferential Procurement	RD.13
JW6.1 Special conditions	RD.14
JW6.2 Declaration certificate for local production and	
(MBD 6.2) content for designated sectors	RD.16
JW10 (MBD 6.1) Preference points claim form in terms of the prefer-	
ential procurement regulations	RD.24
JW14 Non-collusion Form	RD.30
JW 14.1 Declaration of any potential conflict or interest	RD.31
JW 14.2 Declaration of bidder's past supply chain	
management practices	RD.34
JW 14.3 Declaration for Procurement above R10 Million (VAT	
Included)	RD.36
JW MBD 9 Certificate of independent bid determination	RD.39
T2.1.5 Proposed amendments and qualifications	RD.42
T2.1.6 Schedule of proposed subcontractors	RD.43
T2.1.7 Schedule of Plant and Equipment	RD.44
T2.1.8 Schedule of the Tenderer's experience	RD.45
T2.1.9 Contactable reference template	RD.46
T2.1.10 Schedule of key personnel	RD.52
T2.1.11 Curriculum vitae of key personnel	RD.53

T2.2 LIST OF RETURNABLE DOCUMENTS

2. Other documents required only for tender evaluation purposes	
T2.2.1 Certificate of Contractor Registration issued by the Construction	RD.57
Industry Development Board	
T2.2.2 SARS Tax Compliance Status Pin and	RD.58
Proof of CSD registration ie MA xxxxxxxxxx number	

T2.3 LIST OF RETURNABLE SCHEDULES

3. Returnable Schedules that will be incorporated into the contract	
T2.3.1 Price variation on special materials	RD.60

T2.4 LIST OF RETURNABLE SCHEDULES

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (15)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 and T2.2 List of Returnable Documents

4. Other documents that will be incorporated into the contract

T2.4.1	Addenda to the tender documents	RD.62
T2.4.2	Minutes of the pre-tender clarification meeting and site inspection	RD.63
T2.4.3	Acknowledgement of JW Volume 2 OHS Specs	RD.64
T2.4.4	Acknowledgement of Tender Drawings	RD.65
C1.1	FORM OF OFFER AND ACCEPTANCE	81
C1.2	CONTRACT DATA (PART 2)	85
C1.3	FORMS OF SECURITIES	99
C2.1	PRICING DATA	110
	Bill of Quantities	116
	Summary of Bill of Quantities	117

NOTE: the Tenderer is required to complete each and every schedule listed above to the best of his ability as the evaluation of tenders and the eventual contract will be based on the information provided by the tenderer. Failure of a tenderer to complete the schedules and forms to the satisfaction of the employer will inevitably prejudice the tender and may lead to rejection on the grounds that the tender is not responsive.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (16)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1 LIST OF RETURNABLE DOCUMENTS

<u>Document</u>	<u>Page</u>
1. Returnable Schedules required only for tender evaluation purposes	
T2.1.1 Record of addenda to tender documents	RD.5
T2.1.2 Certificate of authority	RD.6
T2.1.3 Compulsory Enterprise Questionnaire	RD.11
T2.1.4 Preferential Procurement	RD.13
T2.1.5 Proposed amendments and qualifications	RD.42
T2.1.6 Schedule of proposed subcontractors	RD.43
T2.1.7 Schedule of Plant and Equipment	RD.44
T2.1.8 Schedule of the Tenderer's experience	RD.45
T2.1.9 Contactable reference template	RD.46
T2.1.10 Schedule of key personnel	RD.52
T2.1.11 Curriculum vitae of key personnel	RD.53

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (17)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.1 Record of Addenda to Tender Documents

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

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

Attach additional pages if more space is required.

Signed

Date

Name

Position

Tenderer

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (18)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.2 Certificate of Authority

Indicate the status of the Tenderer by ticking the appropriate box hereunder. The Tenderer must complete the certificate set out below for the relevant category.

(I) COMPANY	(II) CLOSE COR- PORATION	(III) PARTNERSHIP	(IV) JOINT VENTURE	(V) SOLE PROPRI- ETOR

(I) Certificate For Company

I, ..., chairperson of the Board of Directors of, hereby confirm that by resolution of the Board (copy attached) taken on, Mr/Ms, acting in the capacity of, was authorized to sign all documents in connection with the tender for Contract No. JW14301 and any contract resulting from it on behalf of the company.

Chairman:

As Witnesses: 1.....

2.....

Date:

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (19)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

(II) Certificate For Close Corporation

We, the undersigned, being the key members in the business trading as
 hereby authorize Mr/Ms , acting in the capacity of
, to sign all documents in connection with the
 tender and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

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

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (20)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

(III) Certificate For Partnership

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

....., hereby authorize Mr/Ms,

acting in the capacity of, to sign all documents in connection

with the tender and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

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

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (21)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

(IV) Certificate For Joint Venture

This Returnable Schedule is to be completed by joint ventures.

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

NAME OF FIRM	ADDRESS	DULY AUTHORISED SIGNATORY
Lead partner		Signature. Name Designation
		Signature. Name Designation
		Signature. Name Designation
		Signature. Name Designation

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

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (22)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

(V) Certificate For Sole Proprietor

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

Signature of Sole owner:

As Witnesses:

1.....

2.

Date:

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (23)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.3 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

Proof of CSD registration ie MA xxxxxxxxx number.

SARS Tax Compliance status Pin number

Section 6: Record in the service of the state

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

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

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

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (24)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

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

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:

- authorizes the Employer to verify the tax compliance status from the South African Revenue Services that my / our tax matters are in order;
- 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;
- 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;
- confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and
- 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 _____

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (25)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.4 Preferential Procurement

Forms for Completion by the Tenderer included in this section are:

Form No.	Form Title	Description
JW6.1	Special Conditions	Sub-contracting and Skills Transfer
JW6.2	Declaration certificate for local production and content for designated sectors	Form to be completed by the Tenderer
JW10	Empowerment and Preferential Procurement	Procedures and adjudication criteria for the information of the Tenderer
JW14	Non – collusion Form	Form to be completed by the Tenderer
JW 14.1	Declaration of any potential Conflict or Interest	Form to be completed by the Tenderer
JW14.2	Declaration of bidder's past supply chain management practices	Form to be completed by the Tenderer
JW 14.3	Declaration for Procurement above R10 Million (VAT Included)	Form to be completed by the Tenderer
JW MBD9	Certificate of Independent Bid Determination	Form to be completed by the Tenderer

Note:

.

All information supplied must be current and valid. Proposed or imminent changes to a Tenderer's status may be mentioned but the declarations must reflect current circumstances.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (26)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

SPECIAL CONDITIONS

JW 6.1

Although the total value of this contract exceeds R30m, Johannesburg Water deems it **not** feasible to subcontract a minimum of 30% of the contract. However, the successful tenderer must subcontract a minimum of **11.30%** of the value of this contract to an entity that is an EME or QSE that is 51% Black Owned or 51 Black Women Owned or 51% Black Youth Owned. The subcontractor/s chosen for this purpose must be registered on National Treasury's Central Supplier Database (CSD).

- An EME or QSE which is at least 51% black owned by black people;
 - An EME of QSE which is at least 51% owned by black people who are youth;
 - An EME of QSE which is at least 51% owned by black people who are women;
 - More than one of the categories referred to above.
1. Subcontractors must be chosen from National Treasury's Central Supplier Database which can be accessed on National Treasury's website.
 2. A subcontracting agreement between main contractor and the subcontractor shall be submitted to JW upon appointment and must include minimum information below.
 - Name of sub-contractor and BBBEE status
 - Area and location of project
 - Scope of work issued to the sub-contractor
 - Value of the work issued including P&G's (auditable)
 - Assistance provided to the sub-contractor e.g. acquisition of materials, machinery and tools
 - Skills transfer plan
 3. The successful contractor must submit periodic SMME reports to the Project Manager as follows:
 - Name of sub-contractor and BBBEE status
 - Area and location of project
 - Scope of work issued to the sub-contractor
 - Value of the work issued (auditable)
 - Monthly payments made to the subcontractor (auditable)
 - Assistance provided to the sub-contractor e.g. acquisition of materials, machinery and tools
 - Performance of the sub-contractor
 4. Upon completion of the project, the contractor is required to provide a final report to JW on skills acquired, description and value of work performed as well as their overall performance.

(The above information will assist the sub-contractor to improve their CIDB grading)

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (27)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

Skills transfer

It is an absolute requirement that the successful tenderer empowers the appointed sub-contractor through the transfer of skills. In this regard a skills transfer plan must be submitted prior to commencement of the project.

I / we representing the tenderer hereunder agree to the above conditions in the event of being successful.

Name of tenderer: _____

Authorised signatory _____ **Date** _____

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (28)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

MBD 6.2

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS

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

Before completing this declaration, bidders must study the General Conditions, Definitions, Directives applicable in respect of Local Content as prescribed in the Preferential Procurement Regulations, 2017, the South African Bureau of Standards (SABS) approved technical specification number SATS 1286:2011 (Edition 1) and the Guidance on the Calculation of Local Content together with the Local Content Declaration Templates [Annex C (Local Content Declaration: Summary Schedule), D (Imported Content Declaration: Supporting Schedule to Annex C) and E (Local Content Declaration: Supporting Schedule to Annex C)].

1. General Conditions

- 1.1. Preferential Procurement Regulations, 2017 (Regulation 8) make provision for the promotion of local production and content.
- 1.2. Regulation 8.(2) prescribes that in the case of designated sectors, organs of state must advertise such tenders with the specific bidding condition that only locally produced or manufactured goods, with a stipulated minimum threshold for local production and content will be considered.
- 1.3. Where necessary, for tenders referred to in paragraph 1.2 above, a two stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.
- 1.4. A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.
- 1.5. The local content (LC) expressed as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286:2011 as follows:

$$LC = [1 - x / y] * 100$$

Where

x is the imported content in Rand

y is the bid price in Rand excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by South African Reserve Bank (SARB) on the date of advertisement of the bid as indicated in paragraph 3.1 below.

The SABS approved technical specification number SATS 1286:2011 is accessible on <http://www.thedti.gov.za/industrial-development/ip.jsp> at no cost.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (29)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

1.6. A bid may be disqualified if this Declaration Certificate and the Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation;

2. The stipulated minimum threshold(s) for local production and content (refer to Annex A of SATS 1286:2011) for this bid is/are as follows:

Tender item no's	List of items	Local content % (per item)
(C8)	(C9)	(C15)
	Valves	
3.10.1.3	Supply, installing and testing of 200 mm ND, Class 40 isolation valve	70%
3.10.2.3	Supply, installing and testing of 200 mm ND, Class 40 isolation valve	70%
3.10.3.2	Supply, installing and testing of 900 mm ND, Class 40 isolation valve	70%
3.10.3.7	Supply, installing and testing of 100 mm ND, Class 40 isolation valve	70%
3.31.1.3	Supply, installing and testing of 200 mm ND, Class 40 isolation valve	70%
3.31.2.2	Supply, installing and testing of 500 mm ND, Class 40 isolation valve	70%
3.31.2.7	Supply, installing and testing of 500 mm ND, Class 16 isolation valve	70%
3.31.3.6	Supply, installing and testing of 400 mm ND, Class 16 isolation valve	70%
3.31.3.7	Supply, installing and testing of 300 mm ND, Class 16 isolation valve	70%
3.48.1.7	Supply, installing and testing of 50 mm ND, Class 16 isolation valve	70%
3.48.2.9	Supply, installing and testing of 50 mm ND, Class 16 isolation valve	70%
3.31.2.4	Supply, installing and testing of 500 mm ND, Class 40 Pressure Reducing Valve	70%
3.31.3.10	Supply, installing and testing of 400 mm ND, Class 16 Pressure Reducing Valve	70%
3.31.3.11	Supply, installing and testing of 300 mm ND, Class 16 Pressure Reducing Valve	70%

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (30)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

Tender item no's	List of items	Local content % (per item)
3.31.3.16	Supply, installing and testing of 400 mm ND, Class 16 Level Control Valve	70%
3.31.3.17	Supply, installing and testing of 300 mm ND, Class 16 Level Control Valve	70%
3.10.1.4	Supply, installing and testing of 200 mm ND, Class 40 Air Valve	70%
3.31.1.4	Supply, installing and testing of 200 mm ND, Class 40 Air Valve	70%
3.48.1.8	Supply, installing and testing of 50 mm ND, Class 16 Air Valve	70%
3.48.2.10	Supply, installing and testing of 50 mm ND, Class 16 Air Valve	70%
3.1	Supply steel pipe 1 118 mm OD, API 5L, X52	80%
3.23	Supply steel pipe 1 016 mm OD, API 5L, X52	80%
5.54	Supply and lay cable 3 core armoured cable 4mm ² incl trench and backfill	90%

3. Does any portion of the goods or services offered have any imported content?

(Tick applicable box)

YES		NO	

- 3.1 If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.5 of the general conditions must be the rate(s) published by SARB for the specific currency on the date of advertisement of the bid.

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

Indicate the rate(s) of exchange against the appropriate currency in the table below (refer to Annex A of SATS 1286:2011):

Currency	Rates of exchange
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (31)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

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

- Where, after the award of a bid, challenges are experienced in meeting the stipulated minimum threshold for local content the dti must be informed accordingly in order for the dti to verify and in consultation with the AO/AA provide directives in this regard.

LOCAL CONTENT DECLARATION **(REFER TO ANNEX B OF SATS 1286:2011)**

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

IN RESPECT OF BID NO.

ISSUED BY: (Procurement Authority / Name of Institution):

.....

NB

- The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.
- Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on http://www.thedti.gov.za/industrial_development/ip.jsp. Bidders should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. **Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below.** Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

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

- The facts contained herein are within my own personal knowledge.
- I have satisfied myself that:
 - the goods/services/works to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011; and
 - The local content percentage (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 3.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C:

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (32)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

Bid price, excluding VAT (y)	R
Imported content (x), as calculated in terms of SATS 1286:2011	R
Stipulated minimum threshold for local content (paragraph 3 above)	
Local content %, as calculated in terms of SATS 1286:2011	

If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above.

The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 3.1 above and the information contained in Declaration D and E.

- (d) I accept that the Procurement Authority / Institution has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.
- (e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Institution imposing any or all of the remedies as provided for in Regulation 14 of the Preferential Procurement Regulations, 2017 promulgated under the Preferential Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

SIGNATURE: _____

WITNESS No. 1 _____

DATE: _____

WITNESS No. 2 _____

DATE: _____

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (34)
Linbro Water Upgrades
CIDB grade 7CE or higher

T2.1 Returnable Documents

EXAMPLE											SATS 1286.2011	
Annex D												
Imported Content Declaration - Supporting Schedule to Annex C												
(D1) Tender No.						Note: VAT to be excluded from all calculations						
(D2) Tender description:												
(D3) Designated Products:												
(D4) Tender Authority:												
(D5) Tendering Entity name:												
(D6) Tender Exchange Rate:	USD		EU		GBP							
A. Exempted imported content				Calculation of imported content						Summary		
Tender item no's	Description of imported content	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Exchange Rate	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Tender Qty	Exempted imported value	
(D7)	(D8)	(D9)	(D10)	(D11)	(D12)	(D13)	(D14)	(D15)	(D16)	(D17)	(D18)	
(D19) Total exempt imported value												
										This total must correspond with Annex C - C 21		
B. Imported directly by the Tenderer				Calculation of imported content						Summary		
Tender item no's	Description of imported content	Unit of measure	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Tender Qty	Total imported value	
(D20)	(D21)	(D22)	(D23)	(D24)	(D25)	(D26)	(D27)	(D28)	(D29)	(D30)	(D31)	
(D32) Total imported value by tenderer												
C. Imported by a 3rd party and supplied to the Tenderer				Calculation of imported content						Summary		
Description of imported content	Unit of measure	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl VAT	Quantity imported	Total imported value	
(D33)	(D34)	(D35)	(D36)	(D37)	(D38)	(D39)	(D40)	(D41)	(D42)	(D43)	(D44)	
(D45) Total imported value by 3rd party												
D. Other foreign currency payments			Calculation of foreign currency payments				Summary of payments					
Type of payment	Local supplier making the payment	Overseas beneficiary	Foreign currency value paid	Tender Rate of Exchange								
(D46)	(D47)	(D48)	(D49)	(D50)								
(D52) Total of foreign currency payments declared by tenderer and/or 3rd party												
Signature of tenderer from Annex B					(D53) Total of imported content & foreign currency payments - (D32), (D45) & (D52) above							
Date:					This total must correspond with Annex C - C 23							

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (35)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

EXAMPLE						SATS 1286.2011
Annex E						
Local Content Declaration - Supporting Schedule to Annex C						
(E1)	Tender No.					Note: VAT to be excluded from all calculations
(E2)	Tender description:					
(E3)	Designated products:					
(E4)	Tender Authority:					
(E5)	Tendering Entity name:					
		Local Products (Goods, Services and Works)	Description of items purchased	Local suppliers	Value	
			(E6)	(E7)	(E8)	
		(E9) Total local products (Goods, Services and Works)				
(E10)	Manpower costs	(Tenderer's manpower cost)				
(E11)	Factory overheads	(Rental, depreciation & amortisation, utility costs, consumables etc.)				
(E12)	Administration overheads and mark-up	(Marketing, insurance, financing, interest etc.)				
		(E13) Total local content				
		This total must correspond with Annex C - C24				
Signature of tenderer from Annex B						
Date:						

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (36)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS (January 2017) JW 10 (MBD 6.1)

1. GENERAL CONDITIONS

- 1.1 The following preference point systems are applicable to all bids:
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).
- 1.2 The value of this bid is estimated to exceed R50 000 000 (all applicable taxes included) and therefore the 90/10 preference point system shall be applicable.
- 1.3 Preference points for this bid shall be awarded for:
- (a) Price; and
 - (b) B-BBEE Status Level of Contributor.
- 1.4 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	90
B-BBEE STATUS LEVEL OF CONTRIBUTOR	10
Total points for Price and B-BBEE must not exceed	100

- 1.5 Failure on the part of a bidder to submit proof of BBEE status level of contributor Certificate will be interpreted to mean that preference points for BBEE status level of contribution are not claimed.
- 1.6 The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

2. ADJUDICATION USING A POINT SYSTEM

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

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (37)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS (January 2017) JW 10 (MBD 6.1)

- 2.6 Should two or more bids be equal in all respects, the award shall be decided by the drawing of lots.

3. POINTS AWARDED FOR PRICE

3.1 THE 90/10 PREFERENCE POINT SYSTEMS

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

90/10

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

Where

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

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

- 4.1 In terms of Regulation 6 (2) and 7 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contributor in accordance with the table below:

BBEE Status Level of Contributor	Number of Points (based on 90/10)
1	10
2	9
3	6
4	5
5	4
6	3
7	2
8	1
Non-compliant contributor	0

5. BID DECLARATION

- 5.1 Bidders who claim points in respect of B-BBEE Status Level of Contributor must complete the following:

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (38)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS (January 2017) JW 10 (MBD 6.1)

B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PAR- AGRAPHS 1.4 AND 5.1

- 5.2 B-BBEE Status Level of Contributor: = (maximum of 10 or 20 points)
 (Points claimed in respect of paragraph 6.1 must be in accordance with the table reflected in paragraph 5.1 and must be substantiated by means of a B-BBEE certificate issued by a Verification Agency accredited by relevant proof of BBEE status level of contributor.

6. DECLARATION WITH REGARD TO COMPANY/FIRM/ BIDDER

- 6.1 Name of company/firm/bidder:.....
- 6.2 VAT registration number:.....
- 6.3 Company registration number:.....
- 6.4 Valid Tax Compliance Status Pin for Tenders.....
- 6.5 Proof of CSD Registration - indicate MA -----(Number)
- 6.6 Postal address
- 6.7 Physical address.....
- 6.8 Contact person telephone number.....
- 6.9 Facsimile number Cell number.....
- 6.10 Email address.....website address:.....
- 6.11 Was your company registered under another name previously? If yes, provide company registration details.....

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (39)
Linbro Water Upgrades
CIDB grade 7CE or higher

T2.1 Returnable Documents

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS (January 2017) JW 10 (MBD 6.1)

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

6.12 TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

***NB: In the case of the bidder being a Partnership / Joint Venture / Consorti-
um, this form must be completed in respect of each member of the Joint Ven-
ture / Consortium or Partnership and included in the tender submission**

**The Consortium, Partnership or Joint Venture must indicate each member's
contribution to the project as well as the percentage of such contribution by
completion and submission of the appropriate Consortium, Partnership or
Joint Venture agreement with the tender.**

**Failure to comply with the above requirements will result in the elimination of
the tender.**

6.13 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....
.....
.....
.....COMPANY CLASSIFICATION

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

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (40)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS (January 2017) JW 10 (MBD 6.1)

7. OWNERSHIP STRUCTURE OF ENTERPRISE

List below all the proprietors/partners/shareholders/ members of your enterprise: Attach your own list if the space provided below is inadequate:

Initials & Surname	RSA ID number	Citizenship	Race (A/Ch/Co/I/W) ¹	Ownership Effective Date	Gender M/F	Disabled Yes/No	% Owned

A/Ch/Co/I/W: means African, Chinese, Coloured, Indian or White

8. MUNICIPAL INFORMATION

Municipality where business is situated:

Is the property owned ? yes / no

*If yes, Stand / Erf Number and Registered municipal Account Number:

**Is the property leased? Yes / No

Stand / Erf Number:.....

Nota Bena

*Copy of latest up to date municipal account (not older than 90 days) or where the account is in arrears, confirmation of suitable arrangements have been made with the respective municipality must be submitted with the bid.

**Alternatively, if the premises are leased, then a copy of a valid lease agreement must be submitted.

8.1 Total number of years the company/firm has been in business:.....

8.2 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraph 7 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (41)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS (January 2017) JW 10 (MBD 6.1)

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 6.2, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –
 - (a) disqualify the person from the bidding process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) restrict the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
 - (e) forward the matter for criminal prosecution.

WITNESSES (Name and signature) 1. 2.	Name of authorized signatory: _____ SIGNATURE(S) OF BIDDERS(S) DATE: ADDRESS

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (42)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

JW 14

Non-collusion Form

I, the undersigned

In my capacity as

(insert Sole Owner, Partner, President, Secretary or other title)

of

(insert name of the Company).

acknowledges that on behalf of the abovementioned Company, I submit to Johannesburg Water [JW], a tender and that all statements of fact in such tender are both true and correct.

That such tender was not made in the interest of or on behalf of any undisclosed Person, Partnership, Company, Association, Organization or Corporation.

That such tender is genuine and not collusive or a sham.

That I have not directly or indirectly by agreement, communication or reference with anyone, attempted to induce action prejudicial to the interest of JW, or any other Bidder or anyone interested in the proposed contract.

That prior to the opening and reading of bids,

- I did not, directly or indirectly, induce or solicit anyone else to submit a false or sham tender
- I did not, directly or indirectly, collude, conspire, connive or agree with anyone else that the said bidder or anyone else would submit a false or sham tender, or that anyone should refrain from tendering or withdraw his tender
- I did not, in any manner, directly or indirectly, seek by agreement, communication, or conference with anyone to raise or fix my tender price or anyone else, or to raise or fix any overhead, profit or cost element of his tendered price of that of anyone else.
- I did not directly or indirectly, submit this tender price or any breakdown, thereof, or the contents thereof, or divulge information or data relative thereto, to any Corporation, Partnership, Company, Association, Organization, Tender Depository, or to any member or agent thereof, or to any individual group of individuals, except to the Parent Company holding a controlling interest (above 50%) in my business.

Dated at _____ on this _____ day of _____ 2021

Signed on behalf of the tenderer

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (43)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

JW 14.1

DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state¹.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority.
3. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.
 - 3.1 Full Name of bidder or his or her representative:.....
 - 3.2 Identity Number:
 - 3.3 Position occupied in the Company (director, trustee, shareholder²):.....
 - 3.4 Company Registration Number:
 - 3.5 Tax Reference Number:.....
 - 3.6 VAT Registration Number:
 - 3.7 The name of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.
 - 3.8 Are you presently in the service of the state? **YES / NO**
 3.8.1 If yes, furnish particulars.

¹MSCM Regulations: "in the service of the state" means to be –

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

² Shareholder" means a person who owns shares in the company and is actively involved in the management of the compa- ny or business and exercises control over the company.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (44)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

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

3.9.1 If yes, furnish particulars.....

.....

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

3.10.1 If yes, furnish particulars.

.....

.....

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

3.11.1 If yes, furnish particulars

.....

.....

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

3.12.1 If yes, furnish particulars.

.....

.....

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

3.13.1 If yes, furnish particulars.

.....

.....

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

3.14.1 If yes, furnish particulars:

.....

.....

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (45)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

** The intention of this clause is deemed to be the declaration of relationships which may improperly influence or affect the outcome of this bid, in particular relationships with persons involved in the procurement processes in Johannesburg Water. Therefore if the bidder or any of the persons mentioned in this clause or any company or business controlled by any of them have such a relationship, it should be declared.*

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

Full Name	Identity Number	State Employee Number

.....
Signature

.....
Date

.....
Capacity

.....
Name of Bidder

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (46)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

JW 14.2

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1 The bid of any bidder may be disregarded if that bidder, or any of its directors have-
 - a. abused the institution's supply chain management system;
 - b. committed fraud or any other improper conduct in relation to such system; or
 - c. failed to perform on any previous contract.
- 2 **In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.**

Item	Question	Yes	No
4.1	Is the bidder or any of its directors listed on the National Treasury's database as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the <i>audi alteram partem</i> rule was applied).	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		
4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? To access this Register, enter the National Treasury's website, www.treasury.gov.za, click on the icon "Register for Tender Defaulters" or submit your written request for a hard copy of the Register to facsimile number (012) 3265445.	Yes ☐	No ☐
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court outside of the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars:		
4.4	Was any contract between the bidder and any organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.4.1	If so, furnish particulars:		

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (47)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

JW 14.2

CERTIFICATION

I, THE UNDERSIGNED (FULL NAME).....

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

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

.....

Signature

.....

Date

.....

Position

.....

Name of Bidder

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (48)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

JW 14.3

DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (VAT INCLUDED)

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

- 1 Are you by law required to prepare annual financial statements for auditing? **YES / NO**

1.1 If yes, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.

.....

.....

2. If the bidder is not required by law to prepare annual financial statements for auditing, they shall be required to furnish their Annual Financial Statements -

- i. for the past three years , or
- ii. since their establishment if established during the past three years

Do you have any outstanding undisputed commitments for municipal services towards a municipality or any other service provider in respect of which payment is overdue for more than 30 days?

YES / NO

2.1 If no, this serves to certify that the bidder has no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days.

2.2 If yes, provide particulars.

.....

.....

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (49)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

- 3 Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?

YES / NO

3.1 If yes, furnish particulars

.....

- 4 Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic?

YES / NO

4.1 If yes, furnish particulars

.....

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (50)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

JW 14.3

CERTIFICATION

I, THE UNDERSIGNED (NAME)

.....

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

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

FALSE.

.....
 Signature

.....
 Date

.....
 Position

.....
 Name of Bidder

NB: Failure to complete, sign and provide the required supporting documentation will result in elimination of the tender

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (51)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

JW MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

1. This Municipal Bidding Document (MBD) must form part of all bids¹ invited.
2. Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).² Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.
3. Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
 - a. take all reasonable steps to prevent such abuse;
 - b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.
4. This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.
5. In order to give effect to the above, the attached Certificate of Bid Determination (MBD9) must be completed and submitted with the bid:

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

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

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (52)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

JW MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

(Bid Number and Description) in response to the invitation for the bid made by:

(Name of Municipality / Municipal Entity) do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of _____ that:
 (Name of Bidder)

1. I have read, and I understand the contents of this Certificate;
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
 - (a) has been requested to submit a bid in response to this bid invitation;
 - (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder
6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium³ will not be construed as collusive bidding.
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - (a) prices;
 - (b) geographical area where product or service will be rendered (market allocation)
 - (c) methods, factors or formulas used to calculate prices;
 - (d) the intention or decision to submit or not to submit, a bid;
 - (e) the submission of a bid which does not meet the specifications and conditions of the bid; or
 - (f) bidding with the intention not to win the bid.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (53)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

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

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

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

10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No. 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No. 12 of 2004 or any other applicable legislation.

.....
 Signature

.....
 Date

.....
 Position

.....
 Name of Bidder

NB: Failure to complete and sign this form will result in the elimination of the tender

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (54)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.5 Proposed Amendments and Qualifications

The Tenderer should record any deviations or qualifications he may wish to make to the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter to his tender and reference such letter in this schedule.

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

Page	Clause or item	Proposal

Signed Date

Name Position

Tenderer

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (55)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.6 Schedule of Proposed Subcontractors

We notify you that it is our intention to employ the following Subcontractors for work in this 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 confirm that all Subcontractors who are contracted to construct a house are registered as home builders with the National Home Builders Registration Council.

	Name and address of proposed Subcontractor	Nature and extent of work	Previous experience with Sub-contractor.

Signed

Date

Name

Position

Tenderer

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (56)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

2.1.7 Schedule of Plant and Equipment

JW 6.3

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

Qty	Description, size , capacity

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

Qty	Description, size, capacity

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (58)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.9 Contactable reference template 1.

Note : Please see NB at bottom of page.

To Johannesburg Water (SOC) Ltd

I, the undersigned being duly authorized to do so, hereby furnish a reference to Johannesburg Water relative to tender JW..... for

Name of tenderer: _____

Description of goods / service provided _____

Duration / time when the above was provided _____

Approximate value of the goods/ service provided _____

Was their performance satisfactory? Yes / No*

Were the quality / specifications complied with Yes / No*

If No, please furnish details.....

Will you recommend this supplier to anyone without reservations: Yes / No

Rate this supplier out of a possible score of 5 with 5 being excellent and 1 being unacceptable.

Name of authorised person: _____ Signature: _____

Telephone: _____ e-mail _____ date _____

Completed on behalf (name of business)

Official stamp

*NB: This document must be completed in full by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with all the above requirements.. A separate form must be completed for each reference as required in the evaluation criteria. Failure to adhere to this requirement will result in such tender being prejudiced.
 Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.*

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (59)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.9 Contactable reference template 2

Note : Please see NB at bottom of page.

To Johannesburg Water (SOC) Ltd

I, the undersigned being duly authorized to do so, hereby furnish a reference to Johannesburg Water relative to tender JW..... for

Name of tenderer: _____

Description of goods / service provided _____

Duration / time when the above was provided _____

Approximate value of the goods/ service provided _____

Was their performance satisfactory? Yes / No*

Were the quality / specifications complied with Yes / No*

If No, please furnish details.....

Will you recommend this supplier to anyone without reservations: Yes / No

Rate this supplier out of a possible score of 5 with 5 being excellent and 1 being unacceptable.

☐

Name of authorised person: _____ Signature: _____

Telephone: _____ e-mail _____ date _____

Completed on behalf (name of business)

NB: This document must be completed in full by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with all the above requirements.. A separate form must be completed for each reference as required in the evaluation criteria. Failure to adhere to this requirement will result in such tender being prejudiced. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (60)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.9 Contactable reference template 3.

Note : Please see NB at bottom of page.

To Johannesburg Water (SOC) Ltd

I, the undersigned being duly authorized to do so, hereby furnish a reference to Johannesburg Water relative to tender JW..... for

Name of tenderer: _____

Description of goods / service provided _____

Duration / time when the above was provided _____

Approximate value of the goods/ service provided _____

Was their performance satisfactory? Yes / No*

Were the quality / specifications complied with Yes / No*

If No, please furnish details.....

Will you recommend this supplier to anyone without reservations: Yes / No

Rate this supplier out of a possible score of 5 with 5 being excellent and 1 being unacceptable.

Name of authorised person: _____ Signature: _____

Telephone: _____ e-mail _____ date _____

Completed on behalf (name of business)

NB: This document must be completed in full by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with all the above requirements.. A separate form must be completed for each reference as required in the evaluation criteria. Failure to adhere to this requirement will result in such tender being prejudiced. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (61)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.9 Contactable reference template.4

Note : Please see NB at bottom of page.

To Johannesburg Water (SOC) Ltd

I, the undersigned being duly authorized to do so, hereby furnish a reference to Johannesburg Water relative to tender JW..... for

Name of tenderer: _____

Description of goods / service provided _____

Duration / time when the above was provided _____

Approximate value of the goods/ service provided _____

Was their performance satisfactory? Yes / No*

Were the quality / specifications complied with Yes / No*

If No, please furnish details.....

Will you recommend this supplier to anyone without reservations: Yes / No

Rate this supplier out of a possible score of 5 with 5 being excellent and 1 being unacceptable.

☐

Name of authorised person: _____ Signature: _____

Telephone: _____ e-mail _____ date _____

Completed on behalf (name of business)

NB: This document must be completed in full by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with all the above requirements.. A separate form must be completed for each reference as required in the evaluation criteria. Failure to adhere to this requirement will result in such tender being prejudiced. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (62)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.9 Contactable reference template.5

Note : Please see NB at bottom of page.

To Johannesburg Water (SOC) Ltd

I, the undersigned being duly authorized to do so, hereby furnish a reference to Johannesburg Water relative to tender JW..... for

Name of tenderer: _____

Description of goods / service provided _____

Duration / time when the above was provided _____

Approximate value of the goods/ service provided _____

Was their performance satisfactory? Yes / No*

Were the quality / specifications complied with Yes / No*

If No, please furnish details.....

Will you recommend this supplier to anyone without reservations: Yes / No

Rate this supplier out of a possible score of 5 with 5 being excellent and 1 being unacceptable.

Name of authorised person: _____ Signature: _____

Telephone: _____ e-mail _____ date _____

Completed on behalf (name of business)

NB: This document must be completed in full by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with all the above requirements.. A separate form must be completed for each reference as required in the evaluation criteria. Failure to adhere to this requirement will result in such tender being prejudiced. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (63)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.9 Contactable reference template.6

Note : Please see NB at bottom of page.

To Johannesburg Water (SOC) Ltd

I, the undersigned being duly authorized to do so, hereby furnish a reference to Johannesburg Water relative to tender JW..... for

Name of tenderer:

Description of goods / service provided

Duration / time when the above was provided

Approximate value of the goods/ service provided

Was their performance satisfactory? Yes / No*

Were the quality / specifications complied with Yes / No*

If No, please furnish details.....

Will you recommend this supplier to anyone without reservations: Yes / No

Rate this supplier out of a possible score of 5 with 5 being excellent and 1 being unacceptable.

Name of authorised person: Signature:

Telephone: e-mail date

Completed on behalf (name of business)

NB: This document must be completed in full by the referee and included in the tender submission. Alternatively, the client's letterhead may be used for this purpose provided it complies with all the above requirements.. A separate form must be completed for each reference as required in the evaluation criteria. Failure to adhere to this requirement will result in such tender being prejudiced. Information provided will be verified and if found to be false or misrepresented, punitive measures will be instituted against the respective party including blacklisting and restriction from participating in any future government tender.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (64)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.10 Schedule of Key Personnel

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

The Tenderer shall list below the personnel which he intends to utilize on the Works, including key personnel which may have to be brought in from outside if not available locally.

CATEGORY OF EMPLOYEE	NUMBER OF PERSONS					
	KEY PERSONNEL, PART OF THE CONTRACTOR'S ORGANISATION		KEY PERSONNEL TO BE IMPORTED IF NOT AVAILABLE LOCALLY		UNSKILLED PERSONNEL TO BE RECRUITED FROM LOCAL COMMUNITY	
	HDI	NON-HDI	HDI	NON-HDI	HDI	NON-HDI
Site Agent, Project Managers						
Foremen, Quality Control and Safety Personnel						
Technicians, Surveyors, etc						
Artisans and other Skilled workers						
Plant Operators						
Unskilled Workers						
Others:						

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

DATE:

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (65)
Linbro Water Upgrades
CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.1.11 Curriculum Vitae of Key Personnel

Provide separate forms for each position listed in Form: Key Personnel

Contracts Manager

[illegible]**Certification:**

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

.....
Signature of person named in the schedule

.....
Date

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (66)
Linbro Water Upgrades
CIDB grade 7CE or higher

T2.1 Returnable Documents

Civil Site Agent

[illegible]**Certification:**

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

.....
Signature of person named in the schedule

.....
Date

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (67)
Linbro Water Upgrades
CIDB grade 7CE or higher

T2.1 Returnable Documents

Construction Health and Safety Officer

[illegible]**Certification:**

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

.....
Signature of person named in the schedule

.....
Date

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (68)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.2 LIST OF RETURNABLE DOCUMENTS

<u>Document</u>	<u>Page</u>
2. Other documents required only for tender evaluation purposes	
T2.2.1 Certificate of Contractor Registration issued by the Construction Industry Development Board	RD.57
T2.2.2 SARS Tax Compliance Status Pin and Proof of CSD registration ie MA xxxxxxxxxxxx number	RD.58

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (69)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.2.1 Contractor's Certificate of Registration With CIDB

The Tenderer shall attach hereto the Contractor's Certificate of Registration with CIDB. Failure to submit the certificate with the tender document will lead to the conclusion that the Tenderer is not registered with the CIDB and therefore not eligible to tender.

Tenderers who have made application to CIDB for registration and are capable of being so registered prior to the evaluation of submissions must attach a notification from CIDB that their application is being considered.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (70)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.2.2 SARS Tax Compliance Status Pin and Proof of CSD registration

The Tenderer must attach hereto a copy SARS Tax Compliance Status Pin and Proof of CSD registration ie MA xxxxxxxxxxxx number.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (71)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.3 LIST OF RETURNABLE SCHEDULES

<u>Document</u>	<u>Page</u>
3. Returnable Schedules that will be incorporated into the contract	
T2.3.1 Price variation on special materials	RD.60

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (72)
 Linbro Water Upgrades
 CIDB grade 7CE or higher

T2.1 Returnable Documents

T2.3.1 Price Variation on Special Materials

The following Special Materials are subject to price variation, in accordance with Clause 46.3 of the Conditions of Contract, as detailed below:

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

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (73)
 Linbro Water Upgrades
 CIDB grade 7CE or higher
Tendering Procedures

T2.4 Returnable Documents and Schedules

T2.4 LIST OF RETURNABLE SCHEDULES

<u>Document</u>	<u>Page</u>
4. Other documents that will be incorporated into the contract	
T2.4.1 Addenda to the tender documents	RD.62
T2.4.2 Minutes of the pre-tender virtual clarification meeting	RD.63
T2.4.3 Acknowledgement of JW Volume 2 OHS Specs	RD.64
T2.4.4 Acknowledgement of Tender Drawings	RD.65

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (74)
 Linbro Water Upgrades
 CIDB grade 7CE or higher
Tendering Procedures

T2.4 Returnable Documents and Schedules

T2.4.1 Addenda to the Tender Documents

Copies of all Addenda to the tender documents which have been issued by the Employer will be inserted here by the Employer.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (75)
 Linbro Water Upgrades
 CIDB grade 7CE or higher
Tendering Procedures

T2.4 Returnable Documents and Schedules

T2.4.2 Minutes of the Pre-Tender Clarification Meeting and Site Inspection

Minutes of the pre-tender virtual clarification meeting

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (76)
 Linbro Water Upgrades
 CIDB grade 7CE or higher
Tendering Procedures

T2.4 Returnable Documents and Schedules

T2.4.3 Acknowledgement of JW Volume 2 OHS Specs

Complete the “Acknowledgement of JW Volume 2 OHS Specification” included in Volume Three, OHS Specifications and Environmental Management Plan.

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (77)
 Linbro Water Upgrades
 CIDB grade 7CE or higher
Tendering Procedures

T2.4 Returnable Documents and Schedules

T2.4.4 +Acknowledgement of Tender Drawings

DECLARATION BY TENDERER

I, the undersigned, and representing the tenderer as indicated hereby acknowledge that I have obtained copies of the following listed documentation and confirm that I fully understand the contents thereof and confirm compliance thereto in the event of being successful:

The drawings that are issued for **TENDER PURPOSES** are those noted below:

DRAWING NUMBER	DESCRIPTION
JW14301-DET01-W01	LIST OF DRAWINGS
JW14301-DET02-W01	LOCALITY PLAN - BENDING SCHEDULE
JW14301-DET03-W01	LAYOUT PLAN
JW14301-DET04-W01	LPARC LAYOUT PLAN
JW14301-DET05-W01	GUARD HOUSE
JW14301-DET06-W01	TYPICAL THRUST BLOCKS DETAILS
JW14301-DET07-W01	ROAD CROSSING BY PIPE JACKING: SECTION 1 SCHEDULE
JW14301-DET08-W01	STEEL PIPE TAPERS AND BENDS
JW14301-DET09-W01	STEEL PIPE PROTECTIVE COATING, PIPE JOINTING FOR PLAIN AND BELL ENDED
JW14301-DET10-W01	STANDARD DETAILS FOR TRENCH EXCAVATION AND BACKFILL FOR STEEL PIPES > 400mm ND
JW14301-DET11-W01	AIR VALVE CHAMBER ON 1100mm ND PIPE
JW14301-DET12-W01	AIR VALVE CHAMBER PADLOCK PIN DETAILS
JW14301-DET13-W01	TYPICAL SCOUR VALVE CHAMBER FOR PIPES > 400mm ND
JW14301-DET14-W01	AIR VALVE CHAMBER ON 1000mm ND PIPE
JW14301-DET15-W01	ISOLATION VALVE CHAMBER AND INCLUDING OFF TAKE
JW14301-DET16-W01	ISOLATION VALVE CHAMBER COVER SLAB
JW14301-DET17-W01	PRESSURE REDUCING AND RESERVOIR CONTROL VALVE CONFIGURATION
JW14301-DET18-W01	PRESSURE REDUCING AND FLOW METER PIPE SCHEDULE
JW14301-DET19-W01	RESERVOIR CONTROL VALVE PIPE SCHEDULE
JW14301-DET20-W01	RES 1 RESERVOIR INLET ARRANGEMENTS
JW14301-DET21-W01	RES 2 RESERVOIR INLET ARRANGEMENTS
JW14301-DET22-W01	NODE AND JUNCTION DETAILS
JW14301-DET23-W01	PIPE MARKERS
JW14301-DET24-W01	NAME BOARD
JW14301-DET25-W01	LONG SECTION SECTION 1
JW14301-DET26-W01	LONG SECTION SECTION 2 TO SECTION 4b

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (78)
 Linbro Water Upgrades
 CIDB grade 7CE or higher
Tendering Procedures

T2.4 Returnable Documents and Schedules

DRAWING NUMBER	DESCRIPTION
JW14301-DET27-W01	STEEL STAIRCASE LAYOUT
JW14301-DET28-W01	NAME BOARD HOLDER
JW14301-DET29-W01	CATHODIC PROTECTION INSULATING JOINT
JW14301-DET30-W01	REINFORCEMENT DETAILS - TYPICAL SCOUR VALVE CHAMBER FOR PIPE >400 ND
JW14301-DET30A-W01	REINFORCEMENT DETAILS - TYPICAL SCOUR VALVE CHAMBER FOR PIPE >400 ND
JW14301-DET31-W01	REINFORCEMENT DETAILS - ISOLATION VALVE CHAMBER
JW14301-DET31A-W01	REINFORCEMENT DETAILS - ISOLATION VALVE CHAMBER - BENDING SCHEDULE
JW14301-DET32-W01	REINFORCEMENT DETAILS - PRESSURE REDUCING BUILDING
JW14301-DET32A-W01	REINFORCEMENT DETAILS - PRESSURE REDUCING BUILDING - BENDING
JW14301-DET33-W01	REINFORCEMENT DETAILS - PRESSURE REDUCING BUILDING
JW14301-DET33A-W01	REINFORCEMENT DETAILS - PRESSURE REDUCING BUILDING – BENDING JOINTS AND MAKING GOOD OF JOINTS SCHEDULE
JW14301-DET34-W01	REINFORCEMENT DETAILS - FLOW METER CHAMBER
JW14301-DET34A-W01	REINFORCEMENT DETAILS - FLOW METER CHAMBER - BENDING SCHEDULE
JW14301-DET35-W01	REINFORCEMENT DETAILS - RESERVOIR CONTROL VALVE BUILDING
JW14301-DET35A-W01	REINFORCEMENT DETAILS - RESERVOIR CONTROL VALVE BUILDING - BENDING SCHEDULE
JW14301-DET36-W01	REINFORCEMENT DETAILS - RESERVOIR CONTROL VALVE BUILDING
JW14301-DET36A-W01	REINFORCEMENT DETAILS - RESERVOIR CONTROL VALVE BUILDING

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301
 Linbro Water Upgrades
 Part 1 Agreement and Contract Data

Johannesburg Water SOC Ltd



VOLUME 1

PART 1: AGREEMENT AND CONTRACT DATA

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	<i>T1</i>	T2	C1	C2	C3	C4



Contract JW14301
Linbro Water Upgrades
Part 1 Agreement and Contract Data

1	TABLE OF CONTENTS	PAGE (S)
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9		

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301
 Linbro Water Upgrades
 Part 1 Agreement and Contract Data

C1.1 FORM OF OFFER (ACCEPTANCE & AGREEMENT)

C1.1.1 Form of Offer

The contractor is to complete and sign the form of offer

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

JW14301: LINBRO WATER UPGRADES

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

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

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

_____ Rand (in words); R _____ (in figures),

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

Signature(s)

Name(s)

Capacity

For the Contractor

 (Name and address of organisation)

Name and signature of witness

_____ Date _____

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301
Linbro Water Upgrades
Part 1 Agreement and Contract Data

C1.1.2 Form of Acceptance

The Employer is to complete and sign the form of acceptance

By signing this part of the Form of Offer and Acceptance, the Employer identified below accepts the Contractor'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 Contractor's Offer shall form an agreement between the Employer and the Contractor upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the contract are contained in

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

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

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

The Contractor shall within twenty-eight **(28) days** 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 Contact Data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the Conditions of Contract identified in the Contract Data at, or just after, the date of this Agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Contractor receives one fully completed copy of this document, including the Schedule of Deviations (if any). Unless the Contractor (now the Contractor) within five days after 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 binding contract between the parties,

FOR EMPLOYER OFFICIAL USE ONLY

Name(s) _____
Capacity _____

For the Employer *Johannesburg Water SOC Ltd, Turbine Hall, 65 Ntemi Piliso street, Newtown, Johannesburg*
(Name and address of organisation)

**Name and signature
of witness**

Date _____

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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C1.1.3 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 Contractor'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; and
4. Any change or addition to the tender documents arising from the above arrangements and recorded here shall also be incorporated into the final draft of the Contract.

1 Subject

Details

2 Subject

Details

3 Subject

Details

4 Subject

Details

5 Subject

Details

6 Subject

Details

7 Subject

Details

8 Subject

Details

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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By the duly authorised representatives signing this Schedule of Deviations, the Employer and the Contractor agree to and accept the foregoing Schedule of deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or change to the terms of the offer agreed by the Contractor and the Employer during the 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 Contractor of a completed and signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this Agreement.

For the Contractor:
Signature(s)

Name(s)

Capacity

(Name and address of organisation)

**Name and
signature of
witness**

Date

For the Employer:
Signature(s)

Name(s)

Capacity

***Johannesburg Water SOC Ltd, Turbine Hall, 65 Ntemi Piliso street, Newtown,
Johannesburg***

(Name and address of organisation)

**Name and
signature of
witness**

Date

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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C1.2 CONTRACT DATA

C1.2.1 Part 1: Data provided by the Employer

CONDITIONS OF CONTRACT

The General Conditions of Contract for Construction Works (2015), published by the South African Institution of Civil Engineering, is applicable to this Contract.

C1.2.1.1 Contract Specific Data

The following contract specific data are applicable to this Contract:

GCC Clause	Information
1.1.1.13	The Defects Liability Period is 52 weeks from the date of the Certificate of Completion.
1.1.1.14	The Work shall be completed within 9 months.
1.1.1.15	The name of the Employer is Johannesburg Water (SOC) Limited Contact person is: Enoc Mudau
1.1.1.16	The name of the Engineer is Mariswe (Pty) Ltd. The Contact Person: Mr. K Govender
1.1.1.26	The Pricing Strategy is Re-measurement Contract.
1.2.1.2	The address of the Employer is: Physical Postal Tel: 011 688 6573 Turbine Hall,65 P.O. Box 61542 Fax: 011 688 1521 Ntemi Piliso street, Newtown Email:nqobizitha.ndimande@jwater.co.za
1.2.1.2	The address of the Engineer is: Physical: Postal: Tel : 012 424 9700 Block 1, Suite 201 PO Box 25549 Fax : 086 539 2485 Monument Office Monument Park Email : kubeng@mariswe.com Park 0105 79 Steenbok Ave Monument Park
3.2.3	Specific Approval – The Employer's Agent is required to obtain the Employer's approval for the following: • Approval of Variation Orders • Approval to exceed the Contract Sum
5.3.1	The documentation required before commencement with Works execution are: • Approved Health and Safety File (Clause 4.3) • Approval of the Environmental File • Initial programme (Clause 5.6) • Guarantee from Bank or Insurance Company (Clause 6.2) • Insurance of Construction Machinery Plant (Clause 8.6) • Insurance of Motor Vehicle Liability (Clause 8.6) • Commissioner of COID (Clause 8.6) • Signed Notification to the Department of Labour • Construction Permit were applicable
5.3.2	The Contractor shall deliver his programme of work 21 days before the Commencement Date.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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GCC Clause	Information
5.3.3	Time to instruct commencement of the Works Delete Clause 5.3.3 and replace with the following: The Contractor shall commence with carrying out the Works upon written instruction from the Employer's Agent to commence with the Works.
5.8	The special non-working days are All Public Holidays in terms of the Public Holidays Act as amended. Working days shall be Monday to Friday, between 07h00 to 17h00.
5.8.1	The year-end break "builder's break" commences on 16 December until the first working Monday of January of the succeeding year as defined by the SAFCEC on annual basis.
5.13.1	The penalty for failing to complete the Works is the greater of: An amount equal to daily Time Related P&G rate (as calculated from the Time Related P&G section in the Bill of Quantities) or R6500.00 per day, whichever is greater.
5.16.3	The latent defects period is 10 years.
6.2	The time to deliver the Form of Guarantee is within 21 days from the Commencement Date.
6.2.1	The liability of the guarantee shall be 10% of the tendered sum
6.8.2	This contract is subject to Contract Price Adjustment. The value of payment certificates will be adjusted by a Contract Price Adjustment Factor, the value of each payment certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule, with the following values: The value of "x" is 0,10 The values of the coefficients are: a = 0,32 Labour b = 0,25 Contractor's equipment c = 0,33 Material d = 0,10 Fuel The province where in the Site is located is Gauteng. The base month is the month prior to the closing of the tender. The Consumer Price Indices for Labour (L), Plant (P), Material (M) and Fuel (F) are as published by Statistics South Africa for the applicable time.
6.8.3	Price adjustments for variations in the costs of special materials are NOT allowed.
6.10.1.5	The percentage advance on materials not yet built into the Permanent Works is 80%.
6.10.3	The percentage retention on the amounts due to the Contractor is 10%.
6..10.4	Delivery, dissatisfaction with and payment of payment certificates Delete Clause 6.10.4 and replace with the following: Payment shall be made upon: • The Contractor providing a payment certificate with all required supporting documents to the Employer's Agent on dates to be communicated to the Contractor upon award. • The payment certificate being submitted with an original tax invoice. • A statement being submitted on the last day of the month.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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GCC Clause	Information		
	Payment will be made within 30 days of receipt of the supplier’s statement.		
6.10.5	Payment of Retention Money Add to Clause 6.10.5 the following: Payment will be subject to Johannesburg Water processes as outlined on clause 6.10.4 as amended.		
6.10.6	A Retention Money Guarantee is not permitted.		
6.11	Delete Clause 6.11.		
8.4.1.1	Add to the end of Clause 8.4.1.1 the following text: “hereby indemnifies the Employer against any liability in respect of damage or physical loss of property of any person or injury or death of any person due to non-compliance with the Occupational Health and Safety Act (Act 85 of 1993).		
8.6	Delete Clause 8.6.1 and replace it with the following: Notwithstanding anything elsewhere contained in the Contract and without limiting the obligations, liabilities or responsibilities of the Contractor in any way whatsoever (including but not limited to any requirement for the provision by the Contractor of any other insurances) the Employer shall effect and maintain as appropriate in the joint names of the Employer and the Contractor and where relevant Sub-Contractors the following insurances which are subject to the terms, limits, exceptions and conditions of the Policy :		
8.6.1.1	Contract Works Insurance – which will provide cover against accidental and Physical loss of or damage to the Works, Temporary Works and Materials intended for incorporation in the Works from whatsoever cause arising other than causes set out in Clause 8.3.1for which the Contractor is responsible for the Works in terms of Clause 8.2.1, and for a sum insured which shall, unless otherwise specified in the Contract, be the aggregate of :		
8.6.1.1.1	The Contract Price,		
8.6.1.1.2	a sum to cover the value (specified at the time of delivery to the Contractor) of materials supplied by the Employer for incorporation in the Works and not included in the Contract Price, and		
8.6.1.1.3	a sum to cover professional fees, not included in the Contract Price, payable in respect of the repair or reinstatement of damage to the Works.		
8.6.1.2	Delete clause 8.6.1.2 and replace with the following: Following the introduction of legislation affecting the articles of the South African Special Risks Insurance Association (SASRIA) , insurance cover for loss or damage to the Works caused by any event defined as a risk in terms of the insurance offered by SASRIA, will be provided under a certificate issued by SASRIA.		
8.6.1.3	Delete clause 8.6.1.3 and replace with the following: Public Liability Insurance which will provide indemnity against legal liability in the event of accidental death of or injury to third party persons and/or loss 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 R5million in respect of all claims arising from any one occurrence or series of occurrences consequent on or attributable to one source or original cause.		
Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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GCC Clause	Information
8.6.1.6	Add the following clause to 8.6.1 Full details of the Contract Works and Public Liability insurances effected by the Employer may be obtained from the Employer and the Contractor/Sub-Contractors are deemed to be aware of the terms, exclusions and conditions of these insurances.
8.6.1.7	Add the following clause to 8.6.1 The Employer shall pay the premium in connection with the insurances effected by the Employer in 8.6.1.1, 8.6.1.2 and 8.6.1.3 above.
8.6.2	Delete clause 8.6.2 and replace with the following: The Employer/Contractor/Sub-Contractors and/or any other party who obtains indemnity under the policies effected under 8.6.1.1, 8.6.1.2 and 8.6.1.3 above shall become liable for the deductibles (first amount payable) which are applicable in respect of each and every occurrence or series of occurrences attributable to one source or cause giving rise to loss or damage or indemnifiable liability.
8.6.3	Delete clause 8.6.3 and replace with the following: In the event of an occurrence which is likely to give rise to a claim under the insurance effected by the Employer, the following procedure shall be adhered to:
8.6.3.1	Add the following clause to 8.6.3 In addition to any statutory requirements and/or other requirements contained in the Conditions of Contract, the Contractor shall immediately notify the Employer's Insurance Brokers through the Employer's agent, giving the circumstances, nature and an estimate of the loss or damage.
8.6.3.2	Add the following clause to 8.6.3 The Contractor shall, when required, complete a claims advice form, available from the Employer's Insurance Brokers, to whom the form shall be returned without delay through the Employer's agent. Each claim must be approved by the Employer before submission to the insurance broker.
8.6.3.3	Add the following clause to 8.6.3 The Contractor shall afford all access to the representatives of the Insurers for the purpose of the assessment of any loss or damage.
8.6.3.4	Add the following clause to 8.6.3 Negotiations on the settlement of claims shall be conducted by the Contractor/Sub-Contractor with the Insurers through the Employer's Insurance Brokers via Employer's agent.
8.6.4	Delete clause 8.6.4 and replace with the following: Any amount which becomes payable to the Contractor or any of his Sub-Contractors as a result of claim under the Contract Works Insurance shall if required by the Employer be paid net of the deductible to the Employer who shall pay the Contractor from the proceeds of such payment upon rectification repair or reinstatement of the loss or damage but this provision shall not in any way affect the Contractor's obligations liabilities or responsibilities in terms of the Contract.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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GCC Clause	Information
8.6.5	Delete clause 8.6.5 and replace with the following: The Contractor shall insure all Constructional Machinery and Plant (including tools, offices and other temporary structures and content) and other items, other than those intended for incorporation into the works, owned, leased or hired brought on to the Site against all risks of physical loss or damage for the period such Plant shall be on the Site to the full value thereof. In respect of Plant brought on to the Site by or on behalf of Sub-Contractors the Contractor shall be deemed to have complied with the provisions of this Sub-Clause by ensuring that such Sub-Contractors have similarly insured such Plant and Machinery. Such insurance shall be effected with an Insurer and in terms approved by the Employer (which approval shall not be unreasonably withheld) and the Contractor shall, when required, submit to the Employer's Insurance Brokers, through the Employer's agent, the policy or policies of insurance and receipts for payment of the current premiums.
8.6.6	Delete clause 8.6.6 and replace with the following: The Contractor and the Sub-Contractors shall effect and maintain at their cost insurance under the provision of the Compensation for Occupational Injuries and Diseases Act (COID), 1993 (Act No. 130 of 1993).
8.6.7	Delete clause 8.6.7 and replace with the following: The Contractor and the Sub-Contractors shall effect and maintain at their own cost motor vehicle liability insurance with at least indemnification for "balance of third party" risks, including passenger liability with a limit of indemnity of not less than R2,5million.
8.6.8	Add the following clause to 8.6 The Contractor and the Sub-Contractors shall effect and maintain at their own cost any additional insurance, which they deem necessary to cover damage or loss or injury not insured in terms of the insurance effected by the Employer. Such insurance shall be effected with an Insurer and in terms approved by the Employer (which approval shall not be unreasonably withheld) and the Contractor shall, when required, submit to the Employer's Insurance Brokers through the Employer's agent, the policy or policies of insurance and the receipts for payment of the current premiums. If the Contract entails manufacture and or assembly of the Works or part thereof on a site other than the Contract site, the Contractor must satisfy the Employer that all materials and equipment intended for incorporation into the Works are adequately insured during manufacture and assembly. If the Employer has an insurable interest in such works during manufacture or assembly, such interest shall be recorded by way of endorsement on the policies concerned. The Contractor shall furnish the appropriate insurance policies to the Employer within 21 days from the Commencement Date.
8.6.9	Add the following clause to 8.6 Submission of the Tender will be construed by the Employer as acceptance by the Contractor that he is satisfied with the insurance effected by the Employer supplemented by any additional insurance which he shall specify in the manner provided for in the Schedule of Rates.
8.6.10	Add the following clause to 8.6 The Contractor shall give all notices and observe all conditions and requirements imposed by any and all relevant insurance policies which shall be read as being part of the General Conditions of Contract and which shall be binding on the Contractor.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301
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Part 1 Agreement and Contract Data

GCC Clause	Information
8.6.11	Add the following clause to 8.6 In addition to any statutory obligations, or other requirements contained in the Conditions of Contract, the Contractor shall report in writing to both the Employer's Agent and the Employer's Insurance Brokers every accident within 48 hours of its occurrence, whether such accident is in respect of damage to persons or property. The report shall contain full details of the accident. The Employer's Agent and/or the Employer's Insurers shall have the right to make all and any enquiries either on the Site or elsewhere as to the cause and results of any such accident and the Contractor shall give the Engineer and/or the Employer's Insurers full facilities for carrying out such enquiries.
8.6.12	Add the following clause to 8.6 Negotiations on the settlement of claims under the insurance effected by the Employer shall be conducted by the Contractor/Sub-Contractor with the Insurers through the Employer's Insurance Brokers via the Employer's Agent.
8.6.13	Add the following clause to 8.6 Any claims against the insurance effected by the Employer shall be subject to the Contractor being responsible for the payment of the amount stated in the Policy as being the Deductible (First Amount Payable) as defined in the Policy.
8.6.14	Add the following clause to 8.6 The Employer shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employ of the Contractor or any Sub-Contractor save and except an accident or injury resulting from any act or default of the Employer, its agents or servants and the Contractor shall be deemed to have indemnified and shall keep indemnified the Employer against all such damages and compensation (save and except as aforesaid) and against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.
8.6.15	Add the following clause to 8.6 The Contractor shall insure in the joint names of the Employer, the Contractor and all Sub-Contractors (whether nominated or otherwise) for an amount of R2million per occurrence against the liability stated in Sub-Clause 8.6.6 with an Insurer approved by the Employer (which approval shall not be unreasonably withheld) and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall submit to the Engineer such policy of insurance and the receipt of payment of the current premium. Provided always that in respect of any persons employed by any Sub-Contractor, the Contractor's obligation to insure as aforesaid under this Sub-Clause shall be satisfied if the Sub-Contractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy of insurance but the Contractor shall require such Sub-Contractor to produce to the Employer's Agent such policy and the receipt for payment of the current premium.
8.6.16	Add the following clause to 8.6 If the Contractor shall fail to effect and keep in force the insurances referred to in this Clause or for any other insurance which he may be required to effect in terms of the

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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GCC Clause	Information
	Contract, then and in any such case the Employer may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Employer as aforesaid from any monies due or which may become due to the Contractor or recover the same as a debt due from the Contractor.
8.6.17	Add the following clause to 8.6 The Contractor shall ensure that all proposed and appointed Sub-Contractors are fully aware of the contents of Clause 8.6.1
8.6.1.1.2	The value of the materials supplied by the Employer to be included in the insurance sum is nil.
10.4.2	Dispute resolution shall be by arbitration if amicable settlement has failed.
10.5.3	The adjudication board shall consist of one member.
7.8.2	Cost of making good of defects Amend Clause 7.8.2.1 as follows: In the first line, correct the spelling of 'therefore'.

C1.2.1.2 Additions

The additional Conditions of Contract are:

C1.2.1.2.1 Penalties

In addition to GCC clause 5.13, during the Contract Period should the Contractor:

a) Fail to report

- The Employer shall levy a penalty on Contractor, should the latter fail to provide reporting as required in the specification highlighted in the Scope of Work in PS 3.2, PS 6.7 and PS 6.9, with regard to content and frequency, whilst as per the Pricing Data section no payment for work completed shall be processed.
- The penalty value shall be R15,000.00 per report per occasion; and
- If the Contractor fails to complete the latter more than three incidents and should the Employer or his duly authorised representative find that the Contractor is hindering his (the Employer's) deliverables to senior management, he shall reserve the right to:
 - i. perform the Works internally or through another Contractor; and
 - ii. deduct additional costs incurred by the Employer from monies owed to the Contractor or from the Contractor's Guarantee. Additional costs incurred by the Employer shall include all claims from Contract affected parties, claims such as but not be limited to claims from customers, any costs associated with the loss of water, and all costs associated with the procurement of an alternative Contractor.
 - iii. terminate the Contract;

No liability in terms of this clause shall be attached to the Contractor if he can prove to the

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



satisfaction of the Employer that the nature of the failure is due to fire, war, riot, strikes, act of God, lockout, accident or other unforeseen occurrences or circumstances beyond the Contractor's control, provided, however, that in all cases the Contractor has notified the Employer in writing within 24 hours of it first coming to his notice, that delivery shall be delayed or become impossible for the above-mentioned reasons.

b) Fail to pay any labour or SMME

- The Employer shall levy a penalty on Contractor, should the latter fail to provide payment to the any labourer or SMME as required in the specification highlighted in the Scope of Work and specified in the appointment agreements with the Contractor and the labourer or SMME.
- The penalty value shall be R 50,000.00 per report per occasion; and
- If the Contractor fails to complete the latter more than three incidents and should the Employer or his duly authorised representative find that the Contractor is hindering his (the Employer's) deliverables to senior management, he shall reserve the right to:
 - i) perform the Works internally or through another Contractor; and
 - ii) deduct additional costs incurred by the Employer from monies owed to the Contractor or from the Contractor's Guarantee. Additional costs incurred by the Employer shall include all claims from Contract affected parties, claims such as but not be limited to claims from customers, any costs associated with the loss of water, and all costs associated with the procurement of an alternative Contractor.
 - iii) terminate the Contract;

No liability in terms of this clause shall be attached to the Contractor if he can prove to the satisfaction of the Employer that the nature of the failure is due to fire, war, riot, strikes, act of God, lockout, accident or other unforeseen occurrences or circumstances beyond the Contractor's control, provided, however, that in all cases the Contractor has notified the Employer in writing within 24 hours of it first coming to his notice, that delivery shall be delayed or become impossible for the above-mentioned reasons

c) Penalties irreversible

If the Contractor fails to achieve the monetary value of the target set by the Employer for contract participation by local SMME Contractors in terms of for Procurement and Particular Specifications in Scope of Works clause PS3.2.3, the Contractor shall be liable to the Employer for a sum calculated in accordance with the Contract Data and the aforementioned Scope of Works as a penalty for such underachievement."

The penalty for failing to achieve the monetary value of the target set by the Employer for contract participation by Targeted Enterprises and local SMME Contractors in terms of Small Contractor Development of Particular Specifications in PS3: Scope of Works, is 50% of the monetary value by which the achieved monetary value falls short of the target monetary value.

d) Penalties irreversible

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



The Contractor shall note that all penalties once imposed shall be non-recoverable or reversible, even if the default is remedied.

C1.2.1.2.2 Source of instructions

The Contractor shall neither seek nor accept instructions from any authority external to the Employer's Agent in connection with the performance of his services under this Contract. The Contractor shall refrain from any action which may adversely affect the Employer and shall fulfill his commitments with fullest regard for the interest of the Employer. The Contractor may only take and comply with Employers Health and Safety representative or Environmental representative on matters regarding Health & Safety, as well as Environmental.

C1.2.1.2.3 Officials not to benefit

The Contractor warrants that no official of the Employer has been or shall be admitted by the Contractor to any direct or indirect benefit arising from this Contract or the award thereof. The Contractor agrees that breach of this provision is a breach of the Contract.

C1.2.1.2.4 Prevention of corruption

The Employer shall be entitled to cancel the Contract and to recover from the Contractor the amount of any loss resulting from such cancellation, if the Contractor has offered or given any person any gift or consideration of any kind as an inducement or reward for doing or intending to do any action in relation to the obtaining or the execution of the Contract or any other contract with the Employer or for showing or intending to show favor or disfavor to any person in relation to the Contract or any other contract with the Employer, if the like acts shall have been done by any persons employed by him or acting on his behalf whether with or without the knowledge of the Contractor in relation to this or any other Contract with the Employer.

C1.2.1.2.5 Confidential nature of documents

All maps, drawings, photographs, mosaics, plans, reports, recommendations, estimates, documents and all other data compiled by or received by the Contractor under the Contract shall be the property of the Employer, shall be treated as confidential and shall be delivered only to the Employer's Agent or his duly authorized representative on completion of the Works; their contents shall not be made known by the Contractor to any person other than the personnel of the Contractor performing services under this Contract without the prior written consent of the Employer.

C1.2.1.2.6 Returns of labour, SMME, plant, equipment and material

The Contractor shall provide a return in detail in the form and at such intervals as the Employer's Agent or his duly authorized representative may prescribe showing the supervisory staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting constructional plant, equipment and material as the Employer's Agent or his duly authorized representative may require. Contractor to report on SMME's as per requirements of JW6.1-

C1.2.1.2.7 Materials and workmanship

All materials and workmanship shall be of the respective kinds described in the Contract and in accordance with the Employer's Agent's instructions and shall be subjected from time to time to such tests as the Employer's Agent may direct at the place of manufacture or fabrication, or on

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



the Site or at all or any of such places. The Contractor shall provide such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any materials used and shall supply samples of materials before incorporation in the Works for testing as may be selected and required by the Employer's Agent. All testing equipment and instruments provided by the Contractor shall be used only by the Employer's Agent or by the Contractor in accordance with the instructions of the Employer's Agent.

- a) No material not conforming with the Specifications in the Contract shall be used for the Works without prior written approval of the Employer and instruction of the Employer's Agent, provided always that if the use of such material results or may result in increasing the Contract Price, the procedure in GCC clause 6.3 (Variations) shall apply.

C1.2.1.2.8 Examination of the work before covering up

No work shall be covered up or put out of view without the approval of the Employer's Agent or his duly authorize representative and the Contractor shall afford full opportunity for the Employer's Agent or his duly authorize representative to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the Employer's Agent whenever any such work or foundations is or are ready or about to be ready for examination. The Employer's Agent or his duly authorized representative shall without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or of examining such foundations.

C1.2.1.2.9 Employer's Agent's power to order removal of improper work and materials

The Employer's Agent or his duly authorized representative shall during the progress of the Works have power to order in writing from time to time, and the Contractor shall execute at his cost and expense, the following operations the:

- a) removal from the Site within such time or times as may be specified in the order of any materials which in the opinion of the Employer's Agent are not in accordance with the Contract;
- b) substitution of proper and suitable materials; and
- c) removal and proper re-execution (notwithstanding any previous test thereof or interim payment therefore) of any work which in respect of materials or workmanship is not in the opinion of the Employer's Agent or his duly authorized representative in accordance with the Contract.

C1.2.1.2.10 Default of Contractor in carrying out Employer's Agent's or his duly authorized representative's Instructions

In case of default on the part of the Contractor in carrying out an instruction of the Employer's Agent or his duly authorized representative, the Employer shall be entitled to employ and pay other persons to carry out the same, and all expenses consequent thereon or incidental thereto shall be borne by the Contractor and shall be recoverable from him by the Employer and may be deducted by the Employer from any monies due or which may become due to the Contractor.

C1.2.1.2.11 Date falling on public holiday or weekend

Where under the terms of the Contract any act is to be done or any period is to expire upon a certain day and that day or that period fall on a day of rest or recognized holiday or weekend, the

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
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Linbro Water Upgrades
Part 1 Agreement and Contract Data

Contract shall have effect as if the act were to be done or the period to expire upon the working day following such day.

C1.2.1.2.12 Ambiguities and inconsistencies

The Employer or the Contractor shall notify the other as soon as either becomes aware of an ambiguity or inconsistency in or between the documents, which are part of this Contract. Governed by the spirit and intention of the Contract, the Employer shall give a binding instruction resolving the ambiguity or inconsistency.

C1.2.1.2.13 False claims by the Contractor

- a) Failure, by the Contractor, to demonstrate or present any feature declared during the procurement stage shall constitute grounds for Contract termination or the market related equivalent price discount, if no market related value is available, the Employer shall give a final ruling on the amount. This shall be at the discretion of the Employer based on the implication of such omission. Should the Contractor refuse to accept the Employer's price, the Contract shall be terminated.
- b) Any false claims by the Contractor or his staff (with or without his knowledge), based on Works to be performed or completed per site stage shall constitute grounds for Contract termination and result in blacklisting on the Employer's database.

The Contractor shall note that any of the above shall constitute non-performance on the part of the Contractor, further resulting in him forfeiting his full Contract Guarantee.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
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Linbro water Upgrades

Part 1: Forms and Securities

Johannesburg Water SOC Ltd



VOLUME 1

PART 1: FORMS AND SECURITIES

Employer:		Contractor:	
Witness:		Witness:	

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Employer:		Contractor:	
Witness:		Witness:	

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C1.3 FORMS AND SECURITIES

Forms for completion by the Contractor

The following forms are to be completed by the Contractor after the tender has been awarded to the successful Contractor

- a) Form of Guarantee
- b) Blasting Indemnity
- c) Agreement in terms of the Occupational Health and Safety Act
- d) Occupational Health And Safety Indemnity Undertaking

The forms will be completed by the Contractor who will be instructed to do so in the Form of Acceptance. The completed forms will become part of the Contract.

The Form of Guarantee is a pro forma document. The Contractor will provide an original document, from a financial institution, with the same text within the time stated in the Contract Data. Only a Bank or approved Insurance Company or Guarantee Corporation is acceptable as Guarantor.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Part 1: Forms and Securities

C.1.3.1 Form of Guarantee

TO BE PRINTED ON THE OFFICIAL LETTERHEAD OF THE GUARANTOR.

PERFORMANCE GUARANTEE

WHEREAS Johannesburg Water SOC Ltd (hereinafter referred to as “the Employer” or “beneficiary”) entered into a Contract with

_____ (hereinafter called “the Contractor”)

on the ____ day of _____ 20 ____ for the construction of

_____ at _____

AND WHEREAS it is provided by such Contract that the Contractor shall provide the Employer with security by way of a guarantee for the due and faithful fulfilment of such Contract by the Contractor;

AND WHEREAS _____ has/have at the request of the Contractor, agreed to such guarantee;

NOW THEREFORE WE, _____ Do hereby guarantee and bind ourselves jointly and severally as Guarantor and Co-principal Debtors to the Employer under renunciation of the benefits of division and excussion for the due and faithful performance by the Contractor of all the terms and conditions of the said Contract, subject to the following conditions:

1. The Employer shall, without reference and/or notice to us, have complete liberty of action to act in any manner authorised and/or contemplated by the terms of the said Contract, and/or to agree to any modifications, variations, alterations, directions or extensions of the Completion Date of the Works under the said Contract, and that its rights under this guarantee shall in no way be prejudiced nor our liability hereunder be affected by reason of any steps which the Employer may take under such Contract, or of any modification, variation, alteration of the Completion Date which the Employer may make, give, concede or agree to under the said Contract.
2. This guarantee shall be limited to the payment of a sum of money.
3. The Employer shall be entitled, without reference to us, to release any guarantee held by it, and to give time to or compound or make any other arrangement with the Contractor.
4. This guarantee shall remain in force and effect until the issue of the Certificate of Completion in terms of the Contract, unless we are advised in writing by the Employer before the issue of the said Certificate of his intention to institute claims, and the particulars thereof, in which event this guarantee shall remain in full force and effect until all such claims have been paid or liquidated.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Part 1: Forms and Securities

Our total liability hereunder shall not exceed the sum of _____

_____ (R _____)

5. The guarantor reserves the right to withdraw from this guarantee by depositing the Guaranteed Sum with the beneficiary, whereupon the Guarantor's liability hereunder shall cease.

6. We hereby choose our address for the serving of all notices for all purposes arising here from as _____

IN WITNESS WHEREOF this guarantee has been executed by us at _____

on the _____ day of _20

:

Duly authorised to sign on behalf of _____

As Witnesses:

1:

2:

1

Date : _____

Address : _____

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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Linbro Water Upgrades

Part 1: Forms and Securities

C.1.3.2 Blasting Indemnity

Given by _____

*Company Registration No. _____

Address _____

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Part 1: Forms and Securities

C.1.3.3 Health and Safety Contract Between Employer and Contractor In Terms of Section 37(2) Of The Occupational Health and Safety Act No 85 Of 1993

Written agreement between Johannesburg Water ((SOC) Limited(hereinafter referred to as “the

Employer) and _____ (hereinafter referred to as “the mandatory”) as envisaged by Section 37(2) of the Occupational Health and Safety Act, No. 85, of 1993 as amended.

I _____ representing

_____ (mandatory) do hereby acknowledge that

_____ (mandatory) is an employer in its own right and shall be regarded as the employer for purposes of the contract work specified in the body of the principal agreement with duties as prescribed in the Occupational Health and Safety Act, No. 85 of 1993 as amended so as to ensure that all work will be performed or machinery and plant used in accordance with the provisions of the said Act. I furthermore agree to comply with the requirements of the Employer as contained in the Occupational Health and Safety Specification included with the principal agreement and to liaise with the employer should I, for whatever reason, be unable to perform in terms of this agreement.

Signed this _____ day of _____ at _____

Signature on behalf of mandatory _____

Signature on behalf of Employer _____

Compensation Fund Registration No. of mandatory _____

Good Standing Certificate : ☐ yes ☐ no (tick one box)

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



C.1.3.4 Health and Safety Contract: General Information

1. The Occupational Health and Safety Act comprises Sections 1 to 50 and all un-repealed regulations promulgated in terms of the former Machinery and Occupational Safety Act No 6 of 1983 as amended, as well as other regulations which may be promulgated in terms of the OHS Act.
2. 'Mandatory' is defined as including an agent, a contractor or a subcontractor for work, but without derogating from his status in his own right as an employer or user of plant and machinery.
3. Section 37 of the Occupational Health and Safety Act potentially punishes employers (principals) for the unlawful acts or omissions of mandatories (contractors) save where a written agreement between the parties has been concluded containing arrangements and procedures to ensure compliance with the said Act by the mandatory.
4. All documents attached or referred to in the above agreement form an integral part of the agreement.
5. To perform in terms of this agreement mandatories must be familiar with the relevant provisions of the Act.
6. Mandatories who utilise the services of their own mandatories (subcontractors) are advised to conclude a similar written agreement.
7. Be advised that this agreement places the onus on the mandatory to contact the Employer in the event of inability to perform as per this agreement. The Employer, however, reserves the right to unilaterally take any steps as may be necessary to enforce this agreement.
8. The contractor shall be responsible for the full and proper implementation of the terms and provisions of the Act and its regulations in the area in which the work is to be undertaken by the Contractor.
9. The Contractor shall be responsible for the well-being, in relation to health and safety, of all persons coming upon or into such area in accordance with that legislation, including the implementation of any directives issued by management of the Employer in this respect.
10. The work to be done is the construction of **LINBRO WATER UPGRADES**.
11. The area in which the work is to be conducted is **JOHANNESBURG NORTH**.
12. The Contractor shall familiarise himself with such area and all risks existing thereon and undertakes to report to the representative of the Employer any hazard or risk to health and safety which arises during the contract work in the area concerned and over which the Contractor may have no control. All necessary and appropriate safety / health equipment shall be issued by the Contractor to all persons working on or coming into the area.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Part 1: Forms and Securities

Occupational Health and Safety Indemnity Undertaking

I, the undersigned

in my capacity as

of the firm

1.0 hereby undertake to ensure that I/my firm and/or employees and/or subcontractors and/or his employees -

2.0 comply strictly with the provisions of the Occupational Health and Safety Act of 1993 (as amended) and/or the regulations promulgated in terms thereof, with specific reference to section 37(2) of the said act, as well as any relevant legislation, in the course of the performance/execution of any service and/or work in, to or on any of the Employer's buildings, construction sites and/or premises;

1.2 ensure that consultants and/or visitors comply with any instructions and measures relating to occupational health and safety, as prescribed by the Employer; and

1.3 comply strictly with the statutorily prescribed work systems, operational equipment, machinery and occupational health and safety conditions;

2.0 and as an independent employer and contractor, hereby indemnify, in terms of the above undertakings, the Employer -

2.1 in respect of any costs that I/my firm and/or employees and/or subcontractors and their employees may incur of necessity in compliance with the above undertakings; and

2.2 against any claims that may be instituted against the Employer and/or any liability that the Employer may incur, whether instituted and/or caused by me/my firm's employees, agents, consultants, subcontractors and/or their employees and visitors or the Employer's clients or neighbours in respect of any incidents related to my/my firm's

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Part 1: Forms and Securities

activities and as a result of which the occupational health and safety of the persons involved have been detrimentally affected; and

2.3 against similar claims that I, managers or directors of my firm may have against the Employer and any damages for which I, managers or directors of my firm hold the Employer liable.

3.0 My firm's compensation commissioner number is _____

and I confirm that my firm and its subcontractors' fees have been paid up and obligations in respect of the compensation commissioner have been complied with and further that I shall furnish proof thereof in writing on request.

4.0 I hereby confirm that I have the authority to sign this indemnity undertaking and that the Employer is not obliged to confirm such confirmation.

Signed at _____ this _____ day
of _____

Signature

Capacity

As witnesses:

1

2

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Part 1: Forms and Securities

a *Company incorporated with limited liability according to the company laws of the Republic of South Africa,
*Partnership, *Close Corporation, *Public Company (hereinafter called the Contractor), represented herein by
in his capacity as the Contractor's

_____ duly authorised hereto by a resolution of the Contractor dated

_____ a certified copy of which resolution is attached to this Indemnity.

WHEREAS the Contractor has entered into a Contract with the Johannesburg Water SOC Ltd (hereinafter called the Employer) for,

_____ and the Company requires this Indemnity from the Contractor

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

THUS DONE AND SIGNED for and on behalf of the Contractor at _____ on the
_____ day of _____ 20 _____ in the presence of the subscribing

:

Duly authorised to sign on behalf of _____

As Witnesses:

1:

2:

1

Date : _____

Address : _____

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (108)

Linbro Water Upgrade

Part 2: Pricing Data

Johannesburg Water SOC Ltd



VOLUME 1

PART 2: PRICING DATA

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	<i>T1</i>	T2	C1	C2	C3	C4



Contract JW14301 (109)

Linbro Water Upgrade

Part 2: Pricing Data

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Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (111)

Linbro Water Upgrade

Part 2: Pricing Data

m = metre
 km = kilometre
 m² = square metre
 m² pass = square metre pass
 ha = hectare
 m³ = cubic metre
 m³km = cubic metre-kilometre
 l = litre
 kl = kilolitre
 MPa = megapascal
 W/day = Work day

kg = kilogram
 t = ton (1000kg)
 No. = number
 sum = lump sum
 MN = mega-newton
 MN.m = mega-newton-metre
 PC sum = Prime Cost sum
 Prov sum = Provisional sum
 % = percent
 kW = kilowatt
 R/only = Rate only

- j) For the purpose of this Schedule of Rates, where applicable, 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 SANS 1200.

Quantity : The number of units of work for each item.

Rate : The agreed payment per unit of measurement.

Amount : The product of the quantity and the agreed rate for an item.

Lump sum : An agreed amount for an item, the extent of which is described in the Bills of Quantities but the quantity of work of which is not measured in any units.

- k) Arithmetical errors in the Schedule of Rates shall be corrected in accordance with Clause F3.9 of the Conditions of Tender. Should there be any discrepancy between rates and/or prices written in the Assessment Schedule and the Schedule of Rates, the latter shall govern.
- l) While the Employer has every intent to complete the full scope of works, the Employer reserves the right to reduce or increase the scope of works according to the dictates of the budget, or to terminate this contract, with adjustment to the agreed rates, sums or fees and without payment of any penalty in this regard. The Service Provider shall however be entitled to pro-rata payment for all services carried out in terms of any adjustment to the Scope of Work or, in the case of termination, remuneration and/or reimbursement.
- m) The Schedule of Rates shall be completed by hand in **BLACK PEN INK**.

C2.1.2 Sufficiency of tender

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (112)

Linbro Water Upgrade

Part 2: Pricing Data

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his Tender for the construction of the Works and of the rates and prices, which rates and prices shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract and all matters and things necessary for the proper execution and completion of the Works.

C2.1.3 Special payment conditions

This clause shall be read in conjunction with the 'Penalties' clause(s). Where the penalty clause shall always receive precedence over this clause, should it be found that duplicative financial corrective measures exist.

C2.1.3.1 Applicability of payment items

All payment items forming part of this Contract shall not apply to ordered Works completed by the Contractor under this Contract, where completed Works:

- are not completed to acceptable quality;
- are not issued by the Engineer;
- are still within the defects and liability period; or
- are not accepted by the Engineer or his duly authorised representative.

C2.1.3.2 Provided previously

The Contractor shall **NOT RE-EXECUTE WORKS** under this Contract where he had executed works for the Employer under a previous contract(s).

The Employer shall at his sole discretion decide to re-execute such works.

C2.1.3.3 Working outside normal hours

The additional costs, if any, to perform works outside normal working hours shall be deemed to have been allowed for in the provided activity pricing rates and/or prices.

C2.1.3.4 Materials and equipment

C2.1.3.4.1 Materials

The Employer shall not provide any materials, as this shall be provided by the Contractor and deemed to have been included in the various provided rates and prices.

C2.1.3.4.2 Equipment

The Employer shall not provide any works equipment, as this shall be provided by the Contractor and deemed to have been included in the various provided activity rates and prices.

C2.1.3.4.3 Damage to materials provided by the Employer

Where the Contractor or public damage any materials, provided by the Employer, whilst in the care of the Contractor, he shall immediately report such damage, arrange for the replacement and all replacement costs shall be at his expense.

C2.1.3.5 Permits and way-leaves

All associated costs to obtain permits and way-leaves as required for the execution of the works, where such affect other services, shall be deemed to have been included in the scheduled rates for SANS 1200A or

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (113)

Linbro Water Upgrade

Part 2: Pricing Data

SANS 1200AA or SANS 1200AB where pricing provision for such items have been allowed for in the pricing schedules, alternatively it shall be deemed to be included in the various scheduled activity rates or prices provided by the Contractor.

C2.1.3.6 Locating existing services

The cost to locate existing services shall be included in the various works activity pricing rates and/or prices, including any excavations required and the provision and use of service detection personnel and equipment. Identified existing services shall be suitably marked at regular intervals for reference purposes.

C2.1.3.7 Confined space

The Contractor shall note that a portion of the work will be executed within confined spaces and it shall be deemed that allowance has been made in all provided activity pricing rates and/or prices.

C2.1.3.8 Concrete

Descriptions (prices) of concrete work shall be deemed to include the design of concrete mixes and all testing of concrete and materials other than compressive strength testing of concrete samples from concrete being placed in the works (the Contractor shall only be entitled to payment for those samples and compressive strength tests called for by the Engineer or his duly authorized representative and which pass the test requirements), handling and depositing (by hoisting or lowering) concrete in the forms, working and packing concrete around reinforcement, all "construction joints" other than "designated joints" as defined in SANS 1200G which are given separately, shaping tops of components as required and striking off and curing.

Descriptions (prices) of concrete in surface beds cast in panels shall be deemed to include formwork, fillets and the like in forming the panels.

C2.1.3.9 Formwork

Formwork is measured to the net surfaces of concrete to be supported, except at intersections of beams with beams, columns, walls, etc. and tops of columns with slabs, beams, etc. where no deductions have been made and descriptions (prices) shall be deemed to include use and waste, except where the formwork is of a permanent nature or is to be left in, fitting together to all required shapes, all cutting, intersections, cambering where required, holes for rods, bolts, pipes and the like, propping, maintaining, keeping damp whilst the concrete is being deposited and removing of formwork.

Formwork "left in" and permanent formwork shall be deemed to include leaving in formwork, props, etc.

Descriptions (prices) of formwork to soffits shall be deemed to include propping not exceeding 3.5m high unless otherwise described. Descriptions (prices) of formwork to walls and columns shall be deemed to be not exceeding 3.5m high above bearing level unless otherwise described.

Descriptions (prices) of formwork to soffits of solid slabs shall be deemed to be to slabs not exceeding 300mm thick unless otherwise described.

C2.1.3.10 Smooth formwork

Descriptions (prices) shall be deemed to include for rubbing off all projections at seams etc. after removal of the formwork, making good any defects with 2:1 cement mortar and leaving a smooth surface with all arises slightly rounded, all to the satisfaction of the Engineer or his duly authorized representative.

C2.1.3.11 Reinforcement

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 (114)

Linbro Water Upgrade

Part 2: Pricing Data

Descriptions (prices) for all steel reinforcement to concrete shall be deemed to include cutting and waste, bending, hooked ends, binding at lappings and intersections with annealed wire, all as above described, hoisting or lowering and maintaining in position whilst the concrete is being deposited and cover blocks and spacers in accordance with the relevant SANS Codes of Practice.

C2.1.3.12 Precast concrete

Descriptions (prices) of precast concrete shall be deemed to include reinforcement required for manufacturing, handling and erection purposes, steel rod or wire loop hooks and/or mortices for Lewis bolts required for handling and transporting, any necessary temporary propping and strutting, bedding, jointing and pointing.

C2.1.3.13 Testing

The cost of testing of the ordered Works shall be included in the various applicable Works items. In particular those:

- clearly intended by or provided for in the specifications.
- involving testing or tests to ensure that the design of the whole of the Works or any part of the Works is appropriate for the purpose which it was intended to fulfil.

No additional or separate payment for testing shall be entertained by the Employer.

C2.1.3.14 Cost of samples

All samples shall be supplied by the Contractor at his own cost unless the supply thereof is clearly intended in the specifications or Schedule of Rates to be at the cost of the Employer. Payment shall not be made for samples which do not comply with the specifications.

C2.1.3.15 Failure to submit reports and associated visual media

The Contractor's payment certificate shall be accompanied by confirmation from the Engineer or his duly authorised representative that items listed for payment have been successfully executed and/or delivered as required. Failure to obtain such confirmation from the Engineer or his duly authorised representative shall result in non-payment of the Contractor's payment certificate until the default has been corrected or the deemed incomplete items are excluded from the payment certificate.

C2.1.3.16 Payment ONLY for works completed

The Contractor shall note that payment shall only be made for Work activities successfully (delivering the end result) executed, complying with the quality requirements and provided to the Engineer or his duly authorized representative.

C2.1.3.17 Training

The Contractor is required to provide training on all equipment installed during the installation and commissioning periods of the contract. Pricing shall make adequate provision for the training of the Employer's delegated staff members.

C2.1.3.18 Maintenance

Pricing shall include for attendance to maintenance items in accordance with the requirements of the contract conditions and specifications.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	T1	T2	C1	C2	C3	C4



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Linbro Water Upgrade

Part 2: Pricing Data

C2.1.3.19 Disposal of existing equipment

Pricing shall provide allowance for the successful disposal of all redundant and obsolete equipment indicated for removal from the facility.

C2.1.3.20 Certificate of Compliance

Pricing shall provide allowance for the issuing of the relevant Certificates of Compliance for the installation(s) at the facility. One certificate of compliance is required per electrical distribution board completed, and the certificate shall cover all downstream works.

C2.1.4 SMME Portion of the Works

A particular portion of the works has been allocated for completion by an appointed SMME, as per the Scope of Works. These items are marked with "SC" and the "Amount" Column has been crossed out. These items must not be priced by the Contractor. An indicative provisional sum for all the SC-marked items has been allowed for in the Preliminary and General items.

The Main Contractor shall retain liability and responsibility for the management, scheduling, and quality control of all works performed by the sub-contractors. After appointment of the Main Contractor, Johannesburg Water will supply the Main Contractor with a list of SMMEs which the Main Contractor can approach to provide rates for the items marked with SC in the Bill of Quantities. The Main Contractor will be expected to conduct a competitive process to recommend a Sub-Contractor or Sub-Contractors to Johannesburg Water. Johannesburg Water will then evaluate all rates provided by the Sub-Contractor for fairness. Johannesburg Water will then either a) approve the appointment of the Sub-Contractor or Sub-Contractors or b) enter into negotiations with the Main Contractor and sub-contractor / s or c) request that the Contractor recommend a different sub-contractor.

Further an allowance has been made (which is limited to 10% of the SMME portion of the Works) for the contractor to complete the following tasks:

- The Contractor shall ensure that the Subcontractor(s) complies with the paying all amounts due in respect of his employees and himself in terms of all relevant legislation and regulations including, but not confined to, the
 - Income Tax Act, the
 - Compensation for Occupational Injuries and Diseases Act,
 - Unemployment Insurance Act,
 - Basic Conditions of Employment Act
- Monitoring of the Quality of Work completed by the Sub-contractor/SMME
- Skills transfer during the execution of the project
- Compliance with all aspects of the Scope of Work
- Assistance with sourcing of applicable material in line with the technical data sheets

Further an allowance has been made for "Training" – this is related to CETA accredited training which is to be agreed with the Employer during project execution. No amount can be claimed under this item for on-site or on-the-job training, only for accredited training which the SMME receives.

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	<i>T1</i>	T2	C1	C2	C3	C4



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Linbro Water Upgrade

Part 2: Pricing Data

BILL OF QUANTITIES

Employer:		Contractor:	
Witness:		Witness:	

Volume	1	2	3	4		
Part	<i>T1</i>	T2	C1	C2	C3	C4



Contract JW14301 (117)

Linbro Water Upgrade

Part 2: Pricing Data

SUMMARY OF BILL OF QUANTITIES-

Employer:		Contractor:	
Witness:		Witness:	

SUMMARY OF BILL OF QUANTITIES	
DESCRIPTION	AMOUNT
SECTION 1: PRELIMINARY AND GENERAL	
SECTION 2: EARTHWORKS (PIPE TRENCHES)	
SECTION 3: PIPELINES	
SECTION 4: PIPE JACKING	
SECTION 5: BUILDINGS AND FENCING	
SUB-TOTAL A PLUS 10% CONTINGENCIES SUB-TOTAL B PLUS 15% VAT TOTAL TENDER PRICE	

(Carried Forward to Tender Cover Page)

TENDERER: _____

COMPANY: _____

ADDRESS: _____

CELL: _____

FAX: _____

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 1: PRELIMINARY AND GENERAL

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	SABS 1200A		SECTION 1: PRELIMINARY AND GENERAL				
1.1	8.3		FIXED-CHARGE ITEMS				
1.1.1	8.3.1		Contractual Requirements	Sum	1		
	8.3.2		Establishment of facilities on Site for the duration of construction				
	1200AB		Facilities for Engineer (refer to PSAB)				
1.1.2	1200AB 8.2.1		a) Office Building (1 No.) (20m ²) (PSAB 3.2.1)	Sum	1		
1.1.3	1200AB 8.2.1		b) Telephone (and computer equipment) (PSAB 4.1)	Sum	1		
1.1.4	1200AB 8.2.1		c) Nameboard (2 No.) (PSAB 3.1)	Sum	1		
1.1.5	1200AB 8.2.1		d) Car Port - single (PSAB 3.3)	Sum	1		
	8.3.2.2		Facilities for Contractor				
1.1.6			a) Offices and storage sheds	Sum	1		
1.1.7			b) Workshops	Sum	1		
1.1.8			c) Laboratories	Sum	1		
1.1.9			d) Living accommodation	Sum	1		
1.1.10			e) Ablution and latrine facilities	Sum	1		
1.1.11			f) Tools and equipment	Sum	1		
1.1.12			g) Water supplies, electrical power and telecommunication	Sum	1		
1.1.13			h) Dealing with water	Sum	1		
1.1.14			i) Access	Sum	1		
1.1.15			j) Plant	Sum	1		
	PSA 8.3.5		Additional Contractual Obligations				
1.1.16	PSA 8.3.5.1		a) Notices and warnings to customers	Sum	1		
1.1.17	PSA 8.3.5.2		b) OHS Act Obligations	Sum	1		
1.1.18	PSA 8.3.5.3		c) EMP Obligations	Sum	1		
1.1.19	8.3.4		Remove Engineer's and Contractor's Site establishment on completion	Sum	1		
1.2	8.4		TIME RELATED ITEMS				
1.2.1	8.4.1		Contractual Requirements	Sum	1		
	8.4.2		Operate and maintain facilities on site for the duration of construction:				
TOTAL CARRIED FORWARD							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 1: PRELIMINARY AND GENERAL

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
	1200AB		Facilities for Engineer (refer to PSAB)				
1.2.2	1200AB 8.2.1		a) Office Building (1 No.) (20m ²) (PSAB 3.2.1)	Sum	1		
1.2.3	1200AB 8.2.1		b) Telephone (and computer equipment) (PSAB 4.1)	Sum	1		
1.2.4	1200AB 8.2.1		c) Nameboard (2 No.) (PSAB 3.1)	Sum	1		
1.2.5	1200AB 8.2.1		d) Car Port - single (PSAB 3.3)	Sum	1		
	8.4.2.2		Facilities for Contractor				
1.2.6			a) Offices and storage sheds	Sum	1		
1.2.7			b) Workshops	Sum	1		
1.2.8			c) Laboratories	Sum	1		
1.2.9			d) Living accommodation	Sum	1		
1.2.10			e) Ablution and latrine facilities	Sum	1		
1.2.11			f) Tools and equipment	Sum	1		
1.2.12			g) Water supplies, electrical power and telecommunication	Sum	1		
1.2.13			h) Concrete batching plant	Sum	1		
1.2.14			i) Dealing with water	Sum	1		
1.2.15			j) Access and security	Sum	1		
1.2.16			k) Plant	Sum	1		
1.2.17	8.4.3		Supervision for duration of contract	Sum	1		
1.2.18	8.4.4		Company and Head Office overhead costs	Sum	1		
	PSA 8.4.6		Additional Obligations				
1.2.19	PSA 8.4.6.1		OHS Act Obligation (see C2.1.3.1)	Sum	1		
1.2.20	PSA 8.4.6.3		Provision of Electrical Safety Officer	Month	6		
1.2.21	PSA 8.4.6.2	SC	Security Services Costs	Month	6		
1.3	8.5		SUMS STATED PROVISIONALLY BY THE ENGINEER				
1.3.1	PSA 8.5 (b)(1)(i)		Alteration to existing services by authorities	Prov Sum	1	R 106 000.00	R 106 000.00
1.3.2	PSA 8.5 (b)(2)(i)		Overheads, Charges and profits on (1)(i)	%	R 106 000.00		
1.3.3	PSA 8.5 (b)(1)(ii)		Control tests by independent laboratory	Prov Sum	1	R 53 000.00	R 53 000.00
TOTAL CARRIED FORWARD							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 1: PRELIMINARY AND GENERAL

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
1.3.4	PSA 8.5 (b)(2)(ii)		Overheads, Charges and profits on (1)(ii)	%	R 53 000.00		
1.3.5	PSA 8.5 (b)(1)(iii)		Provision of photographic records	Prov Sum	1	R 1 060.00	R 1 060.00
1.3.6	PSA 8.5 (b)(2)(iii)		Overheads, Charges and profits on (1)(iii)	%	R 1 060.00		
1.3.7	PSA 8.5 (b)(1)(iv)		CLO and CSO	Prov Sum	1	R 68 900.00	R 68 900.00
1.3.8	PSA 8.5 (b)(2)(iv)		Overheads, Charges and profits on (1)(iv)	%	R 68 900.00		
1.3.9	PSA 8.5 (b)(1)(v)		Temporary protection of services	Prov Sum	1	R 31 800.00	R 31 800.00
1.3.10	PSA 8.5 (b)(2)(v)		Overheads, Charges and profits on (1)(v)	%	R 31 800.00		
1.3.11	PSA 8.5 (b)(1)(vi)		Reinstatement of asphalt by JRA	Prov Sum	1	R 53 000.00	R 53 000.00
1.3.12	PSA 8.5 (b)(2)(vi)		Overheads, Charges and profits on (1)(vi)	%	R 53 000.00		
1.3.13	PSA 8.5 (b)(1)(vii)		Supply or hire of specialist equipment	Prov Sum	1	R 26 500.00	R 26 500.00
1.3.14	PSA 8.5 (b)(2)(vii)		Overheads, Charges and profits on (1)(vii)	%	R 26 500.00		
1.3.15	PSA 8.5 (b)(1)(viii)		Training of labour	Prov Sum	1	R 400 000.00	R 400 000.00
1.3.16	PSA 8.5 (b)(2)(viii)		Overheads, Charges and profits on (1)(viii)	%	R 400 000.00		
1.3.17	PSAB 4.1		Telephone and data charges for Engineers Representative	Prov Sum	1	R 15 900.00	R 15 900.00
1.3.18			Overhead, charges and profit on Item 1.3.17	%	R 15 900.00		
1.3.19	PSSC 1		Value of Subcontracted works	Prov Sum	1	R 3 464 225.80	R 3 464 225.80
1.3.20	PSSC 2		Management fee for the Main Contractor to oversee sub-contracted works. (the main contractor will retain liability and responsibility for the management, scheduling, and quality	%	R3 464 225.80		
1.3.21	PSSC 3		Fixed-Charge items for the sub-contractors Contractual Requirements	Prov Sum		R 519 633.87	R 519 633.87
1.3.22	PSSC 4		Overhead, charges and profit for the Main Contractor to provide for fixed-charge items for the sub-contractors Contractual Requirements	%	R 519 633.87		
1.3.23	PSSC 5		Time Related items for the sub-contractors Contractual Requirements	Prov Sum		R 519 633.87	R 519 633.87
1.3.24	PSSC 6		Overhead, charges and profit for the Main Contractor to provide for time related items for the sub-contractors Contractual Requirements	%	R 519 633.87		
1.3.25	PSSC 7		Provide administrative, planning and on the job training to SMME's	Prov Sum	1	R 400 000.00	R 400 000.00
1.3.26	PSSC 8		Overhead, charges and profit on SMME training	%	R400 000.00		
1.3.27	PSA 8.5 (b)(1)(ix)		Cathodic Protection installation	Prov Sum	1	R 1 500 000.00	R 1 500 000.00
1.3.28	PSA 8.5 (b)(2)(ix)		Overhead, charges and profit on Cathodic Protection Installation	%	R1 500 000.00		
1.4	8.7		DAY WORK				
1.4.1	PSA 8.7.1.2		Allowance for labour	Prov Sum	1	R 106 000.00	R 106 000.00
TOTAL CARRIED FORWARD							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 1: PRELIMINARY AND GENERAL

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
1.4.2	PSA 8.7.1.2		Percentage adjustment to item 1.4.1	%	R 106 000.00		
1.4.3	PSA 8.7.1.2		Allowance for material	Prov Sum	1	R 53 000.00	R 53 000.00
1.4.4	PSA 8.7.1.2		Percentage adjustment to item 1.4.3	%	R 53 000.00		
1.4.5	PSA 8.7.1.2		Allowance for plant	Prov Sum	1	R 79 500.00	R 79 500.00
1.4.6	PSA 8.7.1.2		Percentage adjustment to item 1.4.5	%	R 79 500.00		
1.5	8.8		TEMPORARY WORKS				
1.5.1	8.8.2		Dealing with traffic and maintain road (or accommodation of traffic)	Sum	1		
	8.8.4		Existing Services				
1.5.2	PSA 8.8.4		b) Excavate by hand in soft material to expose existing services	m ³	100		
1.5.3	PSA 8.8.4		c) Temporary protection of exposed services	sum	1		
1.5.4	PSA 8.8.6		Special water control	Sum	1		
1.5.5	PSA 8.8.7		Dealing with other service authorities, application for wayleaves, etc.	Sum	1		
1.5.6	PSA 8.8.5		Survey and setting out of works	Sum	1		
SECTION 1: TOTAL CARRIED FORWARD TO SUMMARY							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
SECTION 2: EARTHWORKS (PIPE TRENCHES)							
FOR PAYMENT REF. PREFIX A - REFER TO PARTICULAR SPECIFICATION, SECTION D [MEASUREMENT AND PAYMENT]. FOR ALL OTHER PREFIXES, REFER TO SABS 1200 AS AMENDED							
	SABS 1200 DB		Earthworks (Pipe Trenches)				
	PSDB 8.3.5		Services that Intersect or Adjoin a Pipe Trench				
2.1	PSDB 8.3.5(a)		Services that intersect a trench				
2.1.1			Sewer pipes up to 600 mm Dia.	No.	4		
2.1.2			Stormwater pipes up to 1200 mm Dia.	No.	6		
2.1.3			Water pipes up to 500mm Dia.	No	6		
2.1.4			Water pipes between 500mm Dia and 1200mm Dia	No	2		
2.1.5			Electrical Cables	No	10		
2.1.6			Fibre Optic Cable	No	4		
2.1.7			Telkom Cable	No	4		
2.1.8			Overhead electricity lines	No	4		
2.2	8.3.5(b)		Services that adjoin a trench				
2.2.1			Existing up to 600 mm ND steel pipeline (water)	m	1200		
2.2.2			Existing 600 mm up to 1200mm ND steel pipeline (water)	m	600		
2.2.3			Electrical Cables	m	500		
2.2.4			Fibre Optic Cable	m	100		
2.2.5			Telkom Cable	m	50		
2.2.6			Overhead electricity lines	m	50		
2.3	PSDB 8.3.5(c)		Services that require special care (electricity and telecommunication poles)	No	20		
2.4	8.3.6		Finishing				
2.4.1	8.3.6.1(d)	SC	Reinstate road surfaces complete with all courses: Brick Paving	m ²	100		
2.5	PSDB8.3.6.2		Reinstate of surfacing for footways				
2.5.1	PSDB8.3.6.2	SC	a)Brick paving	m ²	50		
2.5.2	PSDB8.3.6.2	SC	b)Concrete paving	m ²	50		
2.5.3	PSDB8.3.6.2	SC	c)Concrete slabs	m ²	50		
TOTAL CARRIED FORWARD							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
2.6	PSDB8.3.6.3	SC	Reinstate Kerbs and Channels	m ²	100		
2.7	PSDB8.3.6.4	SC	Reinstatement of grassed surfaces	m ²	1000		
2.8	PSDB 8.3.6.5		Reinstatement of recreational areas				
2.8.1		SC	a) Bushes and Scrubs up to 1.5 m	m	200		
2.8.2		SC	a) Moving above ground boulders	No	20		
THE FOLLOWING IS FOR THE EXCAVATION OF A TRENCH FOR A 1100 mm ND STEEL PIPELINE: MINIMUM WIDTH - 2000mm JOINT HOLE WIDTH - 2200mm AVERAGE DEPTH TO INVERT - 2.6 m MAXIMUM DEPTH TO INVERT - 4.5m APPROXIMATE LENGTH - 690 m							
2.9	A1		Excavations and Backfilling Pipe Trench etc.				
2.9.1	A1(a)		a) Set out the work and control line and grade of all stages of excavation and preparation of trench	Sum	1		
2.9.2	A1(b)		b) Provide a pipe laying platform alongside the trench for pipe laying operations	Sum	1		
2.10	SABS 1200C 8.2.1		Clear and grub	m ²	4830		
2.10.1	8.2.2		Remove and grub large trees and stumps of girth:				
2.10.1.1			a) over 1m and up to and including 2m	No	10		
2.10.1.2			b) over 2m and up to and including 3m	No	10		
2.10.1.3			c) over 3m, in steps of 1m	No	1		
2.11	A2		Top soil :				
2.11.1			a) Excavate, stockpile and replace (300 mm thick)	m ³	414		
2.12	A3		Excavate in Bulk :				
2.12.1			a) In soft material (up to 3m deep)	m ³	1060		
2.12.2			b) In rock (up to 3m deep)	m ³	1966		
2.12.3			c) In soft material (3-5.5m deep)	m ³	378		
2.12.4			d) In rock (3-7m deep)	m ³	378		
2.13	PSDB 8.3.5d		Extra over on item 2.12 for excavation in narrow servitude	m	100		
2.14	A4		Widen and deepen the trench for joint and lifting band holes :				
2.14.1			a) In soft material	m ³	17		
2.14.2			b) In rock	m ³	150		
2.15	A5		Additional excavation for widening and deepening the pipe trench for valve chambers, thrust blocks, structures, or for any sundry excavations				
TOTAL CARRIED FORWARD							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
			Maximum depth - 5.5 m				
2.15.1			a) In soft material	m ³	50		
2.15.2			b) In rock	m ³	70		
2.16	A6		The following for providing fill material at the trench side				
2.16.1	A6(a)		a) Provide Class I fill material as follows:				
2.16.1.1			i) Select from spoil deposited alongside the trench	m ³	1480		
2.16.1.2			ii; and iv) Obtain at a source other than trench excavation (i.e. import)	m ³	985		
2.16.1.3			iii) extra over items i) and ii) to sieve material	m ³	1230		
2.16.2	A6(b)		b) Provide Class II fill material as follows:				
2.16.2.1			i) Select from spoil deposited alongside the trench	m ³	600		
2.16.2.2			ii; and iv) Obtain at a source other than trench excavation (i.e. import)	m ³	600		
2.16.3	A6(c)		c) 38 mm stone from any source	m ³	75		
2.16.4	A6(d)		d) Soil for soil cement from any source	m ³	20		
2.16.5	A6(e)		e) Crusher run from any source	m ³	10		
2.17	A7		Load up, transport along trench or to trench, to point of backfilling if distance more than 200 m materials in (a) and (b) above.	m ³ .km	100		
			THE FOLLOWING IN PREPARING THE TRENCH FLOOR, PLACING THE PIPE BED FOUNDATION AND FORMING THE PIPE BED.				
2.18	A8		Prepare the trench floor:				
2.18.1			a) In material of adequate bearing capacity and suitable for the pipe bed	m ²	5		
2.18.2			b) In soil of inadequate bearing capacity	m ²	280		
2.18.3			c) In material of adequate bearing capacity but unsuitable for the pipe bed	m ²	1105		
2.19	A9		Filling in specified over-excavation:				
2.19.1			a) Supply and place Kaymat U44	m ²	560		
2.19.2			b) Place and compact 38 mm stone	m ³	75		
2.20	A10		Construct the 150 mm thick pipe bed foundation using selected fill (Class I)	m ³	210		
2.21	A11		Form the pipe bed	m ²	1380		
			THE FOLLOWING IN BACKFILLING AND DISPOSAL OF SURPLUS SPOIL AND UNDESIRABLE MATERIAL:				
2.22	A12		Backfill the trench and additional excavations				
TOTAL CARRIED FORWARD							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
2.22.1			a) Stage I	m ³	2330		
2.22.2			b) Stage II	m ³	1190		
2.23	A13		Extra over Item A12 to increase the degree of compaction of the backfill around and above the pipe:				
2.23.1			a) Stage I from 90 to 95 percent	m ³	675		
2.23.2			b) Stage II from 85 to 95 percent	m ³	120		
2.24	A14		Backfill the trench with no fines concrete	m ³	10		
2.25	A15		Backfill the trench and other excavations with crusher run fill or soilcrete	m ³	30		
2.26	A16		Dispose of surplus spoil and undesirable material and reinstate surface:				
2.26.1			a) Within 2 km of the Works	m ³	555		
2.26.2			b) 2 km to 5 km from the Works	m ³	1290		
2.27	A17		Spread surplus spoil over and on sides of trench	m ³	20		
			THE FOLLOWING IN SUNDRY ITEMS:				
2.28	A23		Remove and reinstate fences and walls at pipeline crossings and where instructed by Engineer				
2.28.1		SC	a) Security wall (palisade) with electric fence: Section to be replaced 10m long	No	3		
		SC	b) Prefab wall: Section to be replaced: 600m long	No	1		
2.29	A24	SC	Supply, erect and remove temporary five strand barbed wire fences to protect excavations	m	640		
2.30	A25	SC	Supply, erect and remove security fence to property owner's specifications	m	450		
2.31	A28	SC	Form firebreaks	m ²	640		
2.32	A30		Discontinue operations unexpectedly and transfer plant, equipment and labour (provisional item)				
2.32.1			a) Over a route distance not exceeding 640m	No of transfers	2		
			THE FOLLOWING IS FOR THE EXCAVATION OF A TRENCH FOR A 1000 mm ND STEEL PIPELINE: MINIMUM WIDTH - 1900mm JOINT HOLE WIDTH - 2100mm AVERAGE DEPTH TO INVERT - 2.5 m MAXIMUM DEPTH TO INVERT - 4.4m APPROXIMATE LENGTH - 100 m				
2.33	A1		Excavations and Backfilling Pipe Trench etc.				
2.33.1	A1(a)		a) Set out the work and control line and grade of all stages of excavation and preparation of trench	Sum	1		
2.33.2	A1(b)		b) Provide a pipe laying platform alongside the trench for pipe laying operations	Sum	1		
2.34	SABS 1200C 8.2.1	SC	Clear and grub	m ²	700		
2.34.1	8.2.2		Remove and grub large trees and stumps of girth:				
2.34.1.1		SC	a) over 1m and up to and including 2m	No	1		
TOTAL CARRIED FORWARD							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
2.34.1.2		SC	b) over 2m and up to and including 3m	No	1		
2.34.1.3		SC	c) over 3m, in steps of 1m	No	1		
2.35	A2		Top soil :				
2.35.1			a) Excavate and stockpile (300 mm thick)	m ³	60		
2.35.2			b) Replace in top layer of backfilled trench	m ³	60		
2.36	A3		Excavate in Bulk :				
2.36.1			a) In soft material (up to 3m deep)	m ³	140		
2.36.2			b) In rock (up to 3m deep)	m ³	260		
2.36.3			c) In soft material (3-7m deep)	m ³	50		
2.36.4			d) In rock (3-7m deep)	m ³	50		
2.37	PSDB 8.3.5d		Extra over on item 2.36 for excavation in narrow servitude	m	700		
2.38	A4		Widen and deepen the trench for joint and lifting band holes :				
2.38.1			a) In soft material	m ³	7		
2.38.2			b) In rock	m ³	60		
2.39	A5		Additional excavation for widening and deepening the pipe trench for valve chambers, thrust blocks, structures, or for any sundry excavations				
2.39.1			Maximum depth - 4 m				
2.39.2			a) In soft material	m ³	136		
2.39.3			b) In rock	m ³	204		
2.40	A6		The following for providing fill material at the trench side				
2.40.1	A6(a)		a) Provide Class I fill material as follows:				
2.40.1.1			i) Select from spoil deposited alongside the trench	m ³	205		
2.40.1.2			ii; and iv) Obtain at a source other than trench excavation (i.e. import)	m ³	140		
2.40.1.3			iii) extra over items i) and ii) to sieve material	m ³	170		
2.40.2	A6(b)		b) Provide Class II fill material as follows:				
2.40.2.1			i) Select from spoil deposited alongside the trench	m ³	85		
2.40.2.2			ii; and iv) Obtain at a source other than trench excavation (i.e. import)	m ³	85		
2.40.3	A6(c)		c) 38 mm stone from any source	m ³	10		
TOTAL CARRIED FORWARD							

CONTRACT JW14301

Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
2.40.4	A6(d)	SC	d) Soil for soil cement from any source	m ³	20		
2.40.5	A6(e)	SC	e) Crusher run from any source	m ³	10		
2.41	A7	SC	Load up, transport along trench or to trench, to point of backfilling if distance more than 200 m materials in (a) and (b) above.	m ³ .km	10		
			THE FOLLOWING IN PREPARING THE TRENCH FLOOR, PLACING THE PIPE BED FOUNDATION AND FORMING THE PIPE BED.				
2.42	A8		Prepare the trench floor:				
2.42.1			a) In material of adequate bearing capacity and suitable for the pipe bed	m ²	5		
2.42.2			b) In soil of inadequate bearing capacity	m ²	40		
2.42.3			c) In material of adequate bearing capacity but unsuitable for the pipe bed	m ²	160		
2.43	A9		Refill specified over-excavation:				
2.43.1			a) Supply and place Kaymat U44	m ²	190		
2.43.2			b) Place and compact 38 mm stone	m ³	10		
2.44	A10		Construct the 150 mm thick pipe bed foundation using selected fill (Class I)	m ³	30		
2.45	A11		Form the pipe bed	m ²	190		
			THE FOLLOWING IN BACKFILLING AND DISPOSAL OF SURPLUS SPOIL AND UNDESIRABLE MATERIAL:				
2.46	A12		Backfill the trench and additional excavations				
2.46.1			a) Stage I	m ³	210		
2.46.2			b) Stage II	m ³	170		
2.47	A13		Extra over Item A12 to increase the degree of compaction of the backfill around and above the pipe:				
2.47.1			a) Stage I from 90 to 95 percent	m ³	95		
2.47.2			b) Stage II from 85 to 95 percent	m ³	20		
2.48	A14		Backfill the trench with no fines concrete	m ³	5		
2.49	A15		Backfill the trench and other excavations with crusher run fill or soilcrete	m ³	10		
2.50	A16		Dispose of surplus spoil and undesirable material and reinstate surface:				
2.50.1			a) Within 2 km of the Works	m ³	160		
2.50.2			b) 2 km to 5 km from the Works	m ³	380		
2.51	A17		Spread surplus spoil over and on sides of trench	m ³	10		
			THE FOLLOWING IN SUNDRY ITEMS:				
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
2.52	A23		Remove and reinstate fences and walls at pipeline crossings and where instructed by Engineer				
2.52.1		SC	a) Security wall (palisade) with electric fence: Section to be replaced 5m long	No	5		
2.53	A24	SC	Supply, erect and remove temporary five strand barbed wire fences to protect excavations	m	200		
2.54	A25	SC	Supply, erect and remove security fence to property owner's specifications	m	250		
2.55	A28	SC	Form firebreaks	m²	100		
2.56	A30		Discontinue operations unexpectedly and transfer plant, equipment and labour (provisional item)				
2.56.1			a) Over a route distance not exceeding 80m	No of transfers	1		
			THE FOLLOWING IS FOR THE EXCAVATION OF A TRENCH FOR A 400 mm ND STEEL PIPELINE: MINIMUM WIDTH - 1 200mm JOINT HOLE WIDTH - 1 400mm AVERAGE DEPTH TO INVERT - 1.4 m MAXIMUM DEPTH TO INVERT - 1.5m APPROXIMATE LENGTH - 160 m				
2.57	A1		Excavations and Backfilling Pipe Trench etc				
2.57.1	A1(a)		a) Set out the work and control line and grade of all stages of excavation and preparation of trench	Sum	1		
2.57.2	A1(b)		b) Provide a pipe laying platform alongside the trench for pipe laying operations	Sum	1		
2.58	SABS 1200C 8.2.1	SC	Clear and grub	m²	1120		
2.58.1	8.2.2		Remove and grub large trees and stumps of girth:				
2.58.1.1		SC	a) over 1m and up to and including 2m	No	1		
2.58.1.2		SC	b) over 2m and up to and including 3m	No	1		
2.58.1.3		SC	c) over 3m, in steps of 1m	No	1		
2.59	A2		Top soil :				
2.59.1			a) Excavate and stockpile (300 mm thick)	m³	60		
2.59.2			b) Replace in top layer of backfilled trench	m³	60		
2.60	A3		Excavate in Bulk :				
2.60.1			a) In soft material (up to 3m deep)	m³	230		
2.60.2			b) In rock (up to 3m deep)	m³	57		
2.60.3			c) In soft material (3-7m deep)	m³	50		
2.60.4			d) In rock (3-7m deep)	m³	25		
2.61	PSDB 8.3.5d		Extra over on item 2.60 for excavation in narrow servitude	m	150		
2.62	A4		Widen and deepen the trench for joint and lifting band holes :				
2.62.1			a) In soft material	m³	23		
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
2.62.2			b) In rock	m ³	6		
2.63	A5		Additional excavation for widening and deepening the pipe trench for valve chambers, thrust blocks, structures, or for any sundry excavations				
2.63.1			Maximum depth - 4 m				
2.63.2			a) In soft material	m ³	50		
2.63.3			b) In rock	m ³	25		
2.64	A6		The following for providing fill material at the trench side				
2.64.1	A6(a)		a) Provide Class I fill material as follows:				
2.64.1.1			i) Select from spoil deposited alongside the trench	m ³	216		
2.64.1.2			ii; and iv) Obtain at a source other than trench excavation (i.e. import)	m ³	144		
2.64.1.3			iii) extra over items i) and ii) to sieve material	m ³	180		
2.64.2	A6(b)		b) Provide Class II fill material as follows:				
2.64.2.1			i) Select from spoil deposited alongside the trench	m ³	86		
2.64.2.2			ii; and iv) Obtain at a source other than trench excavation (i.e. import)	m ³	86		
2.64.3	A6(c)		c) 38 mm stone from any source	m ³	15		
2.64.4	A6(d)		d) Soil for soil cement from any source	m ³	5		
2.64.5	A6(e)		e) Crusher run from any source	m ³	5		
2.65	A7		Load up, transport along trench or to trench, to point of backfilling if distance more than 200 m materials in (a) and (b) above.	m ³ .km	10		
			THE FOLLOWING IN PREPARING THE TRENCH FLOOR, PLACING THE PIPE BED FOUNDATION AND FORMING THE PIPE BED.				
2.66	A8		Prepare the trench floor:				
2.66.1			a) In material of adequate bearing capacity and suitable for the pipe bed	m ²	116		
2.66.2			b) In soil of inadequate bearing capacity	m ²	40		
2.66.3			c) In material of adequate bearing capacity but unsuitable for the pipe bed	m ²	40		
2.67	A9		Refill specified over-excavation:				
2.67.1			a) Supply and place Kaymat U44	m ²	15		
2.67.2			b) Place and compact 38 mm stone	m ³	15		
2.68	A10		Construct the 150 mm thick pipe bed foundation using selected fill (Class I)	m ³	30		
2.69	A11		Form the pipe bed	m ²	77		
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 2: EARTHWORKS (PIPE TRENCHES)

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
2.70	A12		THE FOLLOWING IN BACKFILLING AND DISPOSAL OF SURPLUS SPOIL AND UNDESIRABLE MATERIAL: Backfill the trench and additional excavations				
2.70.1			a) Stage I	m ³	230		
2.70.2			b) Stage II	m ³	170		
2.71	A13		Extra over Item A12 to increase the degree of compaction of the backfill around and above the pipe:				
2.71.1			a) Stage I from 90 to 95 percent	m ³	100		
2.71.2			b) Stage II from 85 to 95 percent	m ³	18		
2.72	A14		Backfill the trench with no fines concrete	m ³	5		
2.73	A15		Backfill the trench and other excavations with crusher run fill or soilcrete	m ³	5		
2.74	A16		Dispose of surplus spoil and undesirable material and reinstate surface:				
2.74.1			a) Within 2 km of the Works	m ³	160		
2.74.2			b) 2 km to 5 km from the Works	m ³	380		
2.75	A17		Spread surplus spoil over and on sides of trench	m ³	10		
			THE FOLLOWING IN SUNDRY ITEMS:				
2.76	A23		Remove and reinstate fences and walls at pipeline crossings and where instructed by Engineer				
2.76.1		SC	a) Security wall (palisade) with electric fence: Section to be replaced 5m long	No	1		
2.77	A24	SC	Supply, erect and remove temporary five strand barbed wire fences to protect excavations	m	100		
2.78	A28	SC	Form firebreaks	m ²	100		
2.79	A30		Discontinue operations unexpectedly and transfer plant, equipment and labour (provisional item)				
2.79.1			a) Over a route distance not exceeding 80m	No of transfers	1		
SECTION 2: TOTAL CARRIED FORWARD TO SUMMARY							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
			SECTION 3: PIPELINES				
FOR PAYMENT REF. PREFIXED A, B OR C - REFER TO PARTICULAR SPECIFICATION, SECTION D [MEASUREMENT AND PAYMENT]. FOR ALL OTHER PREFIXES, REFER TO SABS 1200 AS AMENDED							
UNLESS OTHERWISE SPECIFIED, ALL SPECIALS EQUAL OR LARGER THAN 400 mm ND SHALL BE TO THE SAME SPECIFICATION. ALL SPECIALS SMALLER THAN 400 mm ND SHALL BE AS SPECIFIED IN THE SPECIFICATION AND ON DRAWINGS							
			SUPPLY, LAYING AND JOINTING OF 1118 mm OD STEEL PIPES, API 5L X52, RPU COATED (OR OTHER AS SPECIFIED) AND SFE LINED, 12.1 m STANDARD LENGTHS (INCL SHORT SECTION OF 900 mm ND)				
3.1	B1		Supply of pipes 1118 mm OD	m	680		
3.2	B2		Unload and transport pipes on site from delivery vehicle 1118 mm OD	m	680		
3.3	B3		Examine coatings for holidays 1118 mm OD	m	680		
3.4	B4		Place pipe in trench, install and line up 1118 mm OD	m	680		
3.5	B5		Welded Joints				
3.5.1			Make socket and spigot joints, fillet welded (1 118mm OD pipes)	No	2		
3.5.2			Make plain ended joints butt welded (1 118 mm OD pipes)	No	60		
3.5.3			Make plain ended joints butt welded (900 mm ND pipes)	No	10		
3.6	B6		Complete the protective coatings at joints (1 118 mm OD pipes)				
3.6.1			a) RPU or other as specified	No	60		
3.6.2			b) Internal SF Epoxy lining	No	60		
3.7	B6		Complete the protective coatings at joints (900 mm ND pipes)				
3.7.1			a) RPU or other as specified	No	15		
3.7.2			b) Internal SF Epoxy lining	No	15		
3.8	B7		Steel pipe vertical, horizontal and composite bends with deflection angles as follows:				
3.8.1			For 1 118 mm OD pipe				
3.8.1.1			a) 2° to 15° (mitred bends)	No	3		
3.8.1.2			b) 15° to 30°	No	3		
3.8.1.3			c) 30° to 45°	No	4		
3.8.1.4			d) 45° to 60°	No	2		
3.8.1.5			e) 60° to 75°	No	1		
3.8.1.6			f) 75° to 90°	No	2		
3.9	B8		Cut steel pipe and prepare ends to receive wrapper plate connections to pipe sets, bends or pipe specials and at isolation valves	No	11		
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
3.10			THE FOLLOWING SUNDRY ITEMS: Supply, deliver, install, line up, drill and weld into the pipeline valves, steel special and regular pipe sections and fittings as follows: (All tees, bends and reducers shall be made of API 5L, X52, 12mm wall thickness with compensation plates and crotch plates as specified.) All flanges in accordance with SABS 1123, Table 4000, unless otherwise stated				
3.10.1			Drawing No JW13899R-DET11 (Air Valve)				
3.10.1.1	B10		Item 1: Reducing Tee 1 100/550mm. Branch 550mm flanged to SANS 1123 Table 4000/3, main stem plain ended for welding. Including compensation collar with W=986mm and T=20mm.	No	1		
3.10.1.2	B10		Item 2: Spacer / Reducer 550/200mm ND, 300mm long, both ends flanged to SANS 1123 table 4000/3.	No	1		
3.10.1.3	B11.1		Item 3: 200mm ND, class 40 Isolation valve	No	1		
3.10.1.4	B11.1		Item 4: 200mm ND class 40 Air Valve	No	1		
3.10.2			Drawing No JW13899R-DET13 (Scour valve)				
3.10.2.1	B10		Item 1: Steel to uPVC Flange adaptor PN40	No	1		
3.10.2.2	B10		Item 2: Flanged distance piece 200 mm dia, flanged to SANS 1123 table 4000/3.	No	1		
3.10.2.3	B11.1		Item 3: 200mm Class 40 gate valve	No	1		
3.10.2.4	B10		Item 4: 60 degree spool pieces, flanged both ends to SANS 1123 table 4000/3.	No	2		
3.10.2.5	B12.1		Item 5: Reducing Tee 1 100/200mm. Branch 300mm flanged to SANS 1123 table 4000/3, main stem plain ended for welding. Including compensation collar.	No	1		
3.10.2.6	B10		Item 7: 200mm ND GMS puddle pipe 1500 mm long, flanged both ends to SANS 1123 table 4000/3. Complete with puddle flange	No	1		
3.10.2.7	B12		Item 8: 200 mm ND HDPE class 16 spacer pipe 6 000 mm length	No	1		
3.10.3			Drawing No JW13899R-DET15 (Isolation valve)				
3.10.3.1	B10		Item 1: Reducing Tee 900/100 mm, main stem 400mm long, branch 300mm long. Main stem flanged one side to SANS 1123 table 4000/3, other end plain for welding. Branch flanged to SANS 1123 table 4000/3. Complete with compensation collar with W=190mm and T=10mm.	No	1		
3.10.3.2	B11.1		Item 2: 900 mm Class 40 Wedge gate valve	No	1		
3.10.3.3	B10		Item 3: 900mm ND 60 degree spool pieces, flanged both ends to SANS 1123 table 4000/3	No	2		
3.10.3.4	B10		Item 4: Reducing Tee 900/100mm. Main stem 800mm long and branch 300mm long. Main stem flanged one side to SANS 1123 table 4000/3, other end plain for welding. Branch flanged to SANS 1123 table 4000/3. Complete with compensation collar with W=190mm and T=10mm.	No	1		
3.10.3.5	B10		Item 5: 100 mm ND 90° short radius bend, flanged both ends to SANS 1123 table 4000/3.	No	2		
3.10.3.6	B10		Item 6: 100mm ND spacer, length 566 mm, both ends flanged to SANS 1123 table 4000/3.	No	1		
3.10.3.7	B11.1		Item 7: 100 mm Class 40 gate valve	No	1		
3.10.3.8	B10		Item 8: 100mm ND 60 degree spool pieces, flanged both ends to SANS 1123 table 4000/3.	No	2		
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
3.10.3.9	B10		Item 9: 100mm ND spacer, length 2 380 mm, both ends flanged to SANS 1123 table 4000/3.	No	1		
3.10.3.10	B12.1		Item 10: Equal Tee 1500/1500mm. All ends plain ended for welding. Complete with crotch plate with thickness = 50mm, wye / base depth = 1253 mm and top depth = 454 mm.	No	1		
3.10.3.11	B10		Item 11: 900mm ND puddle pipe, length 1 500 mm, both ends plain ended for welding. Puddle flange 650 mm from outer edge	No	2		
3.10.3.12	B12.1		Item 12: 900 / 1 100 mm ND reducer, both ends plain for welding.	No	1		
3.10.3.13	B12.1		Item 13: 1500 / 900 mm ND Reducer, both ends plain for welding.	No	1		
			Overall				
3.11	PSL 8.2.17		Connection to existing mains and effect tie in, including the necessary work and arrangements for shut down				
3.11.1			a) New 900 mm ND to existing 1 500 mm ND pipe	No	1		
3.12	B12.1		Supply, fit install and weld 1 100mm ND equal T-piece, one end of main stem flanged to table 4000/3 SANS1123, the other end plain for welding. Branch plain for welding. Complete with crotch plate with wye / base depth = 880mm, top depth = 355mm and plate thickness = 32mm. As per drawing JW13899R-DET22.	No	1		
3.13	B12.1		Supply, fit, install and flange 1 100mm ND, 12 mm steel end cap (epoxy lined both sides) to T-piece as per drawing JW13899R-DET22.	No	1		
3.14	B14 (a)		a) Radiographic examination of 100% of field butt welds	No	75		
3.15	B14 (b)		b) Magnetic particles testing of 100% of fillet welds	No	2		
3.16	B15		Water tightness and structural strength test of completed pipeline.	Sum	1		
3.17	B21		Sum allowed for qualification of the Contractor's welding procedures by an approved inspection body.	Prov Sum	1	R 21 200.00	R 21 200.00
			CONSTRUCTION OF VALVE CHAMBERS AND STRUCTURES. RATES TO PROVIDE FOR ALL COSTS INVOLVED FOR THE SUPPLY OF MATERIAL, INSTALLATION, ETC. FOR THE ENTIRE WORKS COMPLETE AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE SPECIFICATIONS. RATES TO EXCLUDE PIPING AND VALVES, DEPTH TO INVERT OF CHAMBERS AS SPECIFIED.				
3.18	C1 - C3		Air valve chamber, complete as per drawings JW13899R-DET11 and JW13572-DET12. (Excluding all pipe fittings and specials)	No	1		
3.19	C1 - C3		Scour valve chamber, complete as per drawing JW13899R-DET13. (Excluding all pipe fittings and specials).	No	1		
3.20	C1 - C3		Isolation valve chamber, complete as per drawing JW13899R-DET15 and JW13572-DET16. (Excluding all pipe fittings and specials).	No	1		
3.21	C4		Supply and installation of Manhole covers				
3.21.1			a) for Air Valve Chamber	No	2		
3.21.2			b) for Scour Valve Chamber	No	2		
3.21.3			c) for Isolation Valve Chamber	No	1		
3.22	C10		Cast thrust blocks of concrete class 25 including all necessary works and operations	m³	20		
			LAYING AND JOINTING OF 1 016 mm OD STEEL PIPES, API 5L X52, RPU COATED (OR OTHER AS SPECIFIED) AND EPOXY LINED, 12.1 m STANDARD LENGTHS				
3.23	B1		Supply of pipes	m	100		
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
3.24	B2		Unload and transport pipes on site from delivery vehicle	m	100		
3.25	B3		Examine coatings for holidays	m	100		
3.26	B4		Place pipe in trench, install and line up	m	100		
3.27	B5		Welded Joints				
3.27.1			Make socket and spigot joints, fillet welded (1 016mm OD pipes)	No	1		
3.27.2			Make plain ended joints butt welded (1016 mm OD pipes)	No	15		
3.28	B6		Complete the protective coatings at joints (1 016 mm OD pipes)				
3.28.1			a) External RPU or other as specified	No	15		
3.28.2			b) Internal SF Epoxy lining	No	15		
3.29	B7		Steel pipe vertical, horizontal and composite bends with deflection angles as follows:				
3.29.1			For 1 016 mm OD pipe				
3.29.1.1			a) 2° to 15° (mitred bends)	No	1		
3.29.1.2			b) 15° to 30°	No	1		
3.29.1.3			c) 30° to 45°	No	1		
3.29.1.4			d) 45° to 60°	No	1		
3.29.1.5			e) 60° to 75°	No	1		
3.29.1.6			f) 75° to 90°	No	1		
3.29.1.7			g) 500 / 1 000 tapers, all ends plain for welding	No	2		
3.30	B8		Cut steel pipe and prepare ends to receive wrapper plate connections to pipe sets, bends or pipe specials and at isolation valves	No	8		
3.31			THE FOLLOWING SUNDRY ITEMS:				
			Supply, deliver, install, line up, drill and weld into the pipeline steel special and regular pipe sections and fittings as follows: (All tees, bends and reducers shall be made of API 5L, X52, 12mm wall thickness with compensation plates as specified.)				
			All flanges in accordance with SABS 1123, Table as specified				
3.31.1			Drawing No JW13899R-DET14 (Air Valve)				
3.31.1.1	B10		Item 1: Reducing Tee 1 000/500mm ND. Branch flanged to SANS 1123 Table 4000/3, main stem plain ended for welding. Complete with compensation collar with W = 983mm and T = 12mm.	No	1		
3.31.1.2	B10		Item 2: Spacer / Reducer 500/200mm ND, 300mm long, both ends flanged to SANS 1123 table 4000/3.	No	1		
3.31.1.3	B11.1		Item 3: 200mm ND, class 40 Isolation valve	No	1		
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
3.31.1.4	B11.1		Item 4: 200mm ND class 40 Air Valve	No	1		
3.31.2			Drawing No JW13899R-DET18 (Pressure reducing and flow meter pipe schedule)				
3.31.2.1	B10		Item 1: Puddle pipe, 1 000 mm long, flanged one end to SANS 1123, Table 4000/3, other end plain ended, with puddle flange	No	4		
3.31.2.2	B11.1		Item 2: 500mm ND, Class 40 Isolation valve	No	2		
3.31.2.3	B10		Item 3: 500 mm ND Steel pipe 1605 mm long with pressure testing / sampling point (25 mm nipple and cap) Flanged to SANS 1123 Table 4000/3 both sides	No	2		
3.31.2.4	B11.1		Item 4: 500mm ND Class 40 Pressure reducing valve	No	2		
3.31.2.5	B10		Item 5: 500mm ND Steel pipe 1605mm long with pressure testing / sampling point (25 mm nipple and cap) Flanged to SANS 1123 Table 4000/3 on one end, other plain.	No	2		
3.31.2.6	B10		Item 6: 500mm ND VJ coupling, PN16.	No	2		
3.31.2.7	B11.1		Item 7: 500mm ND Class 16 Isolation valve	No	2		
3.31.2.8	B12.1		Item 8: Reducer 500 / 1 000 mm, both ends plain for welding	No	4		
3.31.2.9	B12.1		Item 9: 1 000 mm ND special gusset Y-piece, plain ended	No	2		
3.31.2.10	B12.1		Item 10: 500mm ND gusset T-piece, branch flanged to SANS 1123, Table 1600/3 , including blank flange (epoxy coated), main stem plain ended	No	2		
3.31.2.11	B10		Item 11: Puddle pipe, 2 286 mm long, flanged one end to SANS 1123, Table 1600/3, other end plain ended, with puddle flange	No	4		
3.31.2.12	B11.1		Item 12: 500 mm ND EMF Flow Meter, Class 16	No	2		
3.31.3			Drawing No JW13899R-DET19 (Reservoir control valve pipe schedule)				
3.31.3.1	B12.1		Item 13: 500 mm ND special gusset Y-piece, plain ended	No	2		
3.31.3.2	B10		Item 14: Reducer 500 / 400 mm, both ends plain ended	No	2		
3.31.3.3	B10		Item 15: Reducer 500 / 300 mm, both ends plain ended	No	2		
3.31.3.4	B10		Item 16: 400 mm ND Puddle pipe, 1 000 mm long, flanged one end to SANS 1123 Table 1600/3, other end plain ended, with puddle flange	No	2		
3.31.3.5	B10		Item 17: 300 mm ND Puddle pipe, 1 000 mm long, flanged one end to SANS 1123 Table 1600/3, other end plain ended, with puddle flange	No	2		
3.31.3.6	B11.1		Item 18: 400mm ND Class 16 Isolation valve	No	4		
3.31.3.7	B11.1		Item 19: 300mm ND Class 16 Isolation valve	No	4		
3.31.3.8	B10		Item 20: 400 mm ND Flanged Steel pipe to SANS 1123 Table 1600/3, 1 220 mm long with pressure testing / sampling point (25 mm nipple)	No	2		
3.31.3.9	B10		Item 21: 300 mm ND Flanged Steel pipe to SANS 1123 Table 1600/3, 1000 mm long with pressure testing / sampling point (25 mm nipple)	No	2		
3.31.3.10	B11.1		Item 22: 400mm ND Class 16 Pressure reducing valve	No	2		
3.31.3.11	B11.1		Item 23: 300mm ND Class 16 Pressure reducing valve	No	2		
3.31.3.12	B10		Item 24: 400 mm ND Steel pipe flanged one end to SANS 1123 Table 1600/3, 1 220 mm long with pressure testing / sampling point (25 mm nipple)	No	2		
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
3.31.3.13	B10		Item 25: 300 mm ND Steel pipe flanged one end to SANS 1123 Table 1600/3, 1000 mm long with pressure testing / sampling point (25 mm nipple)	No	2		
3.31.3.14	B10		Item 26: 400 mm ND VJ coupling, PN16.	No	2		
3.31.3.15	B10		Item 27: 300 mm ND VJ coupling, PN16.	No	2		
3.31.3.16	B11.1		Item 28: 400mm ND Class 16 Level Control Valve	No	2		
3.31.3.17	B11.1		Item 29: 300mm ND Class 16 Level Control Valve	No	2		
3.31.3.18	B10		Item 30: 400 mm ND Spacer Pipe, 450 mm long, both ends flanged to SANS 1123 table 1600/3.	No	4		
3.31.3.19	B10		Item 31: 300 mm ND Spacer Pipe, 450 mm long, both ends flanged to SANS 1123 table 1600/3.	No	4		
3.31.3.20	B10		Item 32: 400mm ND Orifice Plate, Stainless Steel	No	2		
3.31.3.21	B10		Item 33: 300mm ND Orifice Plate, Stainless steel	No	2		
3.31.3.22	B10		Item 34: 400 mm ND Puddle pipe, 1 000 mm long, flanged both ends to SANS 1123 table 1600/3, complete with puddle flange.	No	2		
3.31.3.23	B12.1		Item 35: 400 mm ND Straight pipe, 1 744 mm long, both ends flanged to SANS 1123 table 1600/3.	No	1		
3.31.3.24	B10		Item 36: 300 mm ND Puddle pipe, 2 100 mm long, flanged both ends to SANS 1123 table 1600/3, with puddle flange	No	2		
3.31.3.25	B10		Item 37: 400 mm ND 90° gusset long radius bend, both ends flanged to SANS 1123 table 1600/3.	No	2		
3.31.3.26	B12.1		Item 38: Reducer 300 / 400 mm, both ends flanged to SANS 1123 table 1600/3	No	2		
3.31.3.27	B12.1		Item 39: 400 mm ND Spacer Pipe, 1 500 mm long, both ends flanged to SANS 1123 table 1600/3.	No	1		
3.31.3.28	B12.1		Item 40: 400 mm ND Spacer Pipe, 3 500 mm long, both ends flanged to SANS 1123 table 1600/3.	No	1		
3.31.3.29	B12.1		Item 41: 400 mm ND Spacer Pipe, 2 500 mm long, both ends flanged to SANS 1123 table 1600/3.	No	2		
3.31.3.30	B12.1		Item 42: 400mm ND gusset T-piece, all ends flanged to SANS1123 table 1600/3, including blank flange (epoxy coated).	No	2		
3.31.3.31	B12.1		Item 43: 400mm ND gusset T-piece, all ends flanged to SANS1123 table 1600/3, including blank flange (epoxy coated).	No	2		
			Overall				
3.32	B12.1		Supply and install 1 000mm ND equal T-piece, both ends of main stem plain for welding, branch flanged to table 4000/3 SANS1123. Includes crotch plate with wye / base depth = 830mm, top depth = 340mm and plate thickness = 30mm. As per drawing JW13899R-DET22.	No	1		
3.33	B12.1		Supply and fit 1 000mm ND, 12 mm steel end cap (expoly lined both sides) to T-piece as per drawing JW13899R-DET22.	No	1		
3.34	B12.1		Supply and install 1 000mm ND special gusset Y-piece, all ends welded. Complete with crotch plate with wye depth = 1355mm, base depth = 670mm, top depth = 362mm and plate thickness = 50mm. As per drawing JW13899R-DET22.	No	1		
3.35	B14 (a)		a) Radiographic examination of 100% of field butt welds	No	20		
3.36	B14 (b)		b) Magnetic particles testing of 10% of fillet welds	No	2		
3.37	B15		Water tightness and structural strength test of completed pipeline.	Sum	1		
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
3.38	B21		Sum allowed for qualification of the Contractor's welding procedures by an approved inspection body. CONSTRUCTION OF VALVE CHAMBERS AND STRUCTURES. RATES TO PROVIDE FOR ALL COSTS INVOLVED FOR THE SUPPLY OF MATERIAL, INSTALLATION, ETC. FOR THE ENTIRE WORKS COMPLETE AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE SPECIFICATIONS. RATES TO EXCLUDE PIPEING AND VALVES, DEPTH TO INVERT OF CHAMBERS AS SPECIFIED.	Prov Sum	1	R 15 900.00	R 15 900.00
3.39	C1 - C3		Air valve chamber, complete as per drawings JW13899R-DET11 and JW13899R-DET12. (Excluding all pipe fittings and specials)	No	1		
3.40	C1 - C3		Flow Meter Chamber, Complete as per drawings JW13899R-DET17 & JW13899R-DET18 (Excluding all pipe Fittings & Specials)	No	1		
3.41	C4		GENERAL: Supply and installation of Manhole covers				
3.41.1			a) for Air Valve Chamber	No	1		
3.41.2			b) for Meter Chamber	No	1		
3.42	C10		Cast thrust blocks of concrete class 25 including all necessary works and operations LAYING AND JOINTING OF 406 mm OD FLANGED STEEL PIPES, API 5L X52, RPU (OR OTHER AS SPECIFIED) AND EPOXY LINED, 12.1 m STANDARD LENGTHS.	m ³	30		
3.43	B1		Supply of pipes	m	220		
3.44	B2		Unload and transport pipes on site from delivery vehicle	m	220		
3.45	B3		Examine coatings for holidays	m	220		
3.46	B4		Place pipe in trench, install and line up	m	220		
3.47	B7		Steel pipe vertical, horizontal and composite bends with deflection angles as follows:				
3.47.1			For 406 mm OD pipe				
3.47.1.1			a) 2° to 15° (mitred bends)	No	1		
3.47.1.2			b) 15° to 30°	No	1		
3.47.1.3			c) 30° to 45°	No	8		
3.47.1.4			d) 45° to 60°	No	2		
3.47.1.5			e) 60° to 75°	No	2		
3.47.1.6			f) 75° to 90°	No	12		
3.47.1.7			g) 400 / 300 tapers, flanged to SANS 1123 table 1600/3.	No	2		
3.48			THE FOLLOWING SUNDRY ITEMS: Supply, deliver, install, line up, drill and weld into the pipeline steel special and regular pipe sections and fittings as follows: (All tees, bends and reducers shall be made of API 5L, X52, 6mm wall thickness with compensation plates as specified.)				
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
3.48.1			All flanges in accordance with SANS 1123, Table 1600/3, unless otherwise stated. Drawing No JW13899R-DET20 (Reservoir 1 Inlet Arrangements)				
3.48.1.1	B12.1		Item 1: 400 mm ND Steel pipe, 1 050 mm long, flanged both ends	No	2		
3.48.1.2	B12.1		Item 2: 400 mm ND 45° long radius gusset bend, flanged both ends	No	4		
3.48.1.3	B12.1		Item 3: 400 mm ND Steel pipe, 5 540 mm long, flanged both ends	No	4		
3.48.1.4	B12.1		Item 4: 400/50 mm ND reducing tee with all ends flanged	No	2		
3.48.1.5	B12.1		Item 5: 400 mm ND stainless steel goose neck piece 900mm long, including puddle flange and isolating flange kit	No	2		
3.48.1.6	B12.1		Item 6: 400 mm ND stainless steel outlet diffuser pipe, 7 000 mm long with long radius gusset T-piece and bend.	No	2		
3.48.1.7	B11.1		Item 7: 50mm ND Isolation Valve, PN 16	No	2		
3.48.1.8	B11.1		Item 8: 50mm ND Air Valve, PN 16	No	2		
3.48.2			Drawing No JW13899R-DET21 (Reservoir 2 Inlet Arrangements)				
3.48.2.1	B12.1		Item 1: 400 mm ND Steel pipe, 1 050 mm long, flanged both ends	No	2		
3.48.2.2	B12.1		Item 2: 400 mm ND 45° long radius gusset bend, flanged both ends	No	4		
3.48.2.3	B12.1		Item 3: 400 mm ND Steel pipe, 3 400 mm long, flanged both ends	No	4		
3.48.2.4	B12.1		Item 4: 400 mm ND Steel pipe, 660 mm long, flanged both ends	No	2		
3.48.2.5	B12.1		Item 5: 400 mm ND 90° long radius gusset bend, flanged both ends	No	2		
3.48.2.6	B12.1		Item 6: 400/50 mm ND reducing Tee, flanged all sides	No	2		
3.48.2.7	B12.1		Item 7: 400 mm ND stainless steel goose neck piece 900mm long, flanged both ends, with puddle flange and isolating flange kit	No	2		
3.48.2.8	B12.1		Item 8: 400 mm ND stainless steel outlet diffuser pipe, 7 m long with long radius gusset T-piece and bend.	No	2		
3.48.2.9	B11.1		Item 9: 50mm ND Isolation Valve, PN 16	No	2		
3.48.2.10	B11.1		Item 10: 50mm ND Air Valve, PN 16	No	2		
			Overall				
3.49	B12.1		Supply, install and test float control valve CLA-VAL DF1-C1 or similar, complete with 25 mm ND HDPE pipe to level control valves in level control valve chamber	No	4		
3.50	B15		Water tightness and structural strength test of completed pipeline.	Sum	1		
3.51	C10		Cast thrust blocks of concrete class 25 including all necessary works and operations	m³	50		
3.52	B7		Steel pipe vertical, horizontal and composite bends with deflection angles as follows:				
3.52.1			For between 400mm to 550mm OD pipe				
TOTAL CARRIED FORWARD							

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Linbro Park Water Upgrades

SECTION 3: MEDIUM PRESSURE PIPELINES

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
BROUGHT FORWARD							
3.52.1.1			a) 30° to 45°	No	2		
3.52.1.2			b) 45° to 60°	No	2		
3.52.1.3			400mm to 550mm ND gusset T-piece, branch flanged to SANS 1123, Table 4000/3 , including blank flange (epoxy coated), main stem plain ended	No	1		
SECTION3: TOTAL CARRIED FORWARD TO SUMMARY							

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Linbro Park Water Upgrades

SECTION 4: PIPE JACKING

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
SECTION 4: PIPE JACKING							
4.1	SABS 1200LG		PIPE JACKING Total number of jacking operations: 2. Total length of pipes to be jacked: 110m. Maximum depth of jacked pipe invert: 6,5m. See Dwg JW13899R-DET07				
	PSLG 8.2.1		Jacking establishment				
4.1.1			a) Fixed charges (based on 2 jacking operations)	sum	1		
4.1.2			b) Time-related items (based on 110 m of jacking)	sum	1		
4.1.3			c) Contractor to specify duration to complete jacking operations	days			
	8.2.2		Supply of pipe to be jacked				
4.1.4			a) 1650 mm ND Class 100 D SC concrete pipes with rubber ring joints	m	110		
	8.2.3		Jacking pipes into their final position				
4.1.5			a) 1650 mm ND Class 100 D SC concrete pipes with rubber ring joints	m	110		
	8.2.4		Excavation for jacking Excavate for pipes at the jacking face (including removal and disposal of excavated material)				
4.1.6			a) Soft soil	m ³	180		
4.1.7			b) intermediate soil	m ³	180		
4.1.8			c) hard pickable soil	m ³	180		
4.1.9			e) very hard material occurring in bulk requiring extraordinary techniques for breaking, or boulders	m ³	180		
4.1.10	8.2.5		Extra-over 8.2.1 and 8.2.4 for unforeseen rock or boulders	Prov Sum	1	R 424 000.00	R 424 000.00
	8.2.9		Grouting of voids where ordered				
4.1.11			a) provision for establishment (for a total of two jackings	sum	1		
4.1.12			b) operation of equipment	day	10		
4.1.13			c) materials used	m ³	5		
4.1.14	8.2.10		Standing time for pipe jacking gang complete with equipment	hours	80		
4.1.15	PSLG 8.2.11		Installation of 1100mm ND Steel Pipe in Sleeve	m	110		
4.1.16	PSLG 8.2.13		Grouting of annulus between pipe and sleeve	m ³	15		
SECTION 4: TOTAL CARRIED FORWARD TO SUMMARY							

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Linbro Park Water Upgrades

SECTION 5: BUILDINGS AND FENCING

ITEM No.	PAYMENT REFERS	SC	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
			SECTION 5: BUILDINGS AND FENCING				
5			CONSTRUCTION OF THE FOLLOWING STRUCTURES TO BE AS PER ITEMISED BILL				
5.1			Pressure reduction building as per drawings JW13899R-DET17 and JW13899R-DET18				
			EARTH WORKS				
	SABS 1200 C		SITE CLEARANCE				
5.1.1	8.2.1	SC	Clear and Grub	m ²	100		
	SABS 1200 DA		EARTH WORKS (SMALL WORKS)				
5.2	8.3		Excavation:				
5.2.1	8.3.1	SC	a) Remove topsoil to nominal depth of 150 mm, stockpile and maintain	m ²	70		
5.2.2		SC	b) Excavate in all materials, and use for embankment or backfill or dispose, as ordered.	m ³	230		
			c) Extra-over for:				
5.2.3		SC	1) Intermediate excavation	m ³	60		
5.2.4		SC	2) Hard rock excavation	m ³	10		
	8.3.2		Restricted Excavation				
5.3		SC	a) Excavate for restricted foundations, footings and trenches in all materials and use for backfill or embankment or dispose	m ³	10		
	SABS 1200 G		CONCRETE (STRUCTURAL)				
5.4	8.2		Scheduled formwork intems				
	8.2.1		Rough				
5.4.1		SC	Outside walls	m ²	70		
	8.2.2		Smooth				
5.4.2		SC	Horizontal to under side of the roof slab	m ²	60		
			Inside walls				
5.5	8.2.5		Narrow Widths (up to 200 mm wide):				
5.5.1		SC	a) Sides of roof slab and overhang including drip recess	m	27		
5.5.2		SC	c) Sides of Concrete Surround	m	15		
5.6	8.2.6		Box Out Holes / Form Voids				
5.6.1		SC	a) Small, circular, of diameter up to and including 0,35 m	number	1		
			4) 1.5 m up to and including 2.0 m deep				
5.6.2		SC	c) Large, circular, of diameter over 0.35 m up to and including 0,7 m	number	4		
			4) 1.5 m up to and including 2.0 m deep				
	8.3		SCHEDULED REINFORCEMENT ITEMS:				
5.7	8.3.1	SC	High tensile steel bars (provisional)	t	4		
	8.4		SCHEDULED CONCRETE ITEMS				
	8.4.2		Blinding layer				
5.8		SC	50 mm blinding layer thickness Class 15/19	m ³	4		
5.9	8.4.3		Strength Concrete:				
TOTAL CARRIED FORWARD							

BROUGHT FORWARD							
5.9.1		SC	a) Grade 25/19 concrete for aprons	m³	1		
5.9.2		SC	b) Grade 25/19 concrete for floor slabs	m³	12		
5.9.3		SC	c) Grade 25/19 concrete in roof slab	m³	10		
5.9.4		SC	d) Grade 25/19 concrete for ramps	m³	5		
5.9.5		SC	e) Grade 25/19 concrete for walls	m³	20		
5.10	8.4.4		Unformed surface finishes:				
			b) Steel-floated finish				
5.10.1		SC	Top of roof	m²	38		
5.10.2		SC	Floor Slab	m²	26		
5.11			JOINTS				
5.11.1	8.5	SC	Slip joint between wall and roof slab	m	5		
			Installation of two layers of three ply malthoid				
5.12	CSC 5		Brickwork				
5.12.1	CSC 5.1	SC	Brick walls (doubt brick wall)	m²	69		
5.12.2	CSC 5.2	SC	Brick reinforcement	m	354		
5.13	PSG 8.1.4		METAL WORK				
5.13.1	PSG 8.1.4.1	SC	Door	number	3		
5.13.2	PSG 8.1.4.2	SC	Crawl Beam	number	2		
5.13.3	PSG 8.1.4.3	SC	Crawl Beam Support	number	2		
5.13.4	PSG 8.1.4.4	SC	Windows	number	10		
5.13.5	PSG 8.1.4.5	SC	Steel Staircase	number	1		
			Reservoir control valve building, as per drawings JW13899R-DET17 and JW13899R-DET19				
			EARTH WORKS				
5.14	SABS 1200 C		SITE CLEARANCE				
5.14.1	8.2.1	SC	Clear and Grub	m²	105		
	SABS 1200 DA		EARTH WORKS (SMALL WORKS)				
5.15	8.3		Excavation:				
5.15.1	8.3.1	SC	a) Remove topsoil to nominal depth of 150 mm, stockpile and maintain	m²	105		
5.15.2		SC	b) Excavate in all materials, and use for embankment or backfill or dispose, as ordered.	m³	340		
5.15.3			c) Extra-over for:				
5.15.3.1		SC	1) Intermediate excavation	m³	84		
5.15.3.2		SC	2) Hard rock excavation	m³	10		
5.16	8.3.2		Restricted Excavation				
5.16.1		SC	a) Excavate for restricted foundations, footings and trenches in all materials and use for backfill or embankment or dispose	m³	10		
TOTAL CARRIED FORWARD							

BROUGHT FORWARD							
	SABS 1200 G		CONCRETE (STRUCTURAL)				
5.17	8.2		Scheduled formwork items				
	8.2.1		Rough				
5.17.1		SC	Outside walls	m ²	90		
	8.2.2		Smooth				
5.17.2		SC	Horizontal to under side of the roof slab Inside walls	m ²	80		
5.18	8.2.5		Narrow Widths (up to 200 mm wide):				
5.18.1		SC	a) Sides of roof slab and overhang including drip recess	m	35		
5.18.2		SC	c) Sides of Concrete Surround	m	10		
5.19	8.2.6		Box Out Holes / Form Voids				
5.19.1		SC	a) Small, circular, of diameter up to and including 0,35 m 4) 1.5 m up to and including 2.0 m deep	number	4		
5.19.2		SC	c) Large, circular, of diameter over 0.35 m up to and including 0,7 m 4) 1.5 m up to and including 2.0 m deep	number	4		
5.20	8.3		SCHEDULED REINFORCEMENT ITEMS:				
5.20.1	8.3.1	SC	High tensile steel bars (provisional)	t	6		
	8.4		SCHEDULED CONCRETE ITEMS				
	8.4.2		Blinding layer				
5.21		SC	50 mm blinding layer thickness Class 15/19	m ³	6		
5.22	8.4.3		Strength Concrete:				
5.22.1		SC	a) Grade 25/19 concrete for aprons	m ³	1		
5.22.2		SC	b) Grade 25/19 concrete for floor slabs	m ³	20		
5.22.3		SC	c) Grade 25/19 concrete in roof slab	m ³	15		
5.22.4		SC	d) Grade 25/19 concrete for ramps	m ³	1		
5.22.5		SC	e) Grade 25/19 concrete for walls	m ³	25		
	8.4.4		Unformed surface finishes:				
5.23		SC	b) Steel-floated finish Top of roof	m ²	65		
5.24		SC	Floor Slab	m ²	50		
		SC	JOINTS				
5.25	8.5	SC	Slip joint between wall and roof slab Installation of two layers of three ply malthead	m	10		
	CSC 5		Brickwork				
5.26	CSC 5.1	SC	Brick walls (double brick wall)	m ²	90		
5.27	CSC 5.2	SC	Brick reinforcement	m	625		
5.28	PSG 8.1.2.4	SC	Lintels above doors and windows	m	5		
TOTAL CARRIED FORWARD							

BROUGHT FORWARD							
5.29	PSG 8.1.4		METAL WORK				
5.29.1	PSG 8.1.4.1	SC	Door	number	2		
5.29.2	PSG 8.1.4.2	SC	Crawl Beam	number	2		
5.29.3	PSG 8.1.4.3	SC	Crawl Beam Support	number	2		
5.29.4	PSG 8.1.4.4	SC	Windows	number	10		
5.29.5	PSG 8.1.4.5	SC	Steel Staircase	number	2		
			Guardhouse Building, as per Drawing JW13899R-DET05				
			EARTH WORKS				
	SABS 1200 C		SITE CLEARANCE				
5.30	8.2.1	SC	Clear and Grub	m ²	50		
	SABS 1200 DA		EARTH WORKS (SMALL WORKS)				
	8.3		Excavation:				
5.31	8.3.1	SC	a) Remove topsoil to nominal depth of 150 mm, stockpile and maintain	m ²	50		
	SABS 1200 G		CONCRETE (STRUCTURAL)				
	8.2		Scheduled formwork items				
5.32	8.2.5		Narrow Widths (up to 200 mm wide):				
5.32.1		SC	a) Sides of roof slab and overhang including drip recess	m	15		
5.32.2		SC	c) Sides of Concrete Surround	m	25		
	8.4		SCHEDULED CONCRETE ITEMS				
	8.4.2		Blinding layer				
5.33		SC	50 mm blinding layer thickness Class 15/19	m ³	5		
5.34	8.4.3		Strength Concrete:				
5.34.1		SC	a) Grade 25/19 concrete for aprons	m ³	5		
5.34.2		SC	b) Grade 25/19 concrete for floor slabs and strip footing	m ³	5		
5.34.3		SC	c) Grade 25/19 concrete in roof slab	m ³	5		
5.34.4		SC	d) Grade 25/19 concrete for ramps	m ³	1		
5.34.5		SC	e) Grade 25/19 concrete for walls	m ³	1		
	8.4.4		Unformed surface finishes:				
5.35		SC	b) Steel-floated finish	m ²	15		
			Top of roof				
5.36		SC	Floor Slab	m ²	10		
			JOINTS				
5.37	8.5	SC	Slip joint between wall and roof slab	m	5		
			Installation of two layers of three ply malthoid				
	CSC 5		Brickwork				
TOTAL CARRIED FORWARD							

BROUGHT FORWARD							
5.38	CSC 5.1	SC	Brick walls (double brick wall)	m ²	50		
5.39	CSC 5.2	SC	Brick reinforcement	m	125		
5.40	PSG 8.1.2.4	SC	Lintels above doors and windows	m	10		
	PSG 8.1.4		METAL WORK				
5.41	PSG 8.1.4.1	SC	Door	number	2		
	SABS 1200 DB		Potable Water Pipeline to Guardhouse				
	8.3.2		EARTHWORKS (PIPE TRENCHES)				
			a) Excavate in all materials for trenches, backfill compact and dispose of surplus material				
			Pipes with OD up to 25 mm ND				
			Excavation depth:				
			over and up to				
5.42		SC	0 m 1.0 m	metre	100		
	SABS 1200 L		MEDIUM-PRESSURE PIPELINES				
	8.2.1		Supply, Lay, and Bed Pipes Complete with Couplings				
5.43		SC	DN 25 mm HDPE PE 100 PN 16	metre	50		
5.44	8.2.2	SC	Extra-over 8.2.1 for the Supplying, Laying and Bedding of Specials Complete with Couplings	No	10		
	SABS 1200 LB		BEDDING (PIPES)				
5.45	8.2.1		Provision of bedding from Trench Excavation				
5.45.1		SC	a) Selected granular material	m ³	50		
5.45.2		SC	b) Selected fill material	m ³	10		
	SABS 1200 DB		Sewer Pipeline to Guardhouse				
	8.3.2		EARTHWORKS (PIPE TRENCHES)				
			a) Excavate in all materials for trenches, backfill compact and dispose of surplus material				
			Pipes with OD up to 110 mm ND				
			Excavation depth:				
			over and up to				
5.46		SC	0 m 1.0 m	metre	100		
5.47	SABS 1200 LB		BEDDING (PIPES)				
5.47.1	8.2.1	SC	a) Selected granular material	m ³	20		
5.47.2		SC	b) Selected fill material	m ³	20		
	SABS 1200 LD		SEWERS				
	8.2.1		Supply, Lay, Joint, Bed (Class 16) and test pipeline				
5.48		SC		metre	100		
	8.2.2		Extra-over 8.2.1 for Specials				
5.49		SC		metre	100		
5.50	PSA 8.8.7	SC	Application for Water connenction	Sum	1		
5.51	PSA 8.8.7	SC	Application for Sewer connenction	Sum	1		
	PSA 8.8.7	SC	Application for Electical connenction	Sum	1		
TOTAL CARRIED FORWARD							

BROUGHT FORWARD							
		SC	Electrical installation as per Drawing UR1311 - DET25	Sum	1		
5.52	PSA 8.8.7	SC	Application for Electrical connenction	Sum	1		
5.53		SC	Electrical installation as per Drawing UR1311 - DET25	Sum	1		
5.54		SC	Supply + Lay of cable. 3 Core Armoured Cable 4.0 mm ² + Trench + Backfill	m	100		
5.55		SC	Connection to Guardhouse Switchbox including electrical compliceance certificate	Sum	1		
5.56		SC	Sanitary fitting Supplied and Installed as per drawing	Sum	1		
			FENCING				
			SITE CLEARANCE				
5.57	8.2.5	SC	Take down existing concrete pallisade fence and transport material to nearest Johannesburg Water depot	m	570		
5.58		SC	Take down existing concrete precast wall and transport material to nearest Johannesburg Water depot	m	250		
5.59		SC	Take down existing "Clearvu" taper locking posts and pannels and reinstall later at the instruction of the engineer.	m	300		
			SUPPLY AND ERECTION OF NEW FENCE				
5.60		SC	"Clearvu" taper locking posts, 85x45mm, including locking recess mechanism, Galvanised. Post extended for flatwrap. Including excavation, concrete and backfilling.	No	250		
5.61		SC	"Clearvu" panels, 3.3m x 2.4m, 76.2mmx12.7mm apperture size, panel reinforced with 4x50mm "V" formation horisontal recess bands	No	246		
5.62		SC	Ripper flatwrap, 500mm diameter	m	570		
5.63		SC	"Clearvu" underdig anti-burrow, 500mm deep, including excavation and backfilling	m	570		
5.64		SC	6,51m Wide "Clearvu" sliding gate, 2.4 m high including heavy duty sliding rail and Flatwrap topping, 3mm dai galvanised wire with aperture size 76.2 x 12.7mm	No	1		
5.65		SC	6,51m x 600mm x 300mm Concrete beam (including excavation, backfilling, formwork, reinforcement	Sum	1		
SECTION 5: TOTAL CARRIED FORWARD TO SUMMARY							

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 Page (1)

Linbro Water Upgrades
CIDB grade 7CE or higher

Scope of Work

Johannesburg Water SOC Ltd



VOLUME 1

CONTRACT

PART 3:

SCOPE OF WORK



Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



C3 PREAMBLE TO SCOPE OF WORK

GENERAL

This section specifies and describes the supplies, services and engineering and construction works which are to be provided and any other requirements and constraints relating to the manner in which the contract work is to be performed.

SCOPE

These Project Specifications are set out in three portions:

- Portion A: covers a general description of the project, the facilities available and the requirements to be met.
- Portion B: covers variations to the standardised specifications, which are applicable to the contract.
- Portion C: covers particular specifications, which are applicable to all pipe diameters of 400 mm and larger on this contract.

STATUS

The Project Specifications together with the drawings and Schedule of Quantity indicate the section of Standard Specification applicable to this Contract.

In the event of any discrepancy between parts of the Standard Specification and the Project Specifications, the latter shall take precedence and shall govern.

Should any requirement of the Particular Project Specification conflict with any requirement of the Project Specification or Variations and Additions to the Standardised Specifications, the requirements of the Particular Project Specifications shall prevail.



Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Clause	Description
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Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

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Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Clause	Description
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Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

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Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 Page (8)

Linbro Water Upgrades
CIDB grade 7CE or higher

Scope of Work

Clause	Description
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	DRAWINGS

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PORTION A: PROJECT DESCRIPTION AND GENERAL INFORMATION

PS 1 DESCRIPTION OF THE WORKS

PS 1.1 EMPLOYER'S OBJECTIVES

The primary objective of this project is to execute the works described below, while providing uninterrupted water supply to the Johannesburg Water Linbro Park and Alexandra Reservoirs and minimize water loss, and avoid damage of nearby properties.

The project to be implemented has taken into cognizance the prescripts of EPWP and local SMMEs.

PS 1.2 OVERVIEW OF THE WORKS

The work to be carried out under this contract includes the installation of a steel pipeline including 680 m of 1 100 mm ND, 100 m of 1 000 mm ND and 220 m 400 mm ND. Included in the project is the construction of three new air valve chambers, a new scour valve chamber, a new isolation valve chamber, a new pressure reducing valve building, a metering chamber and a new reservoir control valve building. Also included are two pipe jacks with a total combined length of 70 m.

PS 1.3 EXTENT OF THE WORKS

The primary activities of the project entail the following:

- Site clearance
- Traffic control and temporary signage during construction
- Location, exposing and protection of existing services
- Demolition of part of three security fences and the reinstatement of these fences, complete with electric fencing, after construction is complete
- Excavation, trench preparation, bedding and compaction
- Supply, unloading and laying of pipes
- Backfilling of trenches and testing of installation
- Provision and installation of valves and chambers / buildings
- Reinstatement of surfaces to original condition
- Connections into existing pipes
- Connections into existing reservoirs
- Pipe Jacking
- Replacing the existing palisade fence around the reservoir complex
- Construction of a new guardhouse at the reservoir complex

The following table contains the details of the pipes to be supplied by the Contractor. Steel pipes and fittings shall be manufactured in accordance with API 5L X52 and all pipes will have an internal lining of SF Epoxy and an external coating of Rigid Polyurethane.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Length (m)	Pipe ND (mm)	Pipe ID (mm)	Pipe OD (mm)	Wall thickness (mm)	Pipe lengths (m)	Number of pipes
680	1 100	1 094	1 118	12	12.192	56
100	1 000	996	1 016	12	12.192	9
220	400	394	406	6	12.192	19

Johannesburg Water will appoint a separate consultant to provide third party inspections at the pipe manufacturer's premises, including:

- Exercising of quality control at the manufacturer's site during the manufacture of the pipes;
- Review the manufacturer's quality standards;
- Accept / approve the release of each pipe from the factory.

Included in the works is the demolition and subsequent reinstatement of two portions of steel palisade fence, belonging to a private land owner. Both sections of fence to be demolished and reinstated cross the proposed pipe-route. Also included is the demolition and disposal of the existing concrete palisade fence around the reservoir complex, and the replacement thereof with a new Clearvu (or similar) fence.

The contractor shall reinstate these fences to their original conditions or better, complete with electric fences to the satisfaction of the owners. While the walls are demolished, the Contractor shall arrange for additional security to the satisfaction of the private land owner and Johannesburg Water.

Also included is the construction of a new guardhouse. The Contractor shall also locate water, sewer and electricity connections for the new guardhouse and arrange for metered connections with the relevant authorities.

The Contractor's obligations shall also include strict compliance with any Environmental requirements and/or reports deemed to form part of this Contract as well as any Occupational Health and Safety requirements.

This description of the works is not necessarily complete and shall not limit the work to be carried out by the Contractor under the Contract. Approximate quantities of each type of work are given in the Schedule of Quantities.

PS 1.4 LOCATIONS OF THE WORKS

The works are located in Linbro Park, Johannesburg. The proposed pipe-route will run alongside Clifford Road (a portion of which has been abandoned) and through the property of UTi, a private land owner. The proposed pipe-route then crosses Clulee Road and enters the Linbro Park / Alexandra Reservoir Complex (LPARC). Refer to the locality plan included in the set of drawings.

PS 1.5 TEMPORARY WORKS

The Contractor shall, as relevant:

- provide temporary drainage works, temporary pumps and other equipment as might be necessary for the protection, draining and dewatering of the works; and

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- b) construct and maintain haulage, temporary access and construction roads, subject to the approval of the Employer, and permit the Employer, other Contractors, statutory bodies or any other person who might require legitimate access to or through the site for the purpose of executing legitimate business, free and unhindered usage of such roads.
- c) temporary water connections, Contractor's offices, storage sheds, latrines, barricading of Works shall be located in an approved position and subject to the approval of all authorities concerned. Access to a portion of the project site will be via the UTi premises. The Contractor must arrange for access to the entire project site. The Contractor must arrange for the establishment of a Contractor's camp on site.
- d) Safety and security of the Contractors' temporary works shall be at the Contractors' discretion, but always in accordance with stipulated Occupational Health and Safety requirements. The Contractor shall also liaise with UTi, and other affected property owners in the area, to ensure that the security requirements of these owners are met.
- e) The camp shall be adequately guarded during or outside working hours.
- f) The costs for all above activities shall be deemed to be included in the rates.

PS 2 ENGINEERING

PS 2.1 EMPLOYER'S DESIGN

The Contractor undertakes only construction on the basis of designs issued by the Employer. The Contractor is to follow the specification, the design and construction drawings as laid out by the Employer.

PS 2.2 DRAWINGS

Drawings are included at the end of Section C3: Scope of Work of the tender document. The drawings are issued for tender purposes only. Construction drawings will be issued to the successful tenderer, prior to commencement of construction.

PS3 PROCUREMENT

PS 3.1 PREFERENTIAL PROCUREMENT PROCEDURES

The Employer's promotes preferential procurement. The philosophy of the process and mechanics of the points scoring system are described in section JW10, which is included in the returnable documents section T2.2.

PS 3.2 SUBCONTRACTING

Some specialized work could be subcontracted, including CP and AC Mitigation installations and pipe jacking. The Contractor must take note of Clause 4.4 of General Conditions of Contract 2010.

The minimum requirements of the sub-contractors are as follows:

1. Valid CK registration
2. SA ID copies of owners
3. Active CIDB membership
4. Valid Tax clearance certificate
5. Valid BBBEE certificate
6. COID certificate
7. Company Profile including similar experience and skilled personnel CVs
8. Health and Safety Plan

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The main contractor is:

- a) to enter into contract with the above sub-contractor(s) including any other subcontractors (for specialised work, if any) in accordance with the requirements of Clause 4.4 of the General Conditions of Contract 2010. The sub-contractor(s)' nomination will be determined by the scope of work and the amount of work that is to be carried out.
- b) required to utilise local labour for the completion of unskilled labour-based sections of the works, where practical.
- c) Responsible for all work executed (**QUALITY, CONTRACTUAL LIABILITIES**) on his behalf or under his supervision and/or management by all sub-contractors, including nominated sub-contractors.

The Engineer shall, prior to the commencement date of the contract, determine the scope of work and the amount of work that is to be carried out by the nominated subcontractor(s). If applicable, the Contractor shall be expected to enter into a contract with the nominated subcontractor(s) in accordance with the requirements of Clause 4.4 of the General Conditions of Contract 2010.

NOTA BENE: *The Engineer shall not negotiate directly with sub-contractors and all problems relating to payments, programming, workmanship, etc., are matters between the Contractor and his sub-contractors.*

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PS4 CONSTRUCTION

PS 4.1 GENERAL CONDITIONS AND APPLICABLE STANDARDS

PS 4.1.1 General Conditions

The "Special Condition of Contract" to be read in conjunction with the "General Conditions of Contract for use Civil Engineering Works (GCC 2010) (Second Edition, Print 3.1).

PS 4.1.2 Applicable Standardized Specifications

The Standard Specifications for all associated civil work applicable to this Contract shall be:

SANS 1200A	:	GENERAL
SANS 1200AB	:	ENGINEER'S OFFICE
SANS 1200C	:	SITE CLEARANCE
SANS 1200D	:	EARTHWORKS
SANS 1200DB	:	EARTHWORKS (PIPE TRENCHES)
SANS 1200G	:	CONCRETE (STRUCTURAL)
SANS 1200L	:	MEDIUM PRESSURE PIPELINES
SANS 1200 LB	:	BEDDING (PIPES)
SANS 1200 LD	:	SEWERS
SANS 1200 LF	:	ERF CONNECTION (WATER)
SANS 1200 LG	:	PIPE JACKING

Unless and to the extent that it is otherwise stated in the Contract Data, the scope of work or the specifications, the Contractor shall carry out the actions and arrange for the facilities as described in part 1 of SANS 1921, not extend his operations beyond the site.

Reference is made to certain provisions of:

SANS 1921-5 Construction and management requirements for works contracts: Earthworks activities which are to be performed by hand

SANS 1914-5 Targeted construction procurement: Participation of targeted labour

All the above specifications are not issued with this volume but are available at the Contractor's expense from: Standards South Africa,

Office Address:	Postal Address:	Telephone:	Telefax	Email:
1 Dr Lategan Road Groenkloof PRETORIA	Private Bag X191 PRETORIA 0001	(012) 428-6883	(012) 428-6928	sales@SANS.co.za

PS 4.2 PLANT AND EQUIPMENT

Where any of the operations or the movement of any of the construction vehicles or mobile construction equipment, or any combination of these activities, causes damage to the surface of an area normally open to the public, such surface shall be repaired as a matter of urgency.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Construction equipment shall be suitable for the production of the end result required under the conditions applicable to the site.

The construction equipment used for applying the dynamic load, controlling the moisture content, and grading or mixing, shall be capable of achieving the specified compaction with the materials available for the construction of the works.

The Contractor shall ensure that adequate equipment is available for the entire construction operation. In case of pipes, this shall include equipment for pipe cleaning, pressure testing of the newly laid water main.

The Contractor shall provide the following plant and equipment on the site as and when required, together with operating personnel:

- trucks for the transportation of materials from storage site to construction site and back;
- road traffic signs, materials for barricading and lighting and all other items necessary for ensuring public safety and convenience. The Contractor shall furnish all labour required for the erection, maintenance and removal of these items and materials;
- mechanical and power tools, when ordered to do so by the Engineer;
- hand tools and equipment such as shovels, picks, etc, which may, in the opinion of the Engineer, be required for the execution of the works;
- forms for the casting of cast-in-situ concrete for anchor blocks. The Contractor shall supply all labour required for the erection, stripping and cleaning of forms; and
- any other plant and equipment deemed necessary for the execution of the Works

Unless otherwise indicated in the Contract Documents, the Contractor shall provide all such plant and equipment complete with operating personnel, fuel and power as required.

If the Contractor fails, in the opinion of the Engineer due to his own negligence, to enable the plant or equipment to be efficiently or fully utilised, the costs of under-utilisation of plant or equipment shall be borne by the Contractor to the extent determined by the Engineer.

If a vehicle or item of construction equipment is required to operate on any public highway, road or street or on any private road or parking area that has been surfaced, it shall comply with the requirements of the applicable road traffic ordinance.

PS 4.3 ENGAGEMENT OF LABOUR

PS 4.3.1 Provision of a Temporary Workforce for the Contract

The Contractor shall have regard for the stipulation laid down for all Labour Intensive projects that he employs labour from the local community through the Labour Desk that has been established for this purpose.

The Labour Desk shall assist in identifying available local labour and, where available, semi-skilled labour as well as local sub-Contractors. The Labour Desk shall also assist and advise regarding conditions of employment, minimum wages, disputes and disciplinary procedures.

The workforce that is employed on Site shall consist of local labour where applicable, except for approved key staff, to the extent that is compatible with the requirements of Clause 4.11 of the General Conditions of Contract 2010.

The Occupational Health and Safety Act must be adhered to with reference to the safety of any employee irrespective of whether such employee is employed by the Contractor or by a local sub-contractor. Furthermore, a contract of employment must be signed between the Contractor

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

and each of his employees and sub-contractors and between such sub-Contractors, and each of the sub-contractor's employees with clear reference to the following conditions:

- The minimum agreed wage rate per hour in respect of labourers;
- The agreed pay rate per unit of production where applicable;
- UIF and WCA payments;
- Minimum working hours per day;
- Start and end times of a daily shift;
- Lunch break times;

Company Policy regarding the following:

- Rain time
- No work no pay - sick, absent
- Disciplinary policy
- Grievance policy
- Method of payment
- Workers' clothing and safety equipment to be issued.
- The Contractor is required to show these items to the Engineer for approval before construction commences.

PS 4.3.2 Transportation of labourers

The labour employed on this contract shall be local labour from the nearest local community. Transportation should be arranged from their homes to the site.

PS 4.4 **EXISTING SERVICES**

The Contractor shall make himself acquainted with all existing services such as stormwater drains, water mains, power lines, cables, gas pipelines, telephone and lighting poles, water meters, stopcock boxes, valve boxes, hydrants, air mains, trees, sewers, etc. before any excavation commences. Special care and due diligence shall be exercised when working adjacent to the abovementioned existing services. **Under no circumstance is the Contractor to alter or in any way interfere with existing works or underground services unless authorised by the Engineer.**

Where, in the opinion of the Engineer and if ordered by him, there is sufficient uncertainty as to the existence of, or the position or depth of any underground services, the Contractor shall first make use of specialist equipment such as ground penetrating radar before carrying out exploratory excavations using hand tools, in order to obtain the required information without causing damage. Exploratory excavations shall be carried out, refilled and reinstated in an approved manner as expeditiously as possible. Where existing works are of such a nature that the Engineer may require them to be moved by the Contractor, the cost of such work will be paid for at scheduled rates or on a Day works basis.

The Contractor shall take adequate measures approved by the Engineer to protect and prevent damage to existing works and services. The Contractor shall immediately notify the Depot Manager as well as the Engineer, of any damage caused to existing works and services. All cables and pipes shall be considered "live" unless confirmed otherwise by the relevant service authority.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PS 4.5 SITE ESTABLISHMENT, FACILITIES AVAILABLE AND REQUIRED

The Contractor shall be required to establish all facilities, including, as necessary, construction camps, offices, stores, workshops and testing facilities required for the due and proper performance of the contract in the vicinity of the Works. The Employer will not provide any facilities to the Contractor. The Contractor shall make his own arrangements for a campsite with the relevant authorities.

The Contractor shall supply and maintain adequate and suitable sheds for the storage of materials that might deteriorate if exposed to the weather.

The Contractor shall, as specified in the specification data, provide, maintain and keep clean

- a) office accommodation and equipment for use by the Employer and his agents,
- b) air conditioned boardroom for site meetings, and
- c) all other facilities for all persons engaged in the works.

The Contractor shall provide and maintain all first-aid facilities required by law.

The Contractor shall provide, maintain, move to positions required and finally remove, proper latrines in compliance with the relevant Municipal Sanitation General By-laws. Latrines must be properly screened and secluded from public view and their use shall be strictly enforced. The Contractor shall provide chemical toilets (or other approved toilets). Soak-aways and septic tanks will not be allowed on the site. Temporary latrines must be sited so that they are within reasonable distance of the working place. Sufficient latrines must be provided having regard to the number of persons employed on the Works. All latrines shall be adequately ventilated, properly disinfected and kept in a clean condition.

At the time of erecting the sheds and offices, the Contractor shall erect on or adjacent to the site, in a conspicuous place to be agreed upon by the Engineer, contract name board as detailed in PSAB 3.1

On completion of the works, or when the facilities provided by the Contractor are no longer required, the Contractor shall remove them and clear away all surface indications of their presence.

The Contractor shall maintain the site in a clean, orderly and sanitary condition and shall take all the necessary steps and precautions to prevent the pollution on the surrounding area by his employees in any way. These steps and precautions shall be to the satisfaction on the Engineer and Medical Officer of Health of Johannesburg.

The Contractor will be required to obtain a cellular telephone for his own and Engineer's representative's use on the site.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PS 4.6 SITE USAGE

The Employer may make available, as part of or by reference in the Tender Documents, site data relating to hydrological and subsurface conditions relevant to the construction of the Works. The Employer does not guarantee that such site data is fully representative of

- a) all information (as far as practicable) as to risks, contingencies and all other circumstances which may influence or affect the Tender
- b) all conditions that may be encountered by the Contractor during the execution of the Works.

Should the Employer have carried out exploratory drilling and have available the borehole cores derived from such drilling, the Tenderer shall examine such borehole cores and any related data at the place and time notified to the Tenderer.

The Tenderer shall visit the Site of the Works and shall satisfy himself as to the means of access and all matters affecting the Works, including the extent to which mechanical plant can be used for executing the Works.

Visits to the site shall be at the sole risk of the Tenderer and the Employer shall not be liable for any loss or damage to persons or property as a result of or arising from the site inspection.

PS 4.7 PERMITS AND WAYLEAVES

The Engineer has obtained some of the wayleaves from identified authorities. The authorities include the following services: roads and stormwater (JRA), bulk water supply (Rand Water), electricity (Eskom and City Power), gas (Egoli Gas), telecommunications (Telkom), and the like. See item PSA 8.8.7.

PS 4.8 ALTERATIONS, ADDITIONS, EXTENSIONS AND MODIFICATIONS TO EXISTING WORKS

The Contractor shall, within 20 working days or 10 % of the construction period after taking possession of the site (whichever is the lesser), satisfy himself that the dimensional accuracy, alignment, levels and setting out of existing structures or components thereof are compatible with the proposed works, and notify the Employer of any areas of dissatisfaction.

The Contractor shall, on becoming aware of a defect in existing works which will have an impact on the current works, notify the Employer of such a defect without delay.

The water mains of the existing network would have to be modified slightly to facilitate the connection of the new water main installation.

PS 4.9 INSPECTION OF ADJOINING STRUCTURES, SERVICES, BUILDINGS AND PROPERTIES

The Contractor shall, before commencing with works which have the potential to damage surrounding structures, services, buildings or property, arrange an inspection with the owners of such structures, services, buildings and property and representatives of local or controlling authorities, as appropriate, to determine the condition of buildings, structures, services, paved surfaces, roads, kerbs, perimeter walls, channels and the like, that the works could affect, and document their current condition in sufficient detail to enable disturbances or damage which might be caused by the works to be evaluated. The Contractor shall furnish the Employer with copies of all such documentation and shall be held responsible for any disturbance and

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

damage to such structures, services, buildings and property arising from the performance of the contract.

PS 4.10 WATER AND ELECTRICITY FOR CONSTRUCTION PURPOSES

The Contractor shall make his own arrangements for the supply and storage of all water required for this contract. Only sources approved by the Engineer shall be used. No direct payment will be made in respect of the procurement, transporting and distributing of water, however these costs shall be deemed to be covered by the Contractor's rates for the various other items of work in this contract requiring the use of water.

The Contractor must make his own arrangements for any power he considers necessary. Should the Contractor utilise a portable power source, all electrical installations connected thereto shall comply with the provisions of the Mines, Works and Machinery Regulations and the Standard Regulations for the Wiring of Premises. No direct payment will be made to the Contractor. All costs in this respect shall be deemed to be covered by the various other items of work included under this contract.

PS 4.11 SURVEY CONTROL AND SETTING OUT OF THE WORKS

The methods of setting out employed by the Contractor shall be such that they ensure positive control.

The Contractor shall, prior to the ordering of pipe fittings, set out the works strictly according to the Engineer's construction drawings and/or site instructions.

The Contractor shall record the setting out of the works in an approved format and order all required pipe fittings accordingly. See item PSA 8.8.5.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PS 5 MANAGEMENT OF THE WORKS

PS 5.1 PLANNING AND PROGRAMMING

The Contractor shall manage and execute works in premises that are occupied in such a way as to cause the least interference with the general routine of the occupants of these premises. The Contractor shall regularly clear away rubbish and excess materials as the works proceed and maintain the works in a clean and satisfactory state. The Contractor shall manage the works in a manner which protects and does not disturb the trees and shrubs identified in the specification data and those trees and shrubs not directly affected by the works. The Contractor shall take all necessary precautions to keep the works and site free from vermin.

The Contractor shall submit to the Engineer for his approval a detailed programme within the period stated in the Contract Data showing the order of, procedure and method in which he proposes to carry out the work, his method of measurement of progress as well as the resources that will be allocated to each item or phase of the works. On a fortnightly basis throughout the contract, the Contractor shall submit the accepted programme marked to show actual progress. Quantities proposed for execution during each month must be shown. In addition, the anticipated cash-flow for the Contract, based upon these quantities, shall be shown as per prescribed format as provided by the Engineer. The Contractor must include in his programme all necessary details pertaining to the lead-time required for the supply of materials.

The Contractor shall, whenever required by the Engineer, furnish for his information particulars in writing of the Contractor's arrangements for the carrying out of the works and of the plant and temporary works, which the Contractor intends to supply, use or construct as the case may be. The submission to and approval by the Engineer of such programme, or the furnishing of such particulars will not relieve the Contractor of any duties or responsibilities under the contract.

The Contractor will be expected to progress with the Works in accordance with the approved programme, and shall not deviate from the order of execution shown in the programme without the prior approval of the Engineer or his Representative. Should such approval be given, an adjusted programme shall be produced within seven (7) days and submitted to the Engineer for evaluation.

The Contractor must carry out the work at a rate not less than that stated in his programme. Should the work not be executed with the diligence and labour specified, meant and intended in and by the terms of the contract, then the Employer shall institute the remedies under Clause 9.2 of the General Conditions of Contract 2010.

PS 5.2 SEQUENCES OF THE WORKS

Notwithstanding any changes that the Engineer deems necessary the sequences should include the following:

- Mobilisation, project planning and control and communications to stakeholders
- Obtaining wayleaves
- Surveys and setting out
- Site clearance for the affected areas
- Traffic control and temporary signage during construction
- Exposing existing services and driveways
- Searching for services with specialised equipment

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- Excavation, trench preparation and compaction
- Supply, bedding and laying of pipes
- Provision and installation of valves and chambers
- Backfilling (blanket layers and top layers including compaction)
- Trenchless installations
- Construction of valve chambers
- Reinstatement of paved and other areas where affected
- Testing of the installation
- Clearing of the site including removal of spoil
- Survey and provision of as-built information to Engineer
- Site hand over

The Contractor shall obtain approval from the Engineer at each stage to proceed with subsequent stages.

PS 5.3 SOFTWARE APPLICATIONS FOR PROGRAMMING

The Contractor shall table an updated copy of the approved programme at each site meeting clearly indicating the actual progress versus the scheduled progress. It is recommended that MS Projects, MS Excel be used to prepare the construction programme schedule

PS 5.4 METHODS AND PROCEDURES

The Contractor shall submit to the Engineer, within a period stated in the Contract Data, a detailed construction programme, detailing the date of commencement and completion of the work activities, dates, duration and extent of traffic accommodation interruption water supply to affected consumers. The detailed programme shall be based on the preliminary programme submitted with the tender and shall make an allowance for the following:

- Normal working hours shall be defined as between 07:00 and 17:30 Mondays to Fridays and also 07:00 to 13:00 on Saturdays. Working hours to be to the satisfaction of the owners of the surrounding properties, and are to be approved by the Engineer.
- No work outside working hours will be allowed. Should the Contractor wish to work outside normal working hours written permission shall be obtained from the Engineer and all additional costs arising out of such work shall be entirely to the Contractor's account.
- Only one side of the street may be affected by the construction at any one time.
- The Engineer may require that the construction of certain road crossings be done outside normal working hours.

The Engineer shall provide the Contractor with drawings and details of the Works that need to be done.

Once a detailed programme has been approved, the Contractor shall not deviate from the planned operations.

Pipeline and associated hydrants, valves and fittings

- The existing pipes will be left in place and remain operational.
- The connection of the new pipe will be done by the Contractor under strict monitoring by the Engineer.
- Extreme care should be taken not to break or damage the existing pipelines. If this should happen and the existing pipe gets damaged during the course of installing the new line, then the relevant Depot Manager must to be notified. The trench will have to be drained by

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

the Contractor after the Depot has turned the water supply off. All assistance must be given by the Contractor to the Depot in repairing the damaged pipe.

- The new pipelines will be laid as indicated on the drawings supplied.

All existing erf connections are to be disconnected from the existing reticulation and then reconnected to the new pipeline with minimum disruption to residents.

Fire hydrants and valves

- New fire hydrants, valves and fittings are to be and installed on all the new pipelines.
- After the old mains have been disconnected from the reticulation system (if applicable) all existing valves and hydrants are to be handed to the Employer.

General

- The Contractor will arrange for the warning of the public of any shutdown of supply necessary in his/her opinion for the proper execution of the Works.
- All disconnections and reconnections, connections to the existing mains, closing and opening of valves and the disruption of water supply must be liaised with the relevant Depot Manager (011) 531 9550 at least 4 working days prior to the action (but preferably more).
- The disruption of supply and the duration of disruption of the supply to the consumers are to be kept to a minimum. Consumers are to be informed of any disruptions as described later in this specification.
- Any claims from the property owners and/or the community will be considered and evaluated by the Employer. Should The Employer's find a valid claim but found that the Contractor has neglected his/hers responsibilities and/or duties, which lead to the claim, the Contractor will be responsible for settling the claim.

PS 5.5

QUALITY PLANS AND CONTROL

The onus to produce work that conforms in quality and accuracy of detail to the requirements of the specifications and drawings rests with the Contractor, and the Contractor shall, at his own expense, institute a quality-control system and provide experienced personnel, together with all transport, instruments and equipment to ensure adequate supervision and positive control of the works at all times.

The cost of supervision and process control will be deemed to be included in the rates tendered for the related items of work.

On completion and submission of every part of the Works to the Engineer for examination, the Contractor shall furnish the Engineer with proof of quality in the form of a data pack containing measurements, levels and all compaction and hydraulic test results to indicate compliance with the scope of work.

PS 5.6

ACCOMMODATION OF TRAFFIC ON PUBLIC ROADS OCCUPIED BY THE CONTRACTOR

The Works are to be carried out in areas with mostly vehicular traffic and also pedestrian traffic. The watching, barricading, lighting and traffic control on Site shall be carried out in strict compliance with these Specifications. Furthermore, the Contractor shall ensure that pedestrians have free access past the Works without having to walk on trafficked roadways and shall make every effort necessary to ensure that construction activities cause as little inconvenience and danger to the public as possible.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The Contractor shall ensure that the use of the trafficked carriageway, both pedestrian and vehicular, by his construction plant, vehicles and labour is kept to a minimum required for the construction activities but without compromising the safety of his work force.

The Contractor shall ensure that access for residents, vehicles and pedestrians is given at all times. The tendered Sum for trench excavation shall include for the full costs associated with all provisions to ensure adequate accommodation of traffic, i.e. signage, flagmen etc., and no further costs will be approved by the Engineer in this regard.

The Employer shall issue all relevant wayleaves to the successful Contractor. The Contractor shall liaise with all relevant service providers and/or authorities regarding the commencement of works and shall ensure that all wayleave conditions are adhered to.

The Contractor shall liaise with Johannesburg Roads Agency and shall ensure that all required way leaves have been obtained before works commence.

No construction shall commence prior to the Engineer having approved the Contractor's proposed traffic accommodation measures and all traffic control devices having been positioned in accordance with the approved traffic accommodation measures. Approval of a particular proposed accommodation measure shall in no way relieve the Contractor of his duties or responsibilities under the Contract.

In particular, excavations must at all times be made safe such that they will not become a safety risk for the public. Trenches must not be left open overnight without sufficient barricading, lighting and watching to ensure satisfactory safety. Excavations must be kept free of water.

PS 5.7 OTHER CONTRACTORS ON SITE

The Engineer shall, prior to the commencement date of the contract, determine the scope of work and the amount of work that is to be carried out by the nominated sub-Contractor(s). If applicable, the Contractor shall be expected to enter into a contract with the nominated sub-Contractor(s) in accordance with the requirements of Clause 4.4 of the General Conditions of Contract 2010.

The Contractor shall provide the following general attendance on nominated and selected sub-Contractors executing the works:

- access to the site and places where the subcontracted work shall be carried out, including the reasonable use of any temporary personnel, hoists erected by the Contractor;
- the provision of water and lighting and of single phase electric power to a position within 50 m of the place where the subcontracted work shall take place;
- the provision of an area for the sub-Contractor to establish temporary facilities;
- the use of erected scaffolding that belongs to the Contractor, in common use with others, while it remains erected;
- the use of ablution facilities and the like; and
- access to telecommunication facilities.

PS 5.8 TESTING, COMPLETION, COMMISSIONING AND CORRECTION OF DEFECTS

The Contractor shall allow in his general inspections and tests and for the supply of all necessary equipment that may be required for these tests and/or inspections by the Engineer. The Contractor shall make good any defects prior to commissioning of the works.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The Contractor shall carry out sufficient tests to ensure that the contract requirements for all materials incorporated in the works are complied with. The Employer is at liberty to carry out such tests as he deems necessary to determine compliance with the contract requirements and will make available the results of all tests to the Contractor. The Contractor shall keep systematic records of the test results and all worksheets relating thereto.

PS 5.9 RECORDING OF WEATHER AND ABNORMAL RAINFALL

If during the time for completion of the Works or any extension thereof should abnormal rainfall or wet conditions occur, then an extension of time in accordance with Clause 5012 of The General Conditions of Contract 2010 thereof shall be granted by the Employer, calculated on the critical path method. It shall be applied as follows:

A delay caused by inclement weather conditions will be regarded as a delay if, in the opinion of the Engineer, all progress on an item or items of work on the critical part of the working programme of the Contractor has been brought to halt. Delays on working days only (based on a five day working week) will be taken into account for the extension of time, but the Contractor shall make provision in his programme of work for an expected delay of 15 (fifteen) working days caused by normal rainy weather, for which he will not receive any extension of time.

Daily records of rainfall and activities within the critical parts affected shall be kept by the Contractor and signed by the Engineer's representative on the site. For this, accurate rain gauging shall be taken at a suitable point on the site, and the Contractor shall, at his own expense, take all necessary precautions to ensure that unauthorised persons do not interfere with the rain gauges. Failure to produce signed copies of the above records on a daily basis to the Engineer's representative on the site after the event having occurred will be deemed to be in breach of this Clause and will not be admissible for purposes of seeking an extension of time.

The Contractor shall be permitted to take his own rainfall measurements on site subject to the Engineer's approval, but access to the measuring gauge(s) shall be under the Engineer's control. The Contractor is to provide and install all the necessary equipment for accurately measuring the rainfall as well as to provide, erect and maintain a security fence plus gate, padlock and keys at each measuring station, all at his own cost.

PS 5.10 FORMAT OF COMMUNICATIONS

The Contractor and Employer shall follow the communication protocol through the Engineer and Contractor representatives. Communication media applicable shall be site meetings, telephone, fax, letter and email.

PS 5.11 KEY PERSONNEL

The key role players involved or associated with the contract are listed below with references made to the General Conditions of Contract.

- The Employer (GCC, Clause 1.1.1.15)
- The Engineer (GCC, Clause 1.1.1.16)
- The Engineer's Representative (GCC, Clause 1.1.1.17)
- The Contractor (GCC, Clause 1.1.1.9)
- The Contractor's Site Agent (GCC, Clause 4.12.2)
- Responsible person in terms of the OHAS Act

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PS 5.12 MANAGEMENT MEETINGS

It is expected that the key role players mentioned in PS 5.11 will be involved or associated with the contract at all management and site meetings.

PS 5.13 FORMS FOR CONTRACT ADMINISTRATION

Refer to Returnable Documents Volume 1 for contract related forms that should be completed

PS 5.14 DAILY RECORDS

A site daily diary, site instruction book, both in triplicate and safety documents are to be provided and kept by the Contractor on site and updated on a daily basis. All copies will be forwarded to The Employer's after completion of this contract.

PS 5.15 BONDS AND GUARANTEES

The Contractor shall within 21 (twenty one) days from the date of the Letter of Acceptance provide the Employer with a Surety Bond in the form of a Bank Guarantee, Bank Transfer or a Guarantee from an approved Insurance Company to the satisfaction of the Employer in the form included in the Tender Documents, for an amount equal to ten per cent (10%) of the Tender Sum, for the due and punctual fulfilment and completion of all his obligations under the Contract and no Extension of Time or any variation of the Contract nor the determination of the Contract by the Employer in terms of GCC 2010 Clause 9.2 hereof shall in any way impair or diminish or terminate any liability to the Employer under and by virtue of such Surety Bond, and the cost of the Surety Bond to be so entered into shall be at the expense in all respects of the Contractor; the Surety Bond to be released upon issue of the Engineer's Certificate of Completion, unless otherwise stated in the Appendix.

PS 5.16 PAYMENT CERTIFICATES

Measurements will be done continuously between the Engineers Representatives and the Contractor on dates and times agreed on. Dates must be arranged by these parties. The progress of the following items will be recorded hereunder:

- The Contractor will provide a certificate with quantities to the Engineer before or on the 21st of every month.
- If any material on site is claimed, proof of ownership must be provided either by means of the necessary receipts or a letter from the supplier stating that ownership has been transferred to the Contractor upon delivery.
- After the payment certificate has been approved by Engineer, the Contractor must issue a VAT invoice. The certificate will then be ready for handing in.
- Payment certificates must be completed monthly and submitted before or on the 21st of each month. The Contractor must familiarize themselves with the payment circle under Clause 6.10.4 of the General Conditions of Contract for Construction Works 2010.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PS 6 FEATURES REQUIRING SPECIAL ATTENTION

PS 6.1 SECURITY

The Contractor shall be responsible for the security of his personnel; materials and construction plant on and around the site of the Works and for the security of his camp, and the Employer in this regard will consider no claims. An item has been included in the Bill of Quantities to cover additional security needs should the Engineer deem this necessary. The Contractor shall also ensure that none of his activities on site compromise the safety and security of the UTi premises, or adjacent properties. The Contractor shall liaise with the relevant authorities of these properties and provide security to their satisfaction. The Contractor shall also liaise with them for access to respective properties and for permission to set up the Contractor's camp. The daily access to arrangements to site shall be to the satisfaction of the relevant governing bodies of the properties concerned.

PS 6.2 OPERATION OF VALVES

It shall be necessary to isolate a portion of the reticulation to execute the Works. The Contractor shall not operate any valves. Requests for isolation of the pipe section shall be made to the Zandfontein Depot, on (011) 531 9550 at least 4 working days in advance. The Engineer shall arrange for valve closure by The Employer's personnel.

PS 6.3 COMMUNITY LIAISON AND COMMUNITY RELATIONS

In all dealings with the community and workers employed from within the community, the Contractor shall take due cognizance of the character, culture and circumstances of the community involved and shall at all times use his/her best endeavours to avoid the development of disputes and to foster a spirit of co-operation and harmony towards the project.

The Contractor shall at all times, keep the Engineer fully informed on all matters affecting the community and shall at all times maintain good public relations with The Employer's customers and the public. The Contractor shall at all times, keep the Engineer fully informed of progress and planned interruption on all matters affecting the community.

PS 6.4 NOTICE AND WARNING TO CONSUMERS

The Contractor will arrange for the warning of the public of any shutdown of supply necessary in his opinion for the proper execution of the Works. The Contractor must, however, give at least 10 (ten) days' notice to the Engineer of his requirements in this respect. Notice costs to be provided for in the tender price. Assistance in connection to Notices and Warning to Customers can be obtained from The Employer's Customer Service at this Number (011) 688-1500.

PS 6.5 CONTINUITY OF WATER SUPPLY TO CONSUMERS

Every effort must be made to ensure continuity of water supply to the consumers. No consumer may be left without water overnight. In cases where a consumer has to be given water after the Contractor has left the site for the night, a penalty of R 1,000-00 will be deducted from the payment certificate.

PS 6.6 CONDITIONS AND PROCEDURES FOR SERVICE AGENCIES

The Contractor shall throughout the Contract take adequate precautions to protect all existing services from damage whether or not they have been pointed out to him. The Contractor shall as soon as practically possible inform the Engineer of any damages to services and shall not repair any such damage unless instructed to do so.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

All cables and pipes shall be considered “live” unless confirmed otherwise by the relevant service authority.

PS 6.7 REINSTATEMENT OF ASPHALT BY JOHANNESBURG ROADS AGENCY

Johannesburg Roads Agency (JRA) will reinstate all asphalt surfaces, upon satisfactory completion and compaction of the preceding layers by the Contractor. The Contractor must temporarily reinstate (using suitable gravel material from the trench excavation) up to the existing asphalt to keep good riding conditions and safe traffic. The Contractor will be responsible for the temporary reinstatement for a period of 2 weeks from the acceptance of the layer works by JRA.

The minimum requirements of the road authority are that the structural layers of the backfilled trench, i.e. the base, subbase, selected subgrade and subgrade down to a depth of 800 mm below the level of the surfacing of the road, must have at least the same shear strengths as those of the adjacent undisturbed structural layers.

It should be noted that it is generally very difficult to obtain the same quality structural layers in the confinement of a narrow trench as that of the undisturbed adjacent structural layers when the same materials are re-used.

The following method must therefore be used to ensure adequate shear strengths in trench backfill.

- Use of a special “3MPa Hydrofill Rapid” concrete mix must be made for the final backfilling layer of 300mm.
- All Road Trenches/Openings: Place 300 mm “3MPa Hydrofill Rapid” concrete manufactured according to the required specification. The mix is to be placed 100 mm below the level of the surrounding sound surface of the road. The remainder of the trench, above the bedding, shall be backfilled with selected approved material compacted to 90% of MOD AASHTO density.
- All Footway Trenches / Openings: Place 150 mm “3MPa Hydrofill Rapid” concrete manufactured according to the required specification. The mix is to be placed 110 mm below the level of the surrounding sound surface. The remainder of the trench, above the bedding, shall be backfilled with selected approved material compacted to 90% of MOD AASHTO density.

The following properties are achieved with “3MPa Hydrofill Rapid” concrete:

- Excellent drainage.
- Non-shrink properties.
- High compressive strength due to point-to-point contact of coarse aggregate.
- Very low tensile strength due to the limited amount of cement, i.e., less than 0.5 MPa.
- Economical and easy to mix and place with wheelbarrows.

It is recommended that the coarse aggregate that is used for no-fines concrete be single-sized.

The following table provides no-fines concrete for areas around Johannesburg.

Proportions by Dry Mass (kg/m³) – “3MPa Hydrofill Rapid” mix may be obtained from Holcim or other supplier.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PS 6.8 COMPENSATION

Any claims from the property owners and / or the community will be considered and evaluated by the Engineer. Should the Engineer find a valid claim but found that the Contractor has neglected his responsibilities and / or duties, which lead to the claim, the Contractor will be responsible for settling the claim, and all costs involved.

PS 7 HEALTH AND SAFETY SPECIFICATION FOR CONSTRUCTION WORK

The Occupational Health and Safety Specification of the Employer's is bound in Volume 2 of these contract documents. Volume 2 forms an integral part of the Contract Specification and, in particular, shall be a part of the HEALTH AND SAFETY SPECIFICATION FOR CONSTRUCTION WORK.

In terms of Construction Regulations 4 (1) (a) of the Occupational Health and Safety Act, Act No 85 of 1993, the Employer is required to compile an occupational health and safety specification for any intended project and to provide the specification to prospective tenderers.

The objective of this specification is to ensure that the principal Contractor entering into a contract with the Employer achieves and maintains an acceptable level of occupational health and safety performance.

The specification provides the requirements that the principal Contractor and other Contractors shall comply with in order to reduce the risks associated with the contract work, and that may lead to incidents causing injury and/or ill health, to a level as low as reasonably practicable and possible.

The Contractor, appointed by the Employer in terms of Regulation 4 (1) (c), is required to prepare an occupational health and safety plan.

This plan has to be prepared in terms of Regulation 5 (1) as well as the Employer's occupational health and safety specification. In terms of Regulation 4 (2), the Employer and the principle Contractor are required to agree on the occupational health and safety plan before any work may commence.

The principal Contractor's health and safety plan has to follow the framework in Volume 2, as a minimum.

PS 7.1 Site Specific Health and Safety Issues

The following site specific assessment of health and safety issues includes a list of risk assessment headings that have been identified by the Employer as possibly applicable to the contract work for this project.

- Aggregate/Sand Delivery
- Arc welding
- Bench grinder
- Construction of manholes
- Compressed gas cylinders-handling
- Compressors – Air
- Cutting of pipes
- Distribution boards – Electrical
- Drivers – of vehicles
- Electrical installation – Maintenance of
- Excavator

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- Gas explosions
- Fire prevention and protection
- Form and support work
- Front end loader
- Fuel supply
- Gas welding-cutting operations
- Hand and spray painting
- Hand tools
- Landscaping
- Laying of pipes
- Levelling – of materials
- Loading supervisor
- Loading/unloading - of trucks
- Machine operator
- Making of steel items
- Material delivery
- Material handling
- Mixer operator
- Pedestal drill
- Pedestal grinder
- Placing concrete
- Portable ladders
- Refuelling vehicles/plant
- Scaffolding
- Site establishment
- Trenches – Digging of
- Trees – Bracing/removing if roots are
- Damaged during excavations
- Use of angle grinder
- Use of portable electrical tools
- Work in confined spaces
- Work in elevated positions
- Working close to existing services i.e. electrical, waste water etc
- Working close to water
- Workshops

PS 7.2 Barricading of Trenches

The Contractor shall ascertain himself of the nature, volume, stability, depth and possible safety risks of the excavations, before any decision with regards to the method of excavation is made.

Allowance for hand excavation has been made for the location of services. Extreme caution shall be taken when excavating along the route of the new pipe for existing services. Any damages and or repairs to the existing services will be for the Contractor's account.

The length of open excavation must at all times not exceed 100m

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Adequately protected by a barrier or fence comprising fluorescent orange plastic netting of height at least 1 000mm and as close to the excavation as practicable; and

- Provided with notice boards marked "CLOSED " at each end of closed or partially closed roads,
- The barrier or fence (at least 1m high) shall be suitably wrapped with reflective red and white danger tape or provided with flashing orange lights, placed at 15m intervals along the barricading at night.
- Where the depth of an excavation or the nature of the material excavated renders the sides of the excavation liable to movement that might endanger the works or the workers engaged on the excavation,
- the sides of the excavation shall be supported by suitable timber or other sheeting adequately strutted and braced, all properly assembled and of sufficient strength and stiffness to prevent movement in the materials supported, or, alternatively,
- the slope of the excavated face or faces shall be reduced so that any danger to the works or workers is removed.

Any cavities formed by the fall of rock or earth due to rain, flooding, insufficient timbering or other causes, shall be adequately filled.

The Contractor shall so maintain borrow pits that they do not become a danger to persons or livestock.

Trenches may not be left open during the builder's holidays or for any shutdown period exceeding 5 calendar days. Should the Contractor not comply with this requirement without the written approval of the Engineer; the Engineer shall have the open trenches closed by others at the expense of the Contractor. Furthermore, all further opening-up of the backfilled excavation and dealing with the excavated material and subsequent making good will all be to the Contractor's cost.

PS 7.3 Precaution against Pollution and Contamination

The Contractor shall take all necessary steps and precautions to prevent pollution of the surrounding area by his employees in any way. Any debris falling from construction vehicles and plant shall be removed immediately.

Every care is to be taken to avoid possible contamination of the mains during construction. Pipes are not to be stacked in the streets or gutters. On completion of a section, all loose material and foreign bodies are to be removed. The open ends of the new pipeline are to be protected by watertight caps, to the satisfaction of the Engineer, to prevent the entrance of groundwater and foreign bodies until such time as these sections are connected to the live mains.

Sterilising chemicals shall be supplied by the Contractor for sterilizing all new water mains. All new lines are to be thoroughly flushed. All sterilisation shall be done at 10mg/l free chlorine for 12 hours. The Contractor shall give due notice to The Employer of his intention.

PS 7.4 Operations under Live Conditions

Prior to the execution of any operation under live conditions, the Contractor shall liaise with the Johannesburg Water Zandfontein Depot Manager, at least 4 working days in advance, in this regard. At least one representative of the Works shall be present during the execution of such operation. These operations will include disconnection and reconnection to the existing Sewer/ Storm water main and Water storage tank at the works.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Contract JW14301 Page (30)

Linbro Water Upgrades
CIDB grade 7CE or higher

Scope of Work

PS 8 ENVIRONMENTAL MANAGEMENT

The Contractor shall acquaint himself and his staff with the provisions of any potential EMP and applicable regulations, duties, obligations and prohibitions and shall accept responsibility for due compliance with the aforementioned. In the case of failure to comply with any requirements of any potential EMP, the Employer shall be entitled to employ and pay other persons to undertake any remedial work or measures to rectify any consequences or prevent possible consequences resulting from the non-compliance by the Contractor and all costs consequent thereto shall be borne by the Contractor and shall be recovered from him by the Employer. If it is not practical to rectify any consequence resulting from the non-compliance of the Contractor with the requirements of the EMP, the Employer will be entitled to impose a penalty on the Contractor which penalty shall be in relation to the expense which the Contractor would have incurred to comply. A generic EMP is attached in Volume 2.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PORTION B: VARIATIONS AND ADDITIONS TO THE STANDARDISED SPECIFICATIONS

The following variations and additions to the SANS 1200 Standardized Specifications referred to in the last clause of Portion A apply to this Contract. The prefix PS indicates an amendment to SANS 1200. The letters and numbers following these prefixes respectively indicate the relevant Standardized Specification and clause numbers in SANS 1200.

PSA GENERAL

PSA 2 INTERPRETATIONS

PSA 2.3 DEFINITIONS

a) General

ADD THE FOLLOWING DEFINITIONS:

“General conditions: The General Conditions of Contract specified for use with this Contract and the special conditions of Contract as applicable.

Specified: As specified in the standardized specifications, the Drawings, the Project Specifications or Particular Specifications. Specifications shall have the corresponding meaning.”

c) Measurement and payment

REPLACE THE DEFINITIONS FOR “fixed charge”, “time-related charge” AND “value-related charge” WITH THE FOLLOWING:

“Fixed charge: A charge that is not subject to adjustment on account of variation in the value of the Contract amount or the Contract Time of Completion.

Time-related charge: A charge, the amount of which varies in accordance with the Time for Completion of the work, adjusted in accordance with the provisions of the Contract.

Value-related charge: A charge, the amount of which varies pro rata with the final value of the measured work executed and valued in accordance with the provisions of the Contract.”

PSA 3 MATERIALS

PSA 3.1 QUALITY

ADD THE FOLLOWING:

“All manufactured materials supplied shall be new materials unless the contrary is specified. All materials specified in accordance with SANS Specifications shall bear the SANS mark, whether so specified or not.”

ADD THE FOLLOWING SUB-CLAUSE:

PSA 3.3 ORDERING OF MATERIALS

The quantities set out in the Schedule of Quantities have been carefully determined from calculations based on data available at the time and should therefore be considered to be

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

approximate quantities only. Before ordering materials of any kind the Contractor shall check with the Engineer whether or not the scope of the work for which the materials are required is likely to change substantially. No liability or responsibility whatsoever shall be attached to the Employer for materials ordered by the Contractor except when ordered in accordance with written confirmation issued by the Engineer."

PSA 4 **PLANT**

PSA 4.1 **SILENCING OF PLANT**

REPLACE THE CONTENTS OF SUBCLAUSE 4.1 WITH THE FOLLOWING:

"The Contractor's attention is drawn to the applicable regulations pertaining to noise and hearing conservation, framed under the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) as amended.

The Contractor shall at all times and at his own cost, be responsible for implementing all necessary steps to ensure full compliance with such regulations, including but not restricted to the provision and use of suitable and effective silencing devices for pneumatic tools and other plant which would otherwise cause a noise level in excess of that specified in the said regulations.

Where appropriate, the Contractor shall further, by means of temporary barriers, effectively isolate the source of such noise in order to comply with the said regulations."

PSA 5 **CONSTRUCTION**

PSA 5.1 **SURVEY**

PSA 5.1.2 **Preservation and replacement of survey beacons and pegs subject to the Land Survey Act**

DELETE THE WORDS "in the vicinity of boundaries" IN THE SECOND SENTENCE OF SUBCLAUSE 5.1.2 AND REPLACE THE WORDS "under the direction of" IN THE SAME SENTENCE WITH "in consultation and liaison with."

ADD THE FOLLOWING AFTER THE SECOND SENTENCE OF SUBCLAUSE 5.1.2:

"The Contractor and the Engineer shall record on the said list, their concurrence or disagreement (as the case may be) regarding the completeness and accuracy of the details recorded therein."

REPLACE THE THIRD SENTENCE OF SUBCLAUSE 5.1.2 WITH THE FOLLOWING:

"At the completion of the Contract, the Contractor shall expose all pegs that were listed at the commencement of the construction as being in order and the Contractor shall arrange with a registered Land Surveyor for the checking of the positions of all such pegs and the replacement of those that the Land Surveyor's check reveals have become disturbed or damaged. The Contractor shall, as a precedent to the issue of the Certificate of Completion, provide to the Engineer, a certificate from the registered Land Surveyor, certifying that all the pegs listed at the commencement of construction in accordance with the provisions of this clause, have been checked and that those found to have been disturbed, damaged or destroyed have been replaced in their correct positions, all in accordance with the provisions of the said Act.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The costs of all checking, replacement and certification as aforesaid shall be entirely for the Contractor's account. This, with the provisions always that the Contractor shall not be held liable for the cost of replacement of pegs which:

- (a) cannot reasonably be re-established in their original positions by reason of the finished dimensions of the permanent works, and
- (b) the contractor can prove beyond reasonable doubt to the satisfaction of the Engineer, were disturbed, damaged or destroyed by others beyond his control."

PSA 5.3 PROTECTION OF EXISTING STRUCTURES

REPLACE "Machinery and Occupational Safety Act, 1983 (Act No 6 of 1983)" *WITH* "Occupational Health and Safety Act, 1993 (Act No 85 of 1993), as amended," *AND INSERT THE FOLLOWING AFTER* "(Act No. 27 of 1956)": "as amended."

PSA 5.4 PROTECTION OF OVERHEAD AND UNDERGROUND SERVICES

REPLACE THE HEADING AND THE CONTENTS OF SUBCLAUSE 5.4 WITH THE FOLLOWING:

PSA 5.4 LOCATION AND PROTECTION OF EXISTING SERVICES

PSA 5.4.1 Location of existing services

Before commencing with any work in an area, the Contractor shall ascertain the presence and actual position of all services which can reasonably be expected by an experienced and competent Contractor to be present on, under, over or within the Site.

Without in any way limiting his liability in terms of the Conditions of Contract in relation to damage to property and interference with services, the Contractor shall, in collaboration with the Engineer, obtain the most up-to-date plans as are available, showing the positions of services existing in the area where he intends to work. Neither the Employer nor the Engineer offers any warranty as to the accuracy or completeness of such plans and because services can often not be reliably located from plans, the Contractor shall ascertain the actual location of services depicted on such plans by means of careful inspection of the Site.

Thereafter, the Contractor shall, by the use of appropriate methodologies, carefully expose the services at such positions as are agreed to by the Engineer, for the purposes of verifying the exact location and position of the services. Where the exposure of existing services involves excavation to expose underground services, the further requirements of sub clauses 4.4 and 5.1.2.2 of SANS 1200 D (as amended) shall apply.

The aforesaid procedure shall also be followed in respect of services not shown on the plans but which may reasonably be anticipated by an experienced Contractor to be present or potentially present on the site.

All services, the positions of which have been determined as aforesaid at the critical points, shall henceforth be designated as 'known services' and their positions shall be indicated by the Contractor on a separate set of drawings, a copy of which shall be furnished to the Engineer without delay.

As soon as any service which has not been identified and located as described above is encountered on, under, over or within the site, it shall henceforth be deemed to be a known service and the aforesaid provisions pertaining to locating, verifying and recording its position on the balance of the site shall apply. The Contractor shall notify the Engineer immediately when any such service is encountered or discovered on the Site.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Whilst he is in possession of the Site, the Contractor shall be liable for all loss of or damage as may occur to

- (a) known services, anywhere along the entire lengths of their routes, as may reasonably be deduced from the actual locations at which their positions were verified as aforesaid, due cognizance being taken of such deviations in line and level which may reasonably be anticipated, and
- (b) any other service which ought reasonably to have been a known service in accordance with the provisions of this clause.

The Contractor shall also be liable for consequential damage in regard to (a) and (b), whether caused directly by the Contractor's operations or by the lack of proper protection.

No separate payment will be made to the Contractor in respect of any costs incurred in preparing and submitting to the Engineer the Drawings as aforesaid. These costs shall be deemed included in the Contractor's other tendered rates and prices included in the Contract.

Payment to the Contractor in respect of exposing services at the positions agreed by the Engineer and as described above will be made under the payment items (if any) as may be provided for in the respective sections of the specifications pertaining to the type of work involved.

PSA 5.4.2 Protection during construction

The Contractor shall take all reasonable precautions and arrange its operations in such a manner as to prevent damage occurring to all known services during the period which the Contractor has occupation and/or possession of the Site.

Services left exposed shall be suitably protected from damage and in such a manner as will eliminate any danger arising there from to the public and/or workmen, all in accordance with the requirements of the prevailing legislation and related regulations.

Unless otherwise instructed by the Engineer, no services shall be left exposed after its exact position has been determined and all excavations carried out for the purpose of exposing underground services shall be promptly backfilled and compacted. In roadways, the requirements of Subclause 5.9 of SANS 1200 DB should be observed. In other areas compaction is to be to 90% modified AASHTO density.

PSA 5.4.3 Alterations and repairs to existing services

Unless the contrary is clearly specified in the Contract or ordered by the Engineer, the Contractor shall not carry out alterations to existing services. When any such alterations become necessary, the Contractor shall promptly inform the Engineer, who will either make arrangements for such work to be executed by the owner of the service, or instruct the Contractor to make such arrangements himself.

Should damage occur to any existing services, the Contractor shall immediately inform the Engineer, or when this is not possible, the relevant authority, and obtain instructions as to who should carry out repairs. In urgent cases, the Contractor shall take appropriate steps to minimize damage to and interruption of the service. No repairs of telecommunication cables or electric power lines and cables shall be attempted by the Contractor.

The following list of contact telephone numbers is provided for:

Service	Authority	Contact Details	Contact Number
Communication	Telkom	J Tshabalala	(011) 301-9052
Electricity	Eskom	K Bedessie	(011) 711-2290
Municipal Electricity	City Power	D Oliver	(011) 490-7195

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Gas	Sasol	B van der Heuvel	(011) 617-8261
Bulk Water	Rand Water	I Davids	(011) 682-0911
Provincial Road	Gautrans	J Olivier	(012) 310-2200
Municipal Road	Johannesburg Roads Agency	J Montero	(011) 298-5000

Wayleaves should also be consulted regarding contact numbers for relevant service authorities.

PSA 5.5 DEALING WITH WATER

In addition to the items as set out in Subclause 5.5, the contractor shall also provide pumping equipment, pipes and other equipment as may be necessary.

PSA 5.9 SANITARY FACILITIES

Add the following new subclause:

The Contractor shall provide, maintain and finally remove from site adequate sanitary facilities. The sanitary facility shall be properly ventilated and clean at all times. The use of the sanitary facilities shall be strictly enforced.

PSA 6 TOLERANCES

ADD THE FOLLOWING SUBCLAUSE TO CLAUSE 6:

PSA 6.4 USE OF TOLERANCES

No guarantee is given that the full specified tolerances will be available independently of each other, and the Contractor is cautioned that the liberal or full use of any one or more of the tolerances may deprive him of the full or any use of tolerances relating to other aspects of the work.

Except where the contrary is specified, or when clearly not applicable, all quantities for measurement and payment shall be determined from the 'authorised' dimensions. These are specified dimensions or those shown on the drawings or, if changed, as finally prescribed by the Engineer, without any allowance for the specified tolerances. Except if otherwise specified all measurements for determining quantities for payment will be based on the 'authorised' dimensions.

If work is constructed in accordance with the 'authorised' dimensions plus or minus the tolerances allowed, the calculation of quantities will be based on the 'authorised' dimensions, regardless of the actual dimensions to which the work has been constructed.

When the work is not constructed in accordance with the 'authorised' dimensions plus or minus the tolerances allowed, the Engineer may nevertheless, at his sole discretion, accept the work for payment. In such cases no payment shall be made for quantities of work or material in excess of those calculated for the 'authorised' dimensions, and where the actual dimensions are less than the 'authorised' dimensions minus the tolerance allowed, quantities for payment shall be calculated based on the actual dimensions as constructed."

PSA 7 TESTING

PSA 7.1 PRINCIPLES

Add the following new subclause:

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSA 7.1.3 Cost of Testing

The cost of all testing to be carried out by the Contractor in terms of the requirements of the relevant SABS 1200 standards shall be included in the rates for the various work items listed in the Schedule of Quantities. No separate payments shall be made in this regard.

The Engineer may order the Contractor to arrange special check tests to be carried out by an approved independent laboratory. The cost of special check tests ordered by the Engineer shall be borne by the Employer if the test results indicate compliance with the specification and by the Contractor if the results indicate non-compliance with the specification.

PSA 7.2 APPROVED LABORATORIES

REPLACE THE CONTENTS OF SUBCLAUSE 7.2 WITH THE FOLLOWING:

“Unless otherwise specified in the relevant specification or elsewhere in the Project Specification, the following shall be deemed to be approved laboratories in which design work, or testing required in terms of a specification for the purposes of acceptance by the Engineer of the quality of materials used and/or workmanship achieved, may be carried out:

- (a) Any testing laboratory certified by the South African National Accreditation Systems (SANAS) in respect of the nature and type of testing to be undertaken for the purposes of the Contract;
- (b) Any testing laboratory owned, managed or operated by the Employer or the Engineer;
- (c) Any testing laboratory established and operated on the Site by or on behalf of the Employer or the Engineer;
- (d) Any other laboratory that the Engineer approves in his absolute discretion.”

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.1 MEASUREMENT

PSA 8.1.2 Preliminary and General Item or Section

PSA 8.1.2.1 Contents

REPLACE THE LAST SENTENCE OF SUBCLAUSE 8.1.2.1(b) WITH THE FOLLOWING:

“Separate items will be scheduled to cover the fixed, value-related and time-related components of the Contractor’s preliminary and general costs.”

PSA 8.2 PAYMENT

PSA 8.2.1 Fixed-charge and Value-related Items

REPLACE THE CONTENTS OF SUBCLAUSE 8.2.1 WITH THE FOLLOWING:

PSA 8.2.1.1 Fixed-charge Items

Payment of fixed charges in respect of item 8.3.1 will be made as follows:

- (a) EIGHTY PER CENT (80%) of the sum tendered will be paid when the facilities have been provided and approved;

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- (b) The remaining TWENTY PER CENT (20%) will be paid when the works have been completed, the facilities have been removed and the site of the Contractor's establishment has been cleared and cleaned to the satisfaction of the Engineer.

No adjustment will be made to the sum tendered in respect of item 8.3.1 should the value of the works finally executed or the time for completion vary in any way from that specified in the tender."

PSA 8.2.1.2 Value-related Items

Payment for the sum tendered under item 8.3.2 will be made in three separate installments as follows:

- (a) The first installment, which is 40% of the sum, will be paid when the Contractor has fulfilled all his obligations to date under this specification, the General Conditions of Contract and the Special Conditions of Contract, and when the value of work certified for payment, excluding materials on site and payments for preliminary and general items, is equal to not less than 5% of the total value of the work listed in the Schedule of Quantities.
- (b) The second installment, which is 40% of the sum, will be made when the amount certified for payment, including retention moneys but excluding this second installment, exceeds 50% of the tender sum.
- (c) The final payment, which is 20% of the sum, will be made when the works have been certified as completed and the Contractor has fulfilled all his obligations to date under this Specification, the General Conditions of Contract and the Special Conditions of Contract.

Should the value of the measured work finally completed be more or less than the tender sum, the sum tendered under item 8.3.2 will be adjusted up or down in accordance with the provisions of clause 6.11 of the Conditions of Contract 2010, and this adjustment will be applied to the third installment."

PSA 8.2.2 Time-related Items

REPLACE THE CONTENTS OF SUBCLAUSE 8.2.2 WITH THE FOLLOWING:

"Subject to the provisions of sub clauses 8.2.3 and 8.2.4, payment under item 8.4.1 (time-related item) will be made monthly in equal amounts, calculated by dividing the sum tendered for the item by the tendered contract period in months, provided always that the total of the monthly amounts so paid for the item is not out of proportion to the value of the progress of the Works as a whole."

PSA 8.3 SCHEDULED FIXED-CHARGE AND VALUE-RELATED CHARGE

ADD THE FOLLOWING NEW SUBCLAUSES TO CLAUSE 8.3

PSA 8.3.5 Additional Contractual Obligations

PSA 8.3.5.1 Notice and warning to consumers Unit : Sum

The sum shall cover the full compensation and cost of supply and delivery of the notices and warnings to customers at least 3 days before a shutdown is to take place in each section of work.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSA 8.3.5.2 OHS Act Obligations Unit: Sum

The sum shall cover the full compensation and fixed costs for the compliance with the Occupational Health and Safety Act, Construction Regulations 2003 and all the requirements stipulated in the Employer's Health and Safety Specifications."

PSA 8.3.5.3 EMP Obligations Unit: Sum

The sum shall cover the full compensation and all fixed costs for compliance with the requirements of The Employer's Environmental Management Plan or applicable regulations.

PSA 8.4 SCHEDULED TIME-RELATED ITEMS

ADD THE FOLLOWING NEW SUBCLAUSES TO CLAUSE 8.4.

PSA 8.4.6 Additional Obligations

PSA 8.4.6.1 OHS Act Obligation.....Unit: Sum

The sum shall cover the full compensation and all time related costs for the duration of the contract, for the compliance with the Occupational Health and Safety Act, Construction Regulations 2003 and all the requirements stipulated in the Employer's Health and Safety Specifications.

PSA 8.4.6.2 Security services costs.....Unit: Month

The sum shall cover the full compensation and all costs for a sufficient 24 hour guarded services for the duration of the contract. This sum shall also cover the security requirements of the relevant privately owned properties impacted upon by the construction works, as well as negotiations with the owners of the properties in this regard.

PSA 8.4.6.3 Community Liaison Officer Unit: Prov Sum

The stated sum shall cover full compensation and all costs payable on a monthly basis, to provide a full time qualified and suitable experienced Community Liaison Office for the duration of the contract. The stated sum shall also cover for the CLO cellphone airtime.

PSA 8.5 SUMS STATED PROVISIONALLY BY ENGINEER

AMEND SUBCLAUSE 8.5.b) 1 AND ADD THE FOLLOWING ITEMS:

i) Alteration to existing services by authorities	Unit: Prov Sum
ii) Control tests by independent laboratory	Unit: Prov Sum
iii) Provision of photographic records	Unit: Prov Sum
iv) CLO and CSO.....	Unit: Prov Sum
v) Temporary protection of services.....	Unit: Prov Sum
vi) Reinstatement of asphalt by JRA.....	Unit: Prov Sum
vii) Supply or hire of specialist equipment	Unit: Prov Sum
viii) Training of labour.....	Unit: Prov Sum

The Contractor is responsible for both the cost of normal testing as described in the Project Specifications and for the cost of any additional test that indicates that the Specifications have not been complied with.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

These Provisional Sums are at the disposal of the Engineer and will be paid if and when the need arises.

PSA 8.7 DAYWORKS

ADD THE FOLLOWING NEW CLAUSES:

PSA 8.7.1 Scope

This section covers the method of measurement and payment for work carried out on a day work basis.

PSA 8.7.1.1 General Requirements

Work will be classified as day work only if the Engineer considers no other rate in the Bill of Quantities appropriate for payment purposes.

An instruction regarding all work to be carried out under day work in terms of Clause 6.5 of the General Conditions of Contract 2010 will be issued at the discretion of the Engineer. Some or all of the items priced under day work in the Bill of Quantities may possibly not be required for this Contract.

Before ordering any material, the Contractor shall submit quotations to the Engineer for his approval, and shall submit such receipts or vouchers to the Engineer as may be necessary for proving the amount claimed.

PSA 8.7.1.2 Measurement and Payment - Day works

The day work rates submitted for vehicles and construction equipment, in the Bill of Quantities shall be a hire charge for the use of the vehicle and driver or constructional plant/equipment and operator (excluding VAT) and shall apply only to vehicles and construction equipment approved in writing by the Engineer. The rate shall include for maintenance, fuels and oils and other operating costs, establishment, insurance and other contingency costs relating to the running of the vehicle, plant or equipment.

Where there is ambiguity between the power developed at the flywheel and mass of a machine, the power shall govern the measurement category.

The Contractor and the Engineer will agree on the method of recording the working hours prior to the commencement of the work. Any long period of idling at any one time which in the opinion of the Engineer or his representative is beyond that required for normal operating conditions will not be paid for as working time. Non-working hours for any reason shall not be measured for payment.

The ten percent allowed for overheads etc. as per Clause 6.5.1.2.3 of the General Conditions of Contract 2010 shall include full compensation for all administrative costs, supervision, overheads, liabilities and obligations related to the running of the vehicles, constructional plant and equipment. The tendered percentage shall also include for profit and shall be subject to the Contract Price Adjustment factor laid down in the Contract Data.

PSA 8.8 TEMPORARY WORKS

PSA 8.8.4 Existing Services

AMEND THE SUB CLAUSE AS FOLLOWS:

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSA8.8.4 a) Supply or hire of specialist equipment Unit: Prov Sum
The sum shall cover the cost for the supply, operation and/or hire of specialist equipment for detection of underground services as ordered by the Engineer.

PSA 8.8.4 b) Excavate by hand in soft material to expose existing services.....Unit: m³
The rate shall cover the cost for removal of premix or other surfacing where necessary, excavating in all materials, shoring, backfilling, compaction and reinstatement of surfaces except for asphalt.

PSA 8.8.4 c) Temporary protection of exposed services.....Unit: Sum
The sum shall cover the cost of the protection of temporarily exposed existing services, such that the services are not damaged or subject to deterioration while they are exposed. The exposed services shall be adequately barricaded. All Health and Safety aspects shall be fulfilled.

PSA 8.8.5 **Cost of Survey**

DELETE THE EXISTING SUBCLAUSE AND REPLACE WITH:

a) Survey and setting out works.....Unit: Sum

Provision must be made to cover the complete survey of the route – water services and placement of line and level pegs by a professional surveyor every 50m and at all changes of direction and grade. The associated costs will be for the account of the Contractor. The survey shall form part of the construction programme.

The length of the route is 800 m. The Survey shall include:

- (a) Confirmation of cadastral boundaries and road reserves (whether marked by existing structures and fences or not). Setting out of pegs of cadastral boundaries
- (b) Setting out of the pipe centre line as directed by the Engineer within available space, considering above
- (c) Survey of as-built pipeline and production of as built record drawings showing coordinates (X; Y; Z) at:
 - a. Each change of direction
 - b. Each valve chamber
 - c. Beginning and end of road crossings
 - d. Connection to existing pipes
 - e. 50 m spacing in straight sections and at every change in direction of the pipe.
- (d) Verifying existing servitudes including:
 - a. Indicating the servitudes on maps
 - b. Verification of ownership of servitudes

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- (e) Confirming that the survey corresponds with benchmarks that may have been used by the Engineer during the design stage of the works.

The tendered rate includes all costs associated with the survey (establishment, accommodation, travel, title deeds, etc.). Payment shall be effected on the completion and acceptance of the survey and setting out.

PSA 8.8.6 Special Water Control.....Unit: Sum

The tendered rate shall include all cost to ensure that no water enter or stand in excavated trenches, low laying areas or portions of the site under construction.

The tendered rate shall also include all cost to ensure that ingress of sub-surface water is controlled and pumped out of the excavated areas. All plant, labour and operation costs as well as equipment required to secure a dry working area and pumping of water shall be included in the tendered rate.

PSA 8.8.7 Dealing with other Service Authorities, obtaining of wayleaves, etc.....Unit: Sum

The Engineer has obtained some of the wayleaves from identified authorities (attached to Portion 3). By the time of contract award, some of the wayleaves may have expired. The contractor will be responsible to:

- Submit applications and re-issue all wayleaves which have expired into his name;
- Submit applications and issue wayleaves that have not yet been issued into his name;
- For wayleaves that are still valid (and issued in Mariswe's name), the contractor shall issue a legal letter to Mariswe (Pty) Ltd. that he takes full responsibility for compliance with wayleave conditions;
- Maintain wayleaves throughout the duration of the contract and
- Comply with conditions.

The tender rate shall include all costs for dealing with the following service authorities and for fulfilment of way leave requirements:

- Johannesburg Water
- City Power
- City Parks
- Eskom
- Telkom
- Rand Water
- Egoli Gas
- Sasol
- Neotel

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Linbro Water Upgrades
CIDB grade 7CE or higher

Scope of Work

- Dark Fibre Africa
- MTN
- Citi Connect
- Johannesburg Roads Agency
- Others which may be identified.

The Contractor shall also arrange for metered connections for electricity and water for the guardhouse and a connection to the nearest sewer system.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSAB ENGINEER'S OFFICE

PSAB 3 MATERIALS

PSAB 3.1 NAMEBOARDS

DELETE THE ENTIRE CLAUSE AND REPLACE WITH:

"The name board shall be of either tempered hardboard at least 12mm thick or steel sheeting so braced on the reverse side as to prevent warping or buckling and shall be mounted on two or more firmly planted poles as necessary. The quality of the paint shall conform to SANS Standard Specification CKS 193. The colour of the paint shall conform to SANS 1091-1975 colour F11, strong blue. The Employer's SOC Ltd logo shall be in colour. The height of the larger name board shall be 2400mm and the width 4800mm, whilst the height of the smaller name board shall be 800mm and the width 1600mm".

PSAB 3.2 OFFICE BUILDING(S)

Delete this sub-clause entirely and re-title the sub-clause "FACILITIES FOR THE ENGINEER"

Add the following sub-clause.

PSAB 3.2.1 Office Building(s)

The contractor shall provide, furnish and equip one or more offices (as scheduled) for the use of the Engineer.

Buildings for the office shall be constructed of timber, metal sheeting or other approved materials. The building shall have double walls filled with insulating material and lined on the inside with timber or other approved material. Ceiling shall be provided and offices shall have timber or concrete floors with edge carpeting with foam-backed needle punch carpeting.

Office building shall be painted with an approved paint after erection and the paintwork shall be maintained during the contract period.

Each door shall be provided with a lock and two keys.

The siting of all offices shall be to the Engineer's satisfaction and shall be decided upon in consultation with him/her and confirmed in writing before erection.

All accommodation shall include the provision of access roads where required, fresh clean portable water and sewerage, which will be considered as part and parcel of the accommodation provided and will not be paid for separately.

All accommodation shall meet with the approval of the Engineer.

The offices shall comply with the following requirements.

<u>Dimensions</u>	<u>Type 1 Office</u>	<u>Type 2 Office</u>
Minimum floor area	20 m ²	12 m ²
Minimum window area	4.0 m ²	2.4 m ²

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Minimum window area opening	2.4 m ²	1.5 m ²
Minimum clear height	2.4 m	2.4 m
Parking for vehicles	2	2

Furniture and Equipment

Each office shall be equipped with the following:

- (i) Office desk with a surface area of at least 1.5m² with at least 3 drawers one of which can be locked.
- (ii) Two office chairs.
- (iii) Sufficient racks and hangers for hanging contract drawings. The hangers shall be of the "Barhold" type, with one hanger to five drawings.
- (iv) Double 80-watt fluorescent light fittings complete with ballast and tubes (2 per Type 1 office, 1 per Type 2 office).

In addition to the above the Type 1 office shall be equipped with the following:

- (i) Conference table large enough to accommodate twelve people.
- (ii) Fifteen office chairs
- (iii) Air-conditioner
- (iv) Computer equipment as per PSAB4.1.

The Contractor must provide basic survey instruments: dumpy level, tripod stand and staff.

On completion of the Works, ownership of the buildings, furnishings and equipment shall revert to the Contractor who shall remove them from the Site.

PSAB 3.3 CARPORT

ADD THE FOLLOWING NEW CLAUSE:

"The Contractor shall construct the number of carports specified in Portion A of the Project Specifications, for the sole use of the Engineer and his staff. Each carport shall be constructed so that the vehicle parked under it is always protected against the direct rays of the sun. The carport area shall be at least 20 m² and the floor shall be covered with a layer of crushed stone to alleviate dusty and muddy conditions. The carport(s) shall be positioned so as to provide easy and convenient access to the Engineer's office."

PSAB 4 PLANT

PSAB 4.1 TELEPHONE

REPLACE SUBCLAUSE 4.1 OF SANS 1200 AB WITH THE FOLLOWING:

"The Contractor shall at his own cost, arrange for the provision of airtime and data bundles for the duration of the contract, for the Engineer's representative. The Contractor at the tendered rates under the relevant scheduled item shall recover the associated charges and telephone calls and data bundles associated with the contract."

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The Contractor shall also provide, insure, protect, secure and maintain computer facilities, for the duration of the contract, including the following:

- a laptop with a processor similar or equal to an Intel® i3 processor, at least 4 GB Ram, a hard disk drive of at least 100 GB;
- an external hard disk drive of similar or larger capacity as the internal hard disk drive of the laptop for backups;
- an additional mouse, keyboard and screen;
- an A3 Colour printer with sufficient ink / toner, capable to scan, print, copy and fax;
- Wireless data modem;
- Data plan for at least 5GB data per month;
- Software to include Microsoft Office, Microsoft Project and a .pdf viewer.

All the equipment mentioned above will be handed back to the Contractor at the conclusion of the project."

PSAB 4.2 SURVEY EQUIPMENT

ADD THE FOLLOWING NEW CLAUSE:

The Contractor shall provide on site and make available for the exclusive use of the Engineer and his staff, the survey equipment listed in Portion A of the Project Specifications.

All survey equipment provided by the Contractor shall be in good condition, properly calibrated and fit for the purpose.

In addition to survey equipment provided by the Contractor for the exclusive use of the Engineer and his staff, the Contractor shall make available for use by the Engineer, the further survey equipment listed in Portion 1 of the Project Specifications, at all times when such is reasonably required by the Engineer and his staff for the purposes of the Contract."

PSAB 5 CONSTRUCTION

ADD THE FOLLOWING NEW SUBCLAUSES TO CLAUSE 5 OF SANS 1200 AB:

PSAB 5.6 SURVEY EQUIPMENT

All survey equipment provided by the Contractor shall be kept fully serviceable at all times by the Contractor. The Contractor shall have any defective equipment repaired or replaced at his own cost within 12 hours after notification by the Engineer's staff.

Where required by the Engineer, the Contractor shall, at his own cost, promptly arrange for the recalibration of survey equipment provided."

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSC **SITE CLEARANCE**

PSC 3 **MATERIALS**

PSC 3.1 **DISPOSAL OF MATERIALS**

ADD THE FOLLOWING:

“The Contractor shall obtain his own dumping sites for the disposal of material and all transport costs shall be included in the rates tendered for site clearance.”

PSC 5 **CONSTRUCTION**

PSC 5.1 **AREAS TO BE CLEARED AND GRUBBED**

ADD THE FOLLOWING:

“Small diameter pipeline routes shall be cleared to a distance of 1,0m on both sides of the pipeline centre line and large diameter pipeline routes shall be cleared to a distance of 2,0m on both sides of the pipeline centre line. Route pegs or markers shall not be destroyed or damaged during clearing operations.”

PSC 5.2 **CUTTING OF TREES**

PSC 5.2.3 **Preservation of trees**

PSC 5.2.3.2 **Individual trees**

REPLACE THE LAST SENTENCE WITH THE FOLLOWING:

“An amount of R 1000.00 will be deducted from moneys due to the Contractor as a penalty for every tree that is damaged or removed unnecessarily.”

PSC 8 **MEASUREMENT AND PAYMENT**

PSC 8.2 **PAYMENT**

PSC 8.2.1 **Clear and grub**

REPLACE THE FIRST LINE WITH THE FOLLOWING:

“The area designated by the Engineer to be cleared and grubbed will be measured in square metre to the nearest square metre or,” otherwise specified.

PSC 8.2.5 **Take down existing fences**

REPLACE ITEM 8.2.5 WITH THE FOLLOWING:

PSC 8.2.5 **Take down existing fences:**

- (a) Description of fence Unit: m or km
- (b) Etc for other items

The unit of measurement shall be the metre or kilometer of fence taken down and removed from the site.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The rate shall cover the cost of taking down the complete fence (fence height up to 2.2m) as scheduled and removing all fence material from the site, filling of holes, leveling ground surfaces and cleaning the site as well as providing temporary fence during construction."

PSC 8.2.8 Demolish and remove structures/buildings and dismantle steelwork, etc.

REPLACE "Unit: sum" WITH "Unit: sum or number of m²".

REPLACE THE LAST SENTENCE WITH:

"The rate shall cover the cost of all such separate items as scheduled in the Schedule of Quantities."

ADD THE FOLLOWING ITEMS:

PSC 8.2.11a Temporary fencing or hoarding:

- (a) Indicate temporary usage, description and type Unit: m
- (b) Etc for other usage and types.

The unit of measurement shall be the linear meter of fence or hoarding supplied and erected, and in the case of temporary fencing for maintaining and removing on completion of the works or part of the works.

The tendered rate shall include full compensation for the cost of supplying and erecting the complete fence as specified or scheduled and in the case of temporary fencing for taking down the fences, removing from the site, filling of holes, leveling ground surfaces and cleaning the site.

Seventy per cent (70%) of the tendered rate shall be payable on completion and approval of the temporary fences, and the remaining thirty per cent (30%) on completion of the removal of the fences.

PSC 8.2.11b Removal of man-made surfaces

The rate shall cover all plant, labour, material, saw cutting (asphalt and concrete), breaking up, lifting, loading, transportation, off-loading surfacing and storing (where applicable).

Unit: m²

Roadways, Asphalt and other layers

i) Asphalt (≤ 50 mm thick) and including base, sub-base and subgrades layers up to 800mm deep.

ii) Asphalt ($> 50 \leq 100$ mm thick) and including base, sub-base and subgrades layers up to 800mm deep.

a) Footways and driveways

Asphalt ≤ 50 mm thickness

Asphalt $> 50 \leq 100$ mm thickness

Interlocking concrete segmental paving blocks (all colours)

Concrete slabs (450 x 450mm)

Brick paving

Unreinforced concrete ≤ 75 mm thick

Reinforced concrete ≤ 75 mm thick

Grassing

Kerbing (all types of kerbing) (Unit: m)

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**PSC 8.2.12 Backfilling and reinstatement of man-made surfaces**

The rate shall cover the cost of all associated plant, labour, material, loading, transportation from storage, off-loading and placing (levelling and compacting where applicable) the following materials in roadways, footways and driveways in accordance with the COP:

PSC 8.2.12.1 Backfilling and reinstatement of roadsUnit:m²**a) Scenario A**

- i) 150mm base – G2 Graded crushed stone to 102% Mod AASHTO density
- ii) 150mm subbase – G5 Graded crushed stone to 97% Mod AASHTO density
- iii) 150mm Fill – G7 material compacted to 95% Mod AASHTO density
- iv) 150mm selected subgrade – Insitu material compacted to 90% Mod AASHTO

b) Scenario B

- i) 150mm base – G2 material compacted to 97% Mod AASHTO density
- ii) 150mm subbase – C4 Stabilised gravel material to 95% Mod AASHTO density*
- iii) 150mm selected subgrade - Insitu material compacted to 93% Mod AASHTO

***Rate shall include stabilization agent.**

c) Scenario C (Foot paths)

- i) 150mm base – Recovered material compacted to 93% Mod AASHTO
- ii) 150mm selected subgrade – Insitu material compacted to 90% Mod AASHTO

d) Surfacing

- i) 30mm Bitumen hot –mix: Fine
- ii) 70mm Bitumen hot –mix: BTB

PSC 8.2.12.2 Backfilling and reinstatement footwaysUnit:m²

- a) Using removed materials:
 - i) Interlocking concrete segmental paving blocks (all colours)
 - ii) Concrete slabs (450 x 450mm)
 - iii) Brick paving
 - iv) Grassing
 - v) Kerbing..... (Unit: m)
- b) Using new supplied materials: Unit: m²
 - i) 30mm Bitumen hot –mix: Fine
 - ii) Interlocking concrete segmental paving blocks, including a 20mm river sand bedding layer, jointing sand (plaster sand) and mortar infill between edge restraint and blocks
 - 1) Grey blocks
 - 2) Coloured blocks
 - iii) Concrete slabs (450 x 450mm) including a 20mm river sand bedding layer, jointing mortar.
 - iv) Brick paving including a 20mm river sand bedding layer, jointing sand (plaster sand) and mortar infill between edge restraint and bricks.
 - v) Unreinforced concrete ≤ 75mm thick (15MPa)
 - vi) Reinforced (395 mesh) concrete ≤ 75mm thick (15MPa)
 - vii) Grassing
 - viii) Concrete channeling, including formwork, leveling and compacting 300 x 125mm cast in situ concrete of 15MPa.
 - ix) Kerbing, including a 50mm bedding (cement and river sand), jointing mortar and 15MPa concrete haunching at all joints.(Unit: m)
 - 1) Figure 1
 - 2) Figure 7
 - 3) Figure 8
 - 4) Figure 12

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Linbro Water Upgrades
CIDB grade 7CE or higher

Scope of Work

PSC 8.2.13 Reinstatement of existing masonry walls and steel palisade fences

The rate shall cover the cost of reinstating existing masonry walls, plastered or unplastered, and steel palisade fences (including any gates) including plant, labour, material, on-loading, transporting, off-loading and cleaning for the following: Unit: m²

- a) Face brick
 - i) 110mm wall
 - ii) 220mm wall
 - iii) 330mm wall
- b) Plastered
 - i) 110mm wall
 - ii) 220mm wall
 - iii) 330mm wall
 - iv) 440mm wall
- c) Steel palisade fences (height = 2.2m)

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSD EARTHWORKS

PSD 2 INTERPRETATIONS

PSD 2.1 SUPPORTING SPECIFICATIONS

REPLACE SUBCLAUSE 2.1.2 WITH THE FOLLOWING:

“PSD 2.1.2: Any of the other SANS 1200 Specifications may form part of the Contract Documents.”

PSD 2.3 DEFINITIONS

REPLACE THE WORD AND THE DEFINITION FOR “Borrow” WITH THE FOLLOWING:

“Borrow material: Material, other than material obtained from excavations required for the Works, obtained from sources such as borrow pits or the authorised widening of excavations. “Borrow” shall have a corresponding meaning.”

REPLACE THE DEFINITION FOR “Specified density” WITH THE FOLLOWING:

“Specified density: The specified dry density expressed as a percentage of modified AASHTO dry density.”

REPLACE THE DEFINITION FOR “Stockpile” WITH THE FOLLOWING:

“Stockpile (verb): The process of selecting and, when necessary, loading, transporting and off-loading material in a designated area for later use for a specific purpose.”

ADD THE FOLLOWING DEFINITIONS:

“Commercial source: A source of material provided by the Contractor, not the Employer, and including any borrow pit, provided by the Contractor.

Fill: An embankment or terrace constructed of material obtained from excavations or borrow pits. In roads it includes the earthworks up to the underside of the selected subgrade level.

Fill (material): Material used for the construction of an embankment or terrace.

Roadbed: The natural in situ material on which the fill, or in the absence of fill, the pavement layers, are constructed.”

PSD 3 MATERIALS

PSD 3.1 CLASSIFICATION FOR EXCAVATION PURPOSES

PSD 3.1.1 Method of classifying

ADD THE FOLLOWING:

“The classification of material other than ‘soft excavation’ shall be agreed upon before excavation may commence.

The Contractor shall immediately inform the Engineer if and when the nature of the material being excavated changes to such an extent that a new classification is warranted for further

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

excavation. Failure on the part of the Contractor to advise the Engineer in good time shall entitle the Engineer to reclassify, at his discretion, such excavated material."

ADD THE FOLLOWING NEW SUB CLAUSES:

PSD 3.1.3 CLASSIFICATION FOR HAND EXCAVATION

Classification of material for various types of hand excavation will be based on the results of a dynamic cone penetrometer. The category of material shall be determined by testing the material at regular intervals and at various depths along the centre line of the trench. A minimum of 5 tests shall be done at each location and the average number of blows of the tests shall be used to determine the category of material.

The interval between test locations shall be determined by the variation of material type but shall not exceed 50m. The depth of testing shall be determined by the variation of material type and can increase or decrease in hardness with increasing depth of excavation. Table PSD 3.1.3 indicates the categories:

TABLE PSD 3.1.3: Classification for Hand Excavation

Category of Material	Consistency		DCP Blows to Penetrate 100mm	
	Granular	Cohesive	Granular	Cohesive
<u>Soft</u> Soft excavation shall be excavation in material that can be efficiently removed from the trench using a pick and shovel but not requiring prior breaking using mechanical equipment such as pavement breakers	Up to medium dense	Firm to stiff	0-6	1-5
<u>Intermediate</u> Intermediate excavation shall be excavation in material that require loosening with a hand spike (gwala) before being removed from the trench	Dense	Stiff to very stiff	7-15	6-8
<u>Hard</u> Hard excavation shall be excavation in material that requires prior breaking using mechanical equipment, such as pavement breakers with clay spades, before being removed from the trench.	Very dense		16-50	-15
<u>Rock</u> Rock excavation shall be excavation in material other than described above which by nature of the material requires prior breaking using	-	-	>50	>15

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Work**

mechanical equipment, such as pavement breakers with moil points, before being removed from the trench				

PSD 3.2.3 Material suitable for backfill or fill against structures

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

“Material used for backfill behind structures shall generally be the material excavated, subject to the following conditions:

- The material shall not contain an excessive number of stones retained on a 50 mm sieve.
- The material shall not contain large clay lumps that do not break up under the action of the compaction equipment.
- The liquid limit of the material shall not exceed 40, neither shall the Pi exceed 18.”

PSD 3.3 SELECTION

ADD THE FOLLOWING SUBCLAUSE:

PSD 3.3.3 Selection in borrow pits and excavations

Approval of a borrow area for a certain purpose does not necessarily mean that all the material in that area is suitable for the specified purpose. What it does mean is that the borrow area contains some suitable material. The onus shall rest on the Contractor to ensure that only material that is indeed suitable is removed and used for the specified purpose.

When the Contractor has to select excavated material for a specific purpose, the above provisions relating to borrow areas shall apply *mutatis mutandis* to excavations.

The Contractor shall not waste or contaminate material that has been selected for a specific purpose.”

PSD 5 CONSTRUCTION**PSD 5.1 PRECAUTIONS****PSD 5.1.1 Safety****PSD 5.1.1.1 Barricading and lighting**

REPLACE “Machinery and Occupational Safety Act, 1983 (Act 6 of 1983)” *WITH* “Occupational Health and Safety Act, 1993 (Act 85 of 1993).”

REPLACE SUB-PARAGRAPH (a) AND (b) WITH THE FOLLOWING AND ADD SUB-PARAGRAPH c):

- adequately protected by a barrier or fence comprising fluorescent orange plastic netting of height at least 1 000mm and as close to the excavation as practicable; and
- provided with notice boards marked “CLOSED – GESLUIT” at each end of closed or partially closed roads; and
- provided with flashing orange lights, placed at 15m intervals along the barricading at night.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ADD THE FOLLOWING TO THIS SUBCLAUSE:

Should the Contractor fail to provide adequate lighting, signing and barricading, access to properties, or leave the site in a dangerous condition, the Engineer shall be entitled to suspend all work under the Contractor until in the Engineer's opinion the Contractor's obligation in these respects have been fulfilled and/or arrange for any emergency work to be carried out by some other agency and to deduct the cost of this work from any monies due to the Contractor.

PSD 5.1.1.2 Safeguarding of excavations

REPLACE "Machinery and Occupational Safety Act" *IN SUB-PARAGRAPH (a) WITH* "Occupational Health and Safety Act, 1993 (Act 85 of 1993)."

ADD THE FOLLOWING TO SUB PARAGRAPH (d):

Loose ground, materials, tools and appliances shall be kept clear of the edge of the excavations and a pathway at least 0,30 m shall be left clear along the edge of the excavation.

PSD 5.1.1.3 Explosives

REPLACE THE CONTENTS OF THIS SUBCLAUSE AS FOLLOWS:

Where blasting is resorted to, it shall be carried out strictly according to Explosives Act and Regulations 1956 (Act No. 26 of 1956, as amended). However, in no case will blasting be allowed if a reasonable possibility exists of injury to any foundation, wall, pipe, cable or any structure, complete or partly complete. Where the Engineer considers blasting to be dangerous, the same shall not be permitted and his decision shall be final and binding.

Wherever blasting is permitted and resorted to in the vicinity or within the limits of existing townships, roads, etc., it shall only be executed under the cover of sufficient earth backfill, heavy wire mesh screens or rubber matting of adequate weight and area to prevent the blasted material from being ejected from the trench. If any damage should occur, the Contractor shall carry out remedial work arising from such damage and will be held to have allowed therefore in his price.

The Contractor shall undertake such blasting so that the Peak Particle Velocity (PPV) as measured at the closest point to the existing outfall sewer and or building structure shall not exceed 25mm/s. Each blast shall be monitored and the findings recorded by an appropriately qualified explosives expert using a suitably calibrated apparatus. The Contractor shall also timeously inform the relevant inspectorate and obtain the required blasting permit from the South African Police Services, Division of Explosives before proceeding with any blasting on site. If in the opinion of the Engineer, the Contractor makes careless use of explosives, he may forbid the Contractor the use of explosives.

It is a condition that should blasting result in the disturbing of material outside the trench, the Engineer will require the Contractor to remove the disturbed material and backfill it to a compaction standard of the natural in-situ material. All this work for correcting areas of disturbed material will be done at the Contractor's cost.

The schedule rate for hard rock excavation shall cover all costs incurred in connection with supply, transportation, storage and handling of explosives, the related blasting costs and any remedial work should this be required.

PSD 5.1.1.4 Hard rock excavation without using explosives

ADD THE FOLLOWING TO THIS CLAUSE:

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

It is a condition that should blasting result in the disturbing of structures outside the trench, the Engineer will require the Contractor to remove the rock material by means of pneumatic or hydraulic breakers, e.g. jack-hammers or wood-peckers.

The schedule rate for hard rock excavation without using explosives shall cover all costs incurred in connection with supply of specialist equipment, the transportation to and from the site as well as the removal and disposal of the hard material should this be required.

PSD 5.1.2 Existing services

PSD 5.1.2.2 Detection, location and exposure

REPLACE THE CONTENTS OF SUBCLAUSE 5.1.2.2 WITH THE FOLLOWING:

"The exposure by the Contractor of underground services, as required in terms of subclause 5.4 of SANS 1200 A (as amended) shall be carried out by careful hand excavation at such positions and to such dimensions as are agreed to by the Engineer.

Unless otherwise instructed or agreed by the Engineer, no service shall be left exposed after its exact position has been determined and all excavations carried out for the purposes of exposing underground services shall be promptly backfilled and compacted to the following densities:

- (a) In roadways: 93% Mod AASHTO density; and
- (b) In all other areas: 90% Mod AASHTO density.

Where hand excavations to expose underground services have to be carried out in roadways, the Contractor shall reinstate the road layerworks in accordance with the provisions of subclause 5.9 of SANS 1200 DB.

Payment in respect of exposing the services by means of hand excavation as described above, will be made in accordance with subclause PSA 8.8.4

Payment in respect of reinstating layerworks in roadways will be made in accordance with subclause 8.3.6.1 of SANS 1200 DB."

PSD 5.1.2.3 Protection of cables

REPLACE SUBCLAUSE 5.1.2.3 WITH THE FOLLOWING:

PSD 5.1.2.3 Protection during construction

Further to the requirements of subclause 5.4.2 of SANS 1200 A (as amended), major excavating equipment and other plant shall not be operated dangerously close to known services. Where necessary, excavation in close proximity to known services shall be carefully carried out with suitable hand tools, excluding picks wherever their use could damage the services. No additional payment will apply to such more difficult work.

Should any service not being a known service be discovered or encountered during the course of the Contract, the Contractor shall, in addition to complying with the requirements of subclause 5.4.2 of SANS 1200 A (as amended), immediately notify the Engineer thereof and implement such measures as will prevent damage of such service or, if it was damaged in the course of discovery, will prevent and minimize the occurrence of any further damage occurring."

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSD 5.1.2.4 Negligence

DELETE SUB-CLAUSE 5.1.2.4

PSD 5.1.3 Stormwater and Groundwater

ADD THE FOLLOWING TO THE SUB-CLAUSE:

“The Contractor shall, where applicable and at the earliest practicable opportunity, install the permanent drainage specified or shown on the drawings and shall at his own cost provide the temporary drainage required to protect the Works.”

PSD 5.1.4 Nuisance

PSD 5.1.4.3 Excavated material not to endanger or interfere

AMEND THE CLAUSE AS FOLLOWS:

“A safe, clear path shall be kept open at all times for pedestrians. Equipment, materials and waste shall be stored, stockpiled or removed in such a manner that pedestrians are not endangered and that the nuisance level is kept to a minimum. If construction activities occupy the whole footway and verge area so that pedestrians are forced to walk in the traffic lane, adequate protection from traffic shall be provided.

Where instructed by the Engineer or where the Works impose a danger to traffic or pedestrians, the Contractor shall at his own cost remove off Site excavated material to temporary stockpiles (approved by the Engineer) and the return to Site, excavated material for use as backfill or bedding.”

ADD THE FOLLOWING NEW SUBCLAUSE:

PSD 5.1.4.4 Open Trenches

Unless otherwise permitted and where relevant, not more than the 100 m of trench in one place shall be opened ahead of the completed and backfilled pipeline.”

PSD 5.1.5 Reinstatement and Maintenance of Roads

ADD THE FOLLOWING TO THE SUB-CLAUSE:

“Where crossings have been made, the roads shall be reinstated in accordance with the details specified in subclause 5.9 of SANS 1200 DB.”

PSD 5.1.6 Road Traffic Control

DELETE THE SECOND SENTENCE OF SUBCLAUSE 5.1.6

PSD 5.2 METHODS AND PROCEDURES

PSD 5.2.2 Excavation

PSD 5.2.2.1 Excavation for general earthworks and for structures

ADD THE FOLLOWING TO PARAGRAPH (b):

“When the nature of the material precludes the above procedure, additional excavations shall be carried out to provide working space for the erection of formwork. The rate tendered for

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

item 8.3.5 will be deemed to include the cost of a working width of 600 mm, but the Contractor may excavate a greater working width at no additional cost to the Employer."

REPLACE THE CONTENT OF PARAGRAPH (e) WITH THE FOLLOWING:

"Where excavations have been carried below the authorised levels, the Contractor shall backfill such excavations to the correct level with approved gravel compacted to 90% of modified AASHTO density or to the density of the surrounding material.

Where excavations have been carried out in hard material, the Engineer may direct the over-excavation to be backfilled with weak concrete if there is a danger of settlement or differential settlement of the foundations.

Where the sides of excavations against which concrete is to be cast have been over-excavated or have collapsed partially, the Contractor shall re-trim the excavations if necessary and, unless other remedial measures are agreed to by the Engineer, shall cast the concrete for the structure, including the additional concrete that may be required as a result of the over-excavation or partial collapse. The cost of the additional concrete or remedial measures shall be for the Contractor's account."

PSD 5.2.2.3 Disposal

REPLACE THE SECOND SENTENCE WITH THE FOLLOWING:

"The Contractor shall provide all necessary spoil sites for the spoiling of all surplus and unsuitable materials and shall make the necessary arrangements with the owner of the site where the material is disposed of, and pay all charges and levies as may be applicable for the use of such spoil sites.

Every spoil site provided by the Contractor shall be approved by the local authority in whose area it is located, and the spoiling shall comply with the applicable statutory and municipal regulations as well as the requirements of the owner of the spoil site.

Payment to the Contractor in respect of locating and making arrangements for suitable spoil sites and spoiling material at such sites will be made in accordance with the provisions of subclause PSD 8.3.14."

ADD THE FOLLOWING SUBCLAUSE IN SUBCLAUSE 5.2.2:

PSD 5.2.2.4 Selection and stockpiling

Approval or designation of the material in a particular borrow pit or excavation for a particular purpose does not imply that all the material in the borrow pit or excavation is suitable for the particular purpose to which the said approval or designation relates, nor that all material in the borrow pit or source should be used for the particular purpose. The Contractor shall select suitable material from that borrow pit or source, discard unsuitable material and reserve material for other purposes as necessary.

The Contractor shall organize and carry out his operations in such a manner as will prevent the contamination of suitable embankment and backfill material with unsuitable materials. Any excavated material which becomes, in the Engineer's opinion, unsuitable for use in embankments or backfill as a result of contamination, shall be disposed of in a manner acceptable to the Engineer and shall be replaced by the Contractor with materials acceptable to the Engineer, all at the Contractor's cost."

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSD 5.2.5 Transport for earthworks

REPLACE THE CONTENT OF SUBCLAUSE WITH THE FOLLOWING:

“The transport of all excavated materials, irrespective of the distance and source, shall be deemed to be free-haul, the cost of which is included in the Contractor’s tendered rates and prices for the excavation of the materials. No separate compensation shall apply for the transportation of excavated materials.”

PSD 7 TESTING

PSD 7.2 TAKING AND TESTING OF SAMPLES

REPLACE THE CONTENT OF THIS SUBCLAUSE WITH THE FOLLOWING:

“The Contractor shall arrange with the approved independent laboratory to carry out sufficient tests on a regular basis as agreed between him and the Engineer to determine whether the degree of compaction, and, where applicable, the quality of materials used, comply with the specifications and shall submit the results of these tests to the Engineer in a form approved by him.

The compaction requirements for fills shall be deemed complied with when at least 75% of the dry-density tests on any lot show values equal to or above the specified density and when no single value is more than five percentage points below the specified value.”

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSD 8 MEASUREMENT AND PAYMENT

PSD 8.3 SCHEDULED ITEMS

PSD 8.3.1 Site preparation

REPLACE SUBCLAUSES 8.3.1.1 AND 8.3.1.2 WITH THE FOLLOWING:

“Where site preparation such as clearing, grubbing, the removal of large trees or the removal and stockpiling of topsoil is required, the provisions and scheduled items of SANS 1200 C shall apply.”

PSDB EARTHWORKS (PIPE TRENCHES)

PSDB 3 MATERIALS

PSDB 3.5 BACKFILL MATERIALS

ADD THE FOLLOWING PARAGRAPHS TO SUBCLAUSE:

“(c) Cement-stabilised backfilling

Backfilling shall, where directed by the Engineer, be stabilized with 5% cement. The aggregate shall consist of approved soil or gravel containing stones not bigger than 38 mm and with a plasticity index not exceeding 10.

The soil or gravel shall be mixed with 5% cement and shall be compacted in layers of 100 mm thick to 90% of modified AASHTO density.

(d) Soil-crete backfilling

The aggregate for soil-crete shall be mixed with 5% cement and shall consist of approved soil or gravel containing stones not bigger than 38 mm and with a plasticity index not exceeding 10.

The soil or gravel shall be mixed in a concrete mixer with the cement and enough water to acquire a consistency that allows the mixture to be placed with vibrators to fill all voids between the pipe and the sides of the trench. Shuttering shall be used where necessary.”

PSDB 3.7 SELECTION

REPLACE THE WORDS “If he so wishes” IN THE FIRST LINE OF THE SECOND PARAGRAPH WITH THE WORDS “at his own cost.”

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSDB 5 CONSTRUCTION

PSDB 5.1 PRECAUTIONS

PSDB 5.1.2 Stormwater, Seepage and Dewatering of Excavation

PSDB 5.1.2.3 Sloping ground

ADD THE FOLLOWING SENTENCE AT THE END OF THE PARAGRAPH:

“All trench excavations on sloping embankments shall be backfilled in accordance with 5.6.2 over the full extent of the actual trench excavation and to the original embankment ground level.”

PSDB 5.1.3 Accommodation of traffic and access to properties

REPLACE THE SEMICOLON AND THE WORD “and” AT THE END OF THE SUBCLAUSE 5.1.3 (a) WITH A FULL STOP AND REPLACE ITEM (b) WITH THE FOLLOWING:

“(b) Where necessary to achieve compliance by the Contractor with his obligations to provide and maintain pedestrian and vehicular access to properties affected by the works, the contractor shall construct and maintain to the satisfaction of the Engineer, such temporary access roads around, and/or steel or timber bridges over excavations in roads, pavements, entrances or accesses to properties.

The Contractor shall make available on site at all times a sufficient number of steel plates at least 2.0m x 2.0m x 8mm thick to be laid across open trenches to provide access to private properties. The cost of providing, placing and removing the steel plates shall be included in the rates for trench excavation.

On completion of the work, the Contractor shall dismantle and remove all such temporary constructions and reinstate these areas to their former condition.

Except only where the Engineer has included in the Schedule of Quantities, particular payment items specifically therefore, the Contractor will not be paid directly for the construction and maintenance of temporary access roads and/or the provision and maintenance of bridges as aforementioned, and the costs thereof shall be deemed included in the Contractor's tendered rates for excavation.”

ADD THE FOLLOWING NEW SUBCLAUSE TO SUBCLAUSE 5.1:

PSDB 5.1.5 Removal of existing pipelines

Where existing pipes have to be removed, they shall be carefully opened up by machine excavation to 300 mm above the pipes after which the whole pipe shall be fully exposed by means of hand excavation. The excavation width shall comply with subclause 8.2.3.

The pipes shall be removed from the trench in a manner approved by the Engineer, and brought to the surface for inspection by the Engineer.

Pipes that are declared suitable for reuse and pipes declared unfit for reuse shall be dealt with in an applicable manner described in the specifications, or on the Drawings or on the Engineer's instructions, as relevant.”

PSDB 5.2 MINIMUM BASE WIDTHS

ADD THE FOLLOWING SUB PARAGRAPH TO:

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- c) Should the excavated trench width exceed the specified side allowance on each side of the pipe of 300mm by a value greater than 300mm, remedial measures shall be as directed and shall be provided at the Contractor's cost unless it can be shown that such excess width is due to factors beyond the Contractor's control.

Trench widths should be as near vertical as possible in order to minimize the quantity of selected fill material to be provided."

PSDB 5.4 EXCAVATION

ADD THE FOLLOWING SUB CLAUSES:

PSDB 5.4.1 Principles

- "a) The cost of trimming excavations by hand or machine shall not be paid for separately but shall be included in the rates tendered for excavation.
- b) All excavated material shall be kept within defined limits and shall, wherever possible, be deposited alongside the trench. The material shall be deposited so as to leave a clear strip of at least one metre between the edge of the trench and the excavated material and shall not cause undue inconvenience to traffic and property owners. The material shall be placed and kept well clear of all manhole covers, culvert in- and outlets, fire hydrants, benchmarks, stand pegs, fences, etc.
- c) To prevent vertical trench walls from collapsing, excavated material shall, wherever possible, not be stacked on the side of any underlying strata sloping down towards the trench.
- d) Excavations more than 1,5 m deep shall be adequately shored or braced to support the overhanging material and other loads which may occur. If the Contractor is of the opinion that shoring or bracing for an excavation of depth of more than 1,5 m is not necessary, he shall notify the Engineer accordingly in writing, including a report from a professional engineer or a professional technologist competent in excavations. The report shall include the relevant laboratory tests.
- e) The Contractor shall provide all the open and close timbering, strutting and shoring required for the safety of the excavations and structures adjacent to the trenches, and shall be solely and wholly responsible for ensuring the adequacy of these measures for this purpose.

Without in any way affecting or detracting from the Contractor's responsibility, the Engineer shall have the right to instruct the Contractor to provide additional or improved timbering, shoring or strutting where he considers this to be necessary. The Contractor shall have no claim for additional payment on this account.

The shoring method adopted shall be compatible with the soil type and the excavating, backfilling and pipe-laying methods adopted and shall not place any undue restrictions on the laying of the pipes.

Timbering and shoring shall be left in position until the Engineer has authorised their removal.

- f) Shoring and bracing may not be necessary where the Contractor elects to slope the sides of the excavation to at least the maximum angle of repose measured relative to the horizontal plane, as determined by laboratory tests. Sloping of the sides could be combined with steps. The Contractor will submit the proposed excavation profile to the Engineer for approval.
- g) The cost for shoring, bracing and sloping of the sides will be included in the rates tendered for excavation. The cost for the services of a professional engineer or a professional technologist, including the relevant laboratory costs, shall be included in the tendered rates.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- h) The Safety officer, or another competent person appointed by the Contractor in writing, shall inspect every excavation, including bracing and shoring:
- (i) daily, prior to each shift;
 - (ii) after every blasting operation;
 - (iii) after an unexpected fall of ground;
 - (iv) after substantial damage to supports; and
 - (v) after rain,
- in order to pronounce the safety of the excavation to ensure the safety of persons, and those results are to be recorded in a register kept on site and made available to an inspector, the Employer, Employer's agent, contractor or employee upon request;
- i) Each excavation which is accessible to the public or which is adjacent to public roads or thoroughfares, or whereby the safety of persons may be endangered, shall be
- (i) adequately protected by a barrier or fence of at least one metre in height and as close to the excavation as is practicable; and
 - (ii) provided with warning illuminants or any other clearly visible boundary indicators at night or when visibility is poor."

PSDB 5.4.2 Hand Excavatability

PSDB 5.4.3 Excavation of Asphalt Surfaces

The existing asphalt road surfacing shall be saw-cut prior to excavation commencing for the full width of the trench as specified on the construction drawings so as to ensure a neat finish to the reinstated surfacing.

PSDB 5.6 BACKFILLING

PSDB 5.6.1 General

Add the following after the first paragraph:

Trenches shall be backfilled level with adjacent surfaces immediately after completion of pipe laying and successful pressure testing. Should pipe laying not be completed before work is due to cease for the day, the Engineer shall be entitled to instruct the Contractor to backfill the trench and re-excavate it the following day in order to complete pipe laying. The cost of the above activity shall be included in the Contractor's rates for excavation.

PSDB 5.6.3 Disposal of Soft Excavation Material

DELETE THE EXISTING CLAUSE AND REPLACE WITH:

"The Contractor shall locate and negotiate for tipping sites for the disposal of surplus material and bear all costs in connection therewith. Arrangements for the consent of the owner of a property to deposit spoil and or temporary spoil thereon shall be confirmed in writing. Such arrangements shall be approved before being implemented. All spoil sites shall be neatly finished off and compacted to 90% of MOD.AASHTO density."

PSDB 5.6.6 Completion of Backfilling

ADD THE FOLLOWING:

Backfilling should not lag more than 50m behind the laying operation.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSDB 5.7 COMPACTION

ADD THE FOLLOWING:

"Where pipelines cross existing gravel roads, backfilling shall be carried out as specified in Subclause 5.7.2 and payment therefore will be made under sub item 8.3.3.3."

PSDB 5.9 REINSTATEMENT OF SURFACES

ADD THE FOLLOWING TO THIS SUB CLAUSE:

PSDB 5.9.2 Private Property and Commonage

The ground and paved surface of servitudes, parks, driveways, roadways and sidewalks shall be reinstated to at least the standard and conditions as existed previously.

Grass sods shall be cut out from the grassed areas to be excavated and shall be set aside, preserved and kept damp until used for reinstatement. All other material to be used for reinstatement shall be suitably stored for such purpose.

The rate for reinstatement of block paved surfacing shall include all costs for the supplying and laying of the surfacing. The rate shall also cover for taking brick paving out carefully, stockpiling and replacement with new if bricks are broken or damaged. The rate must furthermore provide for all plant, labour and material costs associated with the work.

The rate for reinstatement of asphalt or concrete paved surfacing shall include all costs for the saw cutting, supplying and laying of the surfacing. The rate shall also cover for removal and spoiling of the material. The rate must furthermore provide for all plant, labour and material costs associated with the work.

The width of any trench through an area paved with bricks or precast concrete units shall be the minimum practicable width that, in the opinion of the Engineer, can be removed without cutting bricks or precast units.

PSDB 5.9.4 Bitumen roads: Sub-base and Base

DELETE THIS SUB CLAUSE AND REPLACE WITH THE FOLLOWING:

Johannesburg Roads Agency will reinstate all asphalt surfaces. Refer to PS 6.7.

ADD THE FOLLOWING NEW SUB CLAUSES:

PSDB 5.9.7 Construction of Layers for Footways

The reinstatement of the paving blocks shall be the responsibility of the Contractor. The reinstatement and backfilling of pavement layers shall be done in accordance with PS 6.7

ADD THE FOLLOWING NEW SUB CLAUSES:

PSDB 5.9.8 Existing Kerbs and Channels

"Where excavations have to cross existing kerbs and channels, then:

- a) In the case of a precast kerb and channel the kerb, segmented paving blocks and channel shall be carefully removed and stored so as to avoid any damage to or theft of the kerb and channel, and replaced after the excavation has been backfilled. Any damage to or theft of the kerb and channel shall be made good by the Contractor at his expense.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- b) In the case of cast insitu or extruded insitu kerb and channel the kerb and channel shall be cut with a diamond tipped saw and carefully removed so as to avoid any damage to the remaining kerbs and channels. After the excavation has been backfilled the portion of kerb and channel removed shall be replaced with a cast insitu kerb and channel of the same profile as the existing kerb and channel."

ADD THE FOLLOWING NEW SUB-CLAUSE:

PSDB 5.11 LOCATION OF EXISTING SERVICES

Positions and details of known existing services as received from the various Departments are indicated on the Construction Drawings. Exact positions cannot be guaranteed by The Employer's who will not be held responsible for any damages to any services. The Contractor shall excavate by hand to locate any such services and ensure that care is taken not to damage these services.

ADD THE FOLLOWING NEW SUB-CLAUSE:

PSDB 5.12 DEALING AND PROTECTING EXISTING SERVICES

All existing services, underground as well as above ground level, shall be protected by the Contractor in an appropriate manner, for the duration of the construction or as deemed necessary by the Engineer, such that no damage to or interruption of the services shall occur.

ADD THE FOLLOWING NEW SUB-CLAUSE:

PSDB 5.13 GAS MAIN, ELECTRICITY AND TELECOMMUNICATION POLES

Gas mains, electricity and telecommunication poles along the pipe route are to be stabilised and protected prior to excavation and for the duration of construction.

ADD THE FOLLOWING NEW CLAUSE:

PSDB 5.14 TREES IN CONSTRUCTION PATH

When ever possible any trees that lie within the construction path, shall not be removed and care shall be exercised to avoid damaging them. If the Contractor considers the removal of any tree unavoidable he/she shall obtain in writing the approval of the Engineer and the Environmental Consultant prior to removal of any trees. Rates to cover removal and replacement where practical are provided in the schedule of quantities. A penalty of R1, 000.00 will be applied for any unauthorized or unnecessary damage to any tree which in the opinion of the Engineer could have been avoided.

ADD THE FOLLOWING NEW SUBCLAUSE 5:

PSDB 7 TESTING

ADD THE FOLLOWING NEW SUBCLAUSE:

PSDB 7.2 Inspection at Intermediate Stages of Construction

The Contractor shall call the Engineer, giving him reasonable notice, to inspect the works at the following intermediate stages of construction:

- a) After completion of the trench excavation and preparation of the trench bottom and before any pipe is laid.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- b) After the selected backfill material has been placed around the pipe and before the remainder of the trench is backfilled.
- c) Before placing of premix on roads or any final surfacing on constructed footways. Work shall not progress through the specified stages without the approval of the Engineer or his representative on site.

Failure to comply with the provision of this clause shall result in the suspension of the backfilling work until the testing has been approved by the Engineer."

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.1 BASIC PRINCIPLES

ADD THE FOLLOWING PRARGRAPH:

"The basic principle of measurement and payment for earthworks for a pipe trench is that the rates tendered for excavation shall also cover the cost of trimming, handling and shoring or bracing as specified in clause PSDB 5.4".

PSDB 8.3 SCHEDULED ITEMS

PSDB 8.3.2 Excavation

- a) Excavate in all materials, for trenches, backfill compact and dispose of surplus material

ADD THE FOLLOWING SUB-ITEM:

The rate shall also cover the cost of excavating for trenches using labour intensive construction methods. The rate shall exclude the cost of removal of grass sods and compaction but shall include for the disposal of surplus/unsuitable material. The rate shall, in addition, cover the costs for compliance with the requirements of PSDB 5.4.1.

- b) Extra over item (a) above for:

ADD THE FOLLOWING AT THE END OF THE EXISTING SUB-ITEM 2:

"No payments will be made under sub items (1) and (2) in respect of any materials measured and paid for under sub item 3 below."

AND ADD THE FOLLOWING NEW SUBITEMS IN 8.3.2(b):

- "(3) Hand excavation and backfill where ordered by the Engineer Unit: m³

The unit of measurement shall be the cubic metre of material, measured in place according to the authorised dimensions, which was excavated by the hand on the specific prior written instructions of the Engineer; provided always that the Engineer's said instruction shall have stated that measurement and payment for such hand excavation will be in accordance with this item.

The tendered rate shall include full compensation for the additional cost, effort and time resulting from excavating in the respective materials using hand methods only.

The Engineer shall not be obliged to authorise payment under this item in respect of any hand excavation carried out (whether ordered in writing or otherwise), which hand excavation was in any case necessary to achieve compliance by the Contractor with his obligations under the Contract to

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- (i) utilise construction appropriate to the nature of the specific parts of the works; and/or
 - (ii) protect existing structures and/or services; and/or
 - (iii) comply with all prevailing legislation and regulations.
- (4) Cutting of premix and concrete surfaces.....Unit: m²
- The cutting of premix and concrete surfaces shall be measured per square metre of cut as scheduled. Cutting of premix and concrete surfaces shall be done with a diamond tipped saw or by some other approved method. The depth of the cut shall be such that the adjoining premix and concrete surfaces are not disturbed when excavation takes place. The cutting of surfaces shall be done 100mm on either side of the trench.
- (5) Backfill stabilised with 5% cement where directed by the Engineer.....Unit: m³
- The unit of measurement shall be the cubic metre of backfill material, measured in place after compaction according to the authorised dimensions, which was stabilised on the Engineer's instructions in accordance with subclause PSDB 3.5(c).
- The tendered rate shall include full compensation for supplying the cement and for selecting, mixing, backfilling and compacting the stabilised material to 90% of modified AASHTO density.
- (6) Soil-crete backfill where directed by the Engineer Unit: m³
- The unit of measurement shall be the cubic metre of soil-crete placed on the Engineer's instructions in accordance with subclause PSDB 3.5(d), measured in place according to the authorised dimensions.
- The tendered rate shall include full compensation for supplying the cement and for selecting, mixing and placing the soilcrete as well as for the cost of shuttering if required."

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSDB 8.3.3 Excavation ancillaries

PSDB 8.3.3.3 Compaction in road reserves

REPLACE THE HEADING OF THIS SUBITEM WITH THE FOLLOWING:

“PSDB 8.3.3.3.3 Compaction in road crossings”

REPLACE THE SENTENCE, “The volume will be measured as specified in 8.2.2, 8.2.3 and 8.3.3.1”, WITH THE FOLLOWING:

“To determine the volume in the case of gravel roads, the depth will be measured from the underside of the gravel wearing course to the top of the fill blanket, and in the case of bitumen roads, from the underside of the subbase to the top of the fill blanket.

The rest of the trench shall be backfilled as specified in clauses 5.9.3, 5.9.4 and 5.9.5, as applicable, and payment will be made under item 8.3.6.1.”

PSDB 8.3.3.4 Overhaul

REPLACE THE CONTENTS OF THIS ITEM WITH THE FOLLOWING:

“Measurement and payment shall be in accordance with subclause PSD 5.2.5.”

PSDB 8.3.4 Particular items

PSDB 8.3.4(a) Shore trench opposite structure or service

REPLACE THE HEADING OF THIS SUBITEM WITH THE FOLLOWING:

PSDB 8.3.4(a) Shore trench opposite structure or service for depths:”

ADD THE FOLLOWING AFTER THE LAST SENTENCE:

“Separate items will be measured for depths of trenches in increments of 1 m. The rate for each stated category shall cover the cost of shoring from ground level up to the full depth of the stated category. Payment for this item will only be made if written instructions were issued by the Engineer over and above the Standard Specifications for safety of excavations as specified in SANS 1200 DB, subclause 5.1.”

PSDB 8.3.4(b) Temporary works: Control water inflow from to

REPLACE THIS SUBITEM WITH THE FOLLOWING:

PSDB 8.3.4(b) Accommodation of existing flows for temporary or permanent connections or construction of new structures or pipe trenches:

- 1) (Description of item stated) Unit: Sum
- 2) Etc for other structures

The tendered sums shall include full compensation for any inconvenience suffered, for normal and exceptional risks, for unforeseen eventualities and for maintaining the accommodated flow as long as necessary and shall include for the design and construction of all necessary temporary measures such as additional clearing, grubbing, earthworks, culverts, structures, pipework, pumping, cleaning up and any other associated work that may be required as specified in Clause PS1.5. Where a temporary structure for the

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

accommodation of an existing flow has been designed by the engineer and is to be constructed by the Contractor, payment for such structure shall, unless otherwise stated in the scheduled item, be made under the applicable sub items in this payment item."

PSDB 8.3.5 Existing services that Intersect or Adjoin a Pipe Trench

PSDB 8.3.5 a) Services that intersect a trench

ADD TO THE FIRST SENTENCE OF THIS SUB CLAUSE AS FOLLOWS:

After "Except where water pipes are to be recovered" add "and water leads for erf connections need to be renewed"

ADD THD NEW SUBCLAUSE PSDB 8.3.5 c) TO CLAUSE 8.3.5 AS FOLLOWS:

PSDB 8.3.5 c) Services that require special care

- 1) Description of service.....Unit: No
- 2) Etc for other items.....Unit: No

The Unit of measurement shall be the number of each service described. Electricity, telecommunication poles and water mains along the pipe route are to be stabilised and protected prior to excavation and for the duration of construction. The rate shall cover the temporary stabilization and protection of electricity and telecommunication poles.

ADD THD NEW SUBCLAUSE PSDB 8.3.6.2 TO CLAUSE 8.3.6 AS FOLLOWS:

PSDB 8.3.6.2 Reinstatement of surfacing for footways

- a) Brick paving Unit: m²
- b) Concrete paving Unit: m²
- c) Concrete slabs Unit: m²

The Unit of measurement shall be square meter of a reinstated surface. The rate for reinstatement of footway surfacing shall include all costs for careful removal, replacement of damaged sections and laying of the surfacing using labour intensive construction methods. The rates shall include for the lifting, stockpiling and replacement of broken or damaged bricks, blocks or slabs and shall provide for all plant, labour and material costs associated with the work.

The width of any trench through an area paved with bricks or precast concrete units shall be the minimum practicable width which, in the opinion of the Engineer, can be removed without cutting bricks or precast units.

ADD THE NEW SUBCLAUSE PSDB 8.3.6.3 TO CLAUSE 8.3.6 AS FOLLOWS:

PSDB 8.3.6.3 Reinstatement of kerbs and channels.....Unit: m²

The unit of measurement shall be square metre of area reinstated. The rate shall cover the cost of all labour, plant and material required and shall also include for the disposal of all unsuitable materials.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ADD THD NEW SUBCLAUSE PSDB 8.3.6.3 TO CLAUSE 8.3.6 AS FOLLOWS:

PSDB 8.3.6.4 Reinstatement of grassed surfaces Unit: m²

The unit of measurement shall be square metre of area reinstated. The rate shall cover the cost of careful removal of grass sods to a minimum depth to a minimum depth of 100mm, stockpiling, maintenance for later re-use and reinstatement thereof."

DELETE THIS SUBCLAUSE AND REPLACE WITH THE FOLLOWING:

PSDB 8.3.6.5 Reinstatement of fence

- a) Description of fence.....Unit: m
- b) Etc for other items

The unit of measurement shall be the metre of fence reinstated complete. The rate shall cover the full compensation, labour, material and ancillary works for the reinstatement.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSDK GABIONS AND PITCHING

PSDK 3 MATERIALS

PSDK 3.2 Pitching

PSDK 3.2.1 Stone

REPLACE THE CONTENTS OF TABLE 2 WITH THE FOLLOWING:

“TABLE 2 SIZE AND MASS OF INDIVIDUAL STONES FOR PITCHING

1	2	3	4
Size/mass of pitching	Thickness of pitching Mm, min	Least dimension Mm, min	Mass kg, min
Extra heavy	600	300	180
Heavy	400	190	50
Medium	300	150	27
Light	200	110	11

PSDK 5 CONSTRUCTION

PSDK 5.3.3 Grouted pitching

REPLACE THE WORDS “(Table 4)” IN THE SECOND LINE OF THE FIRST PARAGRAPH WITH “(Table 2)”

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSG CONCRETE STRUCTURAL

PSG 3 MATERIALS

PSG 3.2 CEMENT

PSG 3.2.2 Alternative types of cement

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

“Only sulphate resistant cement shall be used on this project.

If the Contractor wishes to use any other type of cement, he shall obtain the Engineer’s prior written approval (see 8.1 .3 .2 and 8.1.3.3.) The tendered rates, however, shall be based on the use of sulphate resistant cement only”.

PSG 3.2.3 Storage of cement

ADD THE FOLLOWING:

“Cement shall not be stored for longer than 12 weeks without the Engineers permission”.

PSG 3.4 AGGREGATES

ADD THE FOLLOWING SUBCLAUASE:

PSG 3.4.4 Aggregate of dolomatic origin

All aggregates for structural concrete, manholes, pipe encasement, pipe bedding cradles, mass filling, etc. shall be of dolomatic origin. The quantity of insoluble matter in respect of concrete made with aggregates of dolomatic origin, determined according to the method described in SANS 677, Appendix C, shall not be more than 15%.

PSG 4 PLANT

PSG 4.1 GENERAL

ADD THE FOLLOWING SUBCLAUSE

PSG 4.1.1 Minimum Plant

The contractor shall have the following minimum Plant available and in sound working order:

- Two concrete mixers, each of sufficient capacity to complete a section of the wall between horizontal construction joints within 4 hours and without interruption;
- Two concrete vibrators, at least one of which shall be powered by an internal combustion engine;
- One air compressor;
- Storage tanks at the water carts or trucks are adequate capacity to ensure that sufficient water will be available before commencement of every major concrete-placing operation.

If the Plant used for placing concrete for the structure of electrically or mechanically powered, the Contractors shall also provide some other approved, non- electrically powered standby

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

means for placing concrete at an adequate rate in the event of a power or mechanical failure of the main Plant.

When the Contractor elects to place a crane inside the walls of the structure during the construction period, shall communicate with the Engineer in good time to ensure that the design and layout of the panels that form the roof slabs and floor allow for such positioning of the crane. When sections of the roof and floor have to be redesigned to accommodate the crane, the redesigned cost shall be borne by the Contractor.

PSG 4.5 FORMWORK

PSG 4.5.1 Design

ADD THE FOLLOWING:

All form work with scaffolding required for any part the works shall be designed by the Contractor, and before commencing with the erection of any formwork or scaffolding, the Contractor shall submit the methods he proposes to use to the Engineer for approval. The Engineer has the authority to order alterations to the design or the sizes of any part of the formwork or scaffolding. The Contractor shall check the safety and suitability of all such alterations. The fact of the Engineer has approved or altered any part of the formwork of scaffolding shall not be construed as relieving the Contractor of his responsibility with regard to the strength and stability of the formwork or scaffolding.

PSG 4.5.3 Ties

ADD THE FOLLOWING:

"No plugs, bolts, ties or clamps of any description used to hold formwork will be allowed into the project or through the concrete unless expressly approved by the Engineer.

Only approved tie-rods consisting of solid rods (that remain embedded in the concrete) and with removable ends shall be used to hold the formwork of the walls. The removable tie-rod ends shall facilitate removal without damage to the concrete, and no permanently embedded parts of such tie-rods shall have less than 50mm of cover to the finished concrete surface.

The cavities left in the concrete when the tie-rod end cones are removed shall soundly caulked with a cement mortar to which an approved shrinkage-reducing agent has been added, and shall be neatly to finished to a smooth surface uniform with that of the surrounding concrete.

The cost of supplying special tie-rods as well as the filling of the cavities left by the tie-rod cones shall be included in the rates tendered for formwork under the appropriate pay items.

On no account shall formwork be secured to reinforcing bars".

PSG 5 CONSTRUCTION

PSG 5.1 REINFORCEMENT

PSG 5.1.2 Fixing

ADD THE FOLLOWING:

"The Engineer will inspect the reinforcing after it has been fixed in place, the formwork has been cleaned, cover blocks have been positioned, and before concreting commences.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Welding of reinforcing steel will not be permitted”.

PSG 5.1.3 Cover

ADD THE FOLLOWING:

“The distance between pipes in the reinforcing steel shall nowhere be less than:

- (a) 40 mm or
- (b) 5 mm plus the maximum size of the coarse aggregate, whichever is the largest

PSG 5.2 FORMWORK

PSG 5.2.5 Removal of formwork

ADD THE FOLLOWING SUBCLAUSE:

PSG 5.2.5.6 The Contractor shall make provision for the continued support of beams and slabs while the formwork is being removed and/or for that propping of beams and slabs”.

PSG 5.3 HOLES, CHASES AND FIXING BLOCKS

ADD THE FOLLOWING:

“Cover blocks for reinforcing and fixtures may be placed into the concrete provided that neither the strength nor any other desirable characteristics (such as the appearance) of the concrete section is affected or impaired in the opinion of the Engineer.

The holes or cavities left by the ferrule heads in the concrete of water-retaining structures shall be filled with an approved non-shrink grout applied strictly in accordance with the manufacturer’s specifications.”

PSG 5.4 PIPES AND CONDUITS

ADD THE FOLLOWING:

“All pipes passing through to concrete floors, walls or slabs shall be cast into a concrete member simultaneously with the casting of the member. Openings for pipes shall only be left in concrete members when so directed by the Engineer or when shown on the drawings. Pipes shall be installed in such openings according to the details shown on the drawings.

If water tightness is a requirement where pipes are cast into walls, floors and slabs, the Contractor shall ensure water tightness where smooth-surfaced pipes are used by using an approved method such as tape wrapping the pipes prior to casting in. The cost of such method will be deemed to be included in the rates tendered for item PSG 8.10”.

PSG 5.5 CONCRETE

PSG 5.5.1 Quality

PSG 5.5.1.5 Durability

The exposure conditions of the concrete are classified as “severe”.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSG 5.5.1.7 Strength concrete

ADD THE FOLLOWING:

"The concrete mixes for sulphate resistant cement shall be designed by an approved laboratory for approval by the Engineer before commencement of any concrete work".

PSG 5.5.3 Mixing

PSG 5.5.3.2 Ready-mixed concrete

ADD THE FOLLOWING:

"Ready-mixed concrete may be used on the Site. The contractor shall take samples for testing from every load delivered to the Site".

PSG 5.5 5 Placing

ADD THE FOLLOWING SUBCLAUSE:

PSG 5.5.5.10 "Concreting of the wall between horizontal construction joints shall be carried out in both directions from a point on the wall in order to close the gap with fresh concrete".

PSG 5.5.7 Construction joints

ADD THE FOLLOWING:

"Horizontal construction joints are permitted in structure walls in positions indicated on the drawings or approved by the Engineer. Vertical construction joints in the wall are subject to the written approval of the Engineer and the cost of all such vertical or horizontal construction joints will be deemed to be included in the rates for cast-in-situ concrete. This also applies to the preparation of concrete to form construction joints in the flume walls as specified on the drawings.

The construction joints in water-retaining structure shall be made strictly in accordance with the details shown on the drawings. The joints between screeds and concrete floors shall be regarded as construction joints and the surface of the floor shall be prepared as described for construction joints.

Should the Contractor's method of construction necessitate the placing of construction or other joint in a position not shown on the drawings, such method of construction and position of the joint shall be approved by the Engineer in writing. The cost of such joint shall be included in the tendered rates and shall include scrubbling of the concrete where steel reinforcement is continuous.

The walls shall be cast in lifts of height that permits each lift to be poured without interruption in one continuous operation during working hours.

It is the Contractor's responsibility to ensure that construction joints are watertight. The Contractor's proposed method for ensuring the watertightness of such joints shall be submitted to the Engineer for his approval.

For construction joints at kickers all additional costs for concrete, preparation, etc will be deemed to be included in the rates tendered for concrete in walls or sides and kicker joints or construction joints will not be measured separately".

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSG 5.5.8 Curing and protection

ADD THE FOLLOWING:

“Curing by retaining the formwork in place or by covering with a waterproof membrane are the curing methods strongly recommended. Concrete will not be paid for unless properly cured and proof of curing is continuously visible on the Site”.

PSG 5.5.11 Watertight concrete

ADD THE FOLLOWING:

“The minimum cement content in water-retaining structures shall be 325 kg/m³, and the maximum cement content shall be 450 kg/m³ in reinforced concrete.”

The maximum water cement ratio for water-retaining structures shall be more 0, 50”.

ADD THE FOLLOWING SUBCLAUSE:

PSG 5.5.16 Soilcrete

Where soilcrete is specified for filling under floor slabs the soilcrete shall comply with the requirements of subclause PSDB 3.5 (d) of section 1200 DP as amended and shall be placed as specified in this subclause.

PSG 6 TOLERANCES

PSG 6.2 PERMISSIBLE DEVIATIONS

PSG 6.2.3 Specified permissible deviations

ADD THE FOLLOWING:

“Degree of accuracy II is applicable

Every specified permissible deviation is binding in itself. The cumulative effect of permissible deviations will not be considered. The maximum permissible vertical deviation is subject to the other permissible deviations”.

REPLACE SUBCLAUSE 6.2.3 (D)(5) WITH THE FOLLOWING:

	Permissible deviation		
	Degree of accuracy		
	III	II	I
	mm	mm	mm
“Vertically, per metre of height	5	3	2
Subject to a maximum	50	30	10

PSG 7 TESTS

PSG 7.1 FACILITIES & FREQUENCY OF SAMPLING

PSG 7.1.1. Facilities

ADD THE FOLLOWING:

“The Contractor shall provide sufficient storage capacity for the concrete cubes and shall arrange to have them tested by an approved laboratory.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The cost all testing, including the cost of sampling, storage and transporting samples should be included in the rates tendered for concrete work”.

PSG 7.3 ACCEPTANCE CRITERIA FOR STRENGTH CONCRETE

ADD THE FOLLOWING:

“Test results obtained from the supplier of ready-mix concrete will not be accepted for evaluation in terms of subclause 7.3, but samples for testing shall be taken off such concrete at the point of placing “.

ADD THE FOLLOWING SUBCLAUSE:

PSG 7.3.6 Testing for watertightness

Water for testing shall be provided by the Contractor and shall be responsible for providing all necessary equipment that may be required for filling the structures.

The structure shall be filled with water at a uniform rate not exceeding 2.0 m in 24 hours until the top water level been reached. The water level will then be carefully noted and recorded by the Engineer in relation to a fixed benchmark, and shall be contained by the addition of further water for a sterilising period to permit complete absorption of water by the concrete.

The sterilising period may be 7 days for a maximum design crack width of 0.1mm or 21 days for 0.2mm or larger. After the sterilising period, the level of the liquid surface shall be recorded at 24-hour intervals for a test period of 7 days. During the 7 day test period the total permissible drop in level, after allowing for evaporation shall not exceed 1/500 the one of the average water depth of the full tank, or 10 mm.

The evaporation shall be measured by the mean drop in level caused by the evaporation of the water in three flat containers floating in the water being recorded.

In the event of appreciable leakage being evident at any of the stages of the filling or testing or the event of the Engineer considering the final degree of water tightness to be unsatisfactory, the contractor when ordered by the Engineer shall discontinue such filling or testing and shall, at his own expense, take approved steps immediately to rectify the leakage, until a satisfactory test is obtained, which shall prove to the Engineer that a sufficient degree of watertightness has been obtained.

The cost of emptying a water-retaining structure which cannot be drained shall be borne by the Contractor. The water shall be discharged in a manner approved by the Engineer and shall be such that the employer can utilise the water is he so desires.

The water shall not be used as a medium for additives to affect remedial work or to stop leaks.

The cost of retesting the structure for watertightness shall be borne by the Contractor”.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSG 8 MEASUREMENT AND PAYMENT

PSG 8.1 MEASUREMENT AND RATES

PSG 8.1.1 Formwork

DELETE “or splays over 20 mm x 20 mm” FROM THE FIRST LINE OF PARAGRAPH 8.1.1.2

ADD THE FOLLOWING PARAGRAPH 8.1.1.2

“Splays up to and including 25 mm x 25 mm will not be measured separately and will be deemed to be included in the formwork costs”.

ADD THE FOLLOWING PARAGRAPHS

“8.1.1.7 For construction joints at kickers (joint F), all additional costs for formwork to edges up to 300 mm high will be deemed to be included in the rates tendered for vertical formwork to sides of walls and will not be measured separately in narrow width.

8.1.1.8.1 No formwork will be measured to edges of blinding layers under structures and the cost thereof (if needed), will be deemed to be included in the rates tendered for concrete in blinding layers.

8.1.1.8.2 Back-shuttering or formwork to top revealed surfaces of sloping - or conical formwork will only be measured to surfaces over 40° and 85° to the horizontal.

8.1.1.8.3 Formwork to horizontal surfaces in pump stations, valve chambers, man holes or sumps can either be removed through the manhole cover opening or the Contractor may use permanent formwork at his own cost as no claims in this regard will be considered”.

PSG 8.1.2 Reinforcement

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

“The unit of measurement for steel bars shall be the ton of reinforcement in place, in accordance with the Drawings or as authorised by the Engineer.

The unit of measurement for welded steel fabric shall be the kilogram of fabric reinforcement in place, and the quantity shall be calculated from the net area covered by mesh, excluding overlaps.

Clips, ties, separators, stools and other steel used for positioning reinforcement will not be measured, unless these are shown on the bending schedules.

The tendered rate shall include full compensation for the supply, delivery, cutting, bending, welding, placing and fixing of the steel reinforcement, including all tying wire, stools, supports and waste”.

PSG 8.1.3 Concrete

Delete “or the plank size of the excavation where additional excavation is provided to facilitate erection of forms” from the second line of paragraph 8.1.3.1(c).

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSG 8.1.4 Metal work

8.1.4.1 Door

The tendered rate includes the supply and installation of a purpose made double steel door frame and double door complete with locking device, built into the wall as indicated on the drawings. The rate shall include all handles, bolts and locks. The door shall make allowance for the crawl beam. The door and frame shall be manufactured from 1.6 mm mild steel. The hinges shall be 100mm heavy duty. The door without the pull handle shall be fitted with lockable bolts, both top and bottom. The rate shall include the supply of two padlocks with common key. The door and frame shall be painted after installation as follows: 2 x coats of universal undercoat and 2 x coats of white enamel. Payment shall be made on completed and approved construction only.

8.1.4.2 Crawl beam

The rate shall include the supply and installation of a crawl beam, as indicated on the drawings. The crawl beam shall be hot dipped galvanized. All labour, plant, material, specials and ancillary costs required to fix the crawl beam to the roof of the building shall be included in the tendered rate. Measurement shall be per number of beams. Payment shall be made on completed and approved construction only.

8.1.4.3 Crawl beam support

The rate shall include the supply and installation of an external support for the crawl beam, as indicated on the drawings. The support for crawl beam shall be hot dipped galvanized. All labour, plant, material, specials and ancillary costs for the fixing of the support shall be included in the tendered rate. Measurement shall be per number of supports installed. Payment shall be made on completed and approved construction only.

8.1.4.4 Windows

The rate shall include the supply and installation of stock residential type steel windows of type indicated on drawings, including glazing, sills and burglar bars. Burglar bars shall be heavy duty and 15 mm diameter. The bars shall have at least a penetrating of depth of 100 mm in the lintels and sills. Loose burglar bars shall be site welded to the window frames. Payment shall be made on completed and approved construction only.

8.1.4.5 Steel staircase

The rate shall include the supply and installation of a steel staircase with hand rails on both sides, as indicated on the drawings. All labour, plant, material, specials and ancillary costs for the fixing of the support shall be included in the tendered rate. Payment shall be made on completed and approved construction only.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSL MEDIUM-PRESSURE PIPELINES

PSL 2 INTERPRETATIONS

PSL 2.4 ABBREVIATIONS

ADD THE FOLLOWING:

HDPE: High density polyethylene

mPVC : Modified Polyvinyl chloride

PSL 3 MATERIALS

PSL 3.1 GENERAL

ADD THE FOLLOWING TO CLAUSE:

The contract specifications for materials and construction activities will conform to SANS 1200, SANS 1914-5 and Johannesburg Water requirements. The project specifications will include specific items to ensure proper implementation, control reporting on labour based construction and methods as included in the specifications.

Materials for this contract should preferably be obtained from manufacturers who operate an effective quality management system such as that described in SANS 0157 or ISO 9000.

PSL 3.4 STEEL PIPES, FITTINGS, AND SPECIALS

PSL 3.4.3 Pipes of nominal bore over 150mm

OMIT PARAGRAPH (C) AND INSERT THE FOLLOWING:

"Steel pipes and fittings shall be manufactured in accordance with API 5L X52 with a wall thickness of 12mm; 10mm, 8mm or 6mm, depending on the section of pipe in question. External lining to be FB MDPE (Sintakote 2) (or other as specified by the Employer) and internal lining to be SF Epoxy with a target thickness of 600 microns. Pipe lengths to be 12.192 m.

Straight joints and bends to be fillet welded on site.

The pipe manufacturer shall submit to the Engineer the steel maker's certificates covering all steel used. These certificates shall indicate the process of manufacture, the chemical analysis and the physical properties of the steel except that, at the option of the pipe manufacturer, the physical properties of the steel may be determined from specimens taken from finished pipe."

PSL 3.7 OTHER TYPES OF PIPES

PSL 3.7.1 uPVC Pipes

ADD THE FOLLOWING TO THE SUB CLAUSE

"uPVC Pipe's systems shall conform to SANS 966-1998Part1 or II as applicable and have integral pipe end sockets of the rubber ring joint type. All uPVC - pipes shall be in 6m lengths. Fittings and specials for uPVC pipes shall be manufactured in Grade 14 cast iron, rated to at

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

least 1600kPa working pressure. Unless otherwise specified fittings and specials shall be bitumen dipped.

PSL 3.7.2 Polyethylene Pipes

REPLACE THE SUBCLASE WITH THE FOLLOWING

"HDPE pipes of diameter up to and including 63 mm shall conform with SANS 4427 Part 2 for Type IV pipes. HDPE pipes greater than 63 mm shall conform with SANS 4427 Part 3 for Type V pipes. Unless otherwise specified, pipes shall be Class 16 and plain ended for butt welding".

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 3.7.3 High Impact uPVC Pipes

Class 16 uPVC pipes shall conform to SANS 1283 (alternatively ISO 4422) shall be used unless otherwise indicated. Jointing shall be effected by means of approved "press-on" shouldered ends and cast iron and steel victaulic clamps. Unless otherwise specified, pipes shall be Class 16.

Where the cutting of any pipe is necessary, shouldered ends shall be fixed to the pipe by means of an approved machine capable of clamping the pipe without causing any damage to the pipe and pressing on the shouldered end by means of a hydraulic operated jack applying a uniform axial force to locate the shouldered end truly in position. The use of impact force to either the pipe or shouldered end will not be permitted. No on-site fixing of shouldered ends shall be permitted."

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 3.7.4 mPVC Pipes

High Impact mPVC Class 16 and shall conform to SANS 1283 for diameter up to and including 315mm with a fully end load restraint coupling system approved by Johannesburg Water.

PSL 3.8 JOINTING MATERIAL

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 3.8.2 Flexible couplings

OMIT THE EXISTING CLAUSE AND INSERT THE FOLLOWING:

"All flexible couplings shall be "Viking Johnson" couplings without centre register, or approved similar.

Rubber rings shall be of the wedge-type and shall be manufactured from natural or synthetic rubber only. Reclaimed rubber shall not be used in the manufacture of the rubber rings."

PSL 3.8.3 Flanges and accessories

ADD THE FOLLOWING TO THE EXISTING CLAUSE:

"The dimensions and drilling of standard flanges shall comply with the requirements of SANS 1123 and SANS 1476 for a working pressure as specified. Flanges shall be machined flat, i.e. without a raised joint face. Puddle flanges shall have the same dimensions as standard flanges but shall be undrilled.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Linbro Water Upgrades
CIDB grade 7CE or higher

Scope of Work

Faces of flanges which will be in contact with jointing gaskets shall receive a protective coating of such thickness and consistence as will not impair the air/gas/water tightness of the joint."

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 3.8.8 Victaulic joints

Joints for uPVC and medium steel pipelines shall conform to SANS 815: Standard specifications for shouldered end pipes, fittings and couplings.

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 3.8.9 HDPE Pipe joints

Joints for HDPE pipe shall be by means of welding or electro fusion, welded flanges or approved external compression type fittings (Plasson or similar approved)."

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSL 3.9 CORROSION PROTECTION

PSL 3.9.2 Steel pipe

ADD THE FOLLOWING TO THE EXISTING CLAUSE:

"All coating and linings shall be completed strictly to the publication "Corrosion Protection for Civil, Mechanical and Electrical Engineer" 2000 Edition.

Pipes and fitting shall be externally coated with fusion bonded medium density polyethylene (Sintakote2) (or other as specified by the Employer) and internally with Solvent Free Epoxy.

The target thickness of the lining material shall be 600 microns, and not less than 500 micron and test certificates of the lining thickness must be furnished to the Engineer for his approval."

PSL 3.9.2.3 Repairs to epoxy coatings

ADD THE FOLLOWING TO THE EXISTING CLAUSE:

PSL 3.9.2.3.1 General

- Where the damage is extensive the remedial procedures shall be agreed in writing with the Engineer.
- All repairs shall comply with the requirements of the repair-product manufacturer's data sheet. The Engineer may at his discretion request that repaired coating areas undergo adhesion tests.
- The Contractor shall repair any damage occurring during transport, on site during handling, assembly, storage, and erection.
- The repaired area shall be tested in accordance with Sub-Clauses 8.4 and 8.12 of SANS 1217 for compliance with the relevant requirements for thickness and electrical insulation defects respectively.
- Any item showing electrical insulation defects exceeding an average of five per square metre (a cluster of pinholes within a radius of 25 mm being regarded as a single defective area), or flaking or other signs of loss of adhesion, shall not be repaired. The item shall be blast cleaned and re-coated in accordance with the relevant requirements of the Clause PSL 3.9.2.3.3.

PSL 3.9.2.3.2 Repair Methods for Minor Defects

The repair of areas showing electrical insulation defects or low film thickness shall, if approved by the Engineer, be carried out as follows:

- Degrease in accordance with Clause PSL 3.9.2.3.4.
- Thoroughly abrade the damaged area, including an adjacent surrounding area of at least 25 mm wide, with a medium grade 220 abrasive paper;
- Vacuum-clean the surface to remove dust and debris in accordance with SANS 5769.
- Wipe the abraded paint surface with methyl ethyl ketone and allow to dry, and
- Apply as many coats of the following repair material as necessary to achieve the specified thickness and finish.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- (i) Solvent free epoxy; or
- (ii) Fusion-bonded epoxy powder repair kit.

NOTE: Apply a final topcoat over the repaired area to achieve a pleasing, uniform finish of the item.

PSL 3.9.2.3.3 Repair Methods for Major Defects

The total un-coated areas for renovation by the applicator shall not exceed 0.5% of the total surface area of a component. Each un-coated area for renovation shall not exceed 2 500 mm². If damaged areas are larger, the items containing such areas shall be re-coated.

The repair of areas showing damage down to the steel surface shall, if approved by the Engineer, be carried out as follows:

- (a) Degrease in accordance with Clause PSL 3.9.2.3.4
- (b) Blast-clean all damaged areas to Sa 3 (ISO 8501-1).
- (c) Feather the surrounding paint for a distance of 25 mm beyond the damaged areas with a medium grade 220 abrasive paper.
- (d) Vacuum-clean the surface to remove dust and debris in accordance with SANS 5769.
- (e) Wipe only the abraded paint surface with methyl ethyl ketone and allow drying.
- (f) Apply as many coats of the following repair material as necessary to achieve the specified thickness and finish.
 - (i) Solvent free epoxy or
 - (ii) Fusion-bonded epoxy powder repair kit.

NOTE: Apply a final topcoat over the repaired area to achieve a pleasing, uniform finish of the item.

PSL 3.9.2.3.4 Degreasing

- (a) All surfaces to be coated shall be tested for oil and grease contamination by the water break free test.
- (b) Oil and grease contamination shall be removed by:
 - Steam-cleaning;
 - An emulsifiable or aqueous detergent applied in accordance with SANS 1344, and;
 - An alkaline cleaning solution.
- (b) Allow to react, and then rinse off with clean, potable water to remove all residues prior to surface preparation, all in accordance with Clauses 3.3 and 3.4 of SANS 10064.
- (c) The surfaces shall be tested after degreasing and show no oil, grease and chemical contamination after degreasing.
- (d) Care shall be taken to avoid entrapment of cleaning agents in recesses or other retention areas.

ADD THE FOLLOWING NEW SUBCLAUSE:

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSL 3.9.2.4 REPAIR OF DAMAGED SINTAKOTE

PSL 3.9.2.4.1 General

Damaged Sintakote shall be repaired in accordance with the procedures detailed in the Tyco Handling and Installation Manual for steel pipeline systems for the repair of Sintakote or in accordance with clause 3.2 or clause 3.3

PSL 3.9.2.4.2 REPAIR OF SMALL PINHOLE TYPE DEFECTS

PSL 3.9.2.4.2.1 Surface Preparation

- Clean and dry the area to be repaired including the removal of dirt, dust and other contaminants. Slightly roughen the area around the repair for a minimum distance of 50 millimetres using a coarse file or abrasive paper.
- Wipe the surface with a clean dry rag.

PSL 3.9.2.4.2.2 Priming

- Stir the primer to ensure complete mixing prior to application. Apply a thin even coat of Densopol Primer D around the area of repair using a paint brush or roller
- Allow the primer to tack dry (approximately 10 to 20 minutes)

PSL 3.9.2.4.2.3 Tape Wrapping

- Apply Deponsole 60 tape to the repair area ensuring a minimum of 50 mm overlap onto sound coating around the defect area.
- Apply Denso MP/HD P.V.C self adhesive over wrap tape around the full pipe circumference to completely cover the repaired patch.

PSL 3.9.2.4.3 REPAIR OF LARGE AREA OF DAMAGE WHERE STEEL IS EXPOSED

PSL 3.9.2.4.3.1 Surface preparation

Cut out the area of Sinkakote and clean the steel surface in accordance with AS1627.2. Clean and dry the area to be repaired. Slightly roughen the area around the repaired using a coarse file or abrasive paper. Wipe the surface clean with a dry clean rag.

PSL 3.9.2.4.3.2 Priming

- Stir the primer to ensure complete mixing prior to application. Apply a thin, even coat of Densopol Primer D onto the steel surface and around the periphery of the Sintakote.
- Allow the primer to track dry (Approximately 10 to 20 minutes)

PSL 3.9.2.4.3.3 Filling/Priming

- Cut out a piece of Bitumen Mastic Strip to fit into the bare steel area prior to applying the primer.
- Insert the cut out piece of Bitumen Mastic Strip into the repair area.
- Re-apply a thin even coat of Densopol Primer D over the patch and adjacent area of Sintakote.
- Allow the primer to track dry (Approximately 10 to 20 minutes)

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSL 3.9.2.4.3.4 Tape Wrapping

- Apply Densopol 60 tape to the repair area ensuring a 50mm overlap over the fitted patch.
- Apply Denso MP/HD P.V.C self adhesive over wrap tape around the full pipe circumference to completely cover the repaired patch.

PSL 3.9.2.4.4 SURFACE PREPARATION

All joints shall be fully welded and sealed and all sharp edges and corners ground off to a radius of not less than 1.5 mm. All weld spatter and irregularities shall be removed. Any unsound or damaged edges of sintakote shall be cut back into the sound coating and the edges chamfered.

The surface shall be cleaned by means of power tools to achieve a minimum surface preparation in accordance with AS1627.2 TO CLASS St. 2. All dust, dirt, moisture and grease shall be removed. Slightly roughen the sintakote 100 millimeters both sides of the joint, using a coarse file or abrasive paper. Wipe the surface clean with a dry rag.

PSL 3.9.2.4.5 PRIMING

- Stir the primer to ensure complete mixing prior to application, Apply a thin even coat of Densopol Primer D to the steel and roughened sintakote surfaces using a paintbrush or roller.
- Allow the primer to touch dry (approximately 10 to 20 minutes)

PSL 3.9.2.4.6 MASTIC FILLING

To improve the contours for wrapping the tape, fillet welds, sharp edges of sintakote, test plugs or welding lid holes shall be filled and profiled with Bitumen Mastic Strip. The mastic filling shall be moulded such that the Densopol 60 tape can be applied with no sharp edges protruding or air entrapment.

PSL 3.9.2.4.7 TAPE WRAPPING

Commencing at least 100 millilitres back onto the primed sintakote one complete turn of 150 millilitre wide Densopol 60 tapes shall be applied. Release film shall be removed before application. While holding the tape under tension, the pipe shall be spirally wrapped using a 55 percent overlap and finished 100 mm onto the primed sintakote with one complete circumferential wrap around the pipe. The tape shall be cut off in the downward direction of wrapping. New roles of tape shall have the ends overlapped at least 75 mm.

During wrapping the tape shall be smoothed out by hand to exclude any air bubbles or wrinkles and to seal overlaps.

Care shall be taken to prevent any folds or misplacement of the tape, especially under the pipe, and to prevent the tape becoming contaminated during wrapping.

The butt-welds in segmental (lobster bends) are to have the tape applied partial layer by partial layer with a 55 percent overlap until a full spiral wrap can be made (refer sketch in appendix A) continue wrapping onto the primed sintakote for at least 100mm with one complete circumferential wrap around the pipe.

Straight steel pipes shall also be wrapped with Densopol 60 with a 55 percent overlap in accordance with the above clauses.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSL 3.9.2.4.8 STEEL FITTINGS AND FLANGES

PSL 3.9.2.4.8.1 GENERAL

Procedures for the protection of steel fittings apply to both main pipeline fittings and branch pipe work. Fittings manufactured shall be factory coated with Sintakote. Difficult fittings such as valves may be protected using a more conformable petrolatum system in accordance with TS29 only with the approval of the Employer.

PSL 3.9.2.4.8.2 SURFACE PREPARATION

Still surfaces shall be prepared in accordance with clause 4.1.

PSL 3.9.2.4.8.3 TAPE WRAPPING

Prepare and wrap all straight sections leading up to the fitting and flange in accordance with section 4.

PSL 3.9.2.4.8.4 PRIMING

- Stir the primer to ensure complete mixing prior to application. Apply a thin even coat of Densopol Primer D to the prepared steel surfaces and a minimum of 50mm onto the Densopol 60 wrapped areas using a paint brush.
- Allow the primer to touch dry (approximately 10 to 20 minutes).

PSL 3.9.2.4.8.5 MASTIC WRAPPING

Unavoidable sharp edges such as bolts, nuts and collars shall have mastic strip moulded over the positions or edges. Strip with a 55 percent overlap onto itself and minimum 50mm overlap onto the Densopol 60 or Sintakote coated pipe work. Press the Bitumen Mastic Strip firmly into place ensuring no air voids are beneath the Bitumen Mastic Strip.

Note: The Bitumen Mastic Strip provides corrosion protection to the steel work and is similar in composition to Densopol 60, but it does not have a woven carrier.

PSL 3.9.2.8.6 OVER WRAPPING

150 or 100mm wide Denso MP/HD tape (self adhesive PVC) shall be spirally wrapped over the Bitumen Mastic Strip with a 55percent overlap. While wrapping, the Denso MP/HD tape shall be pulled firmly and the lapse properly sealed.

PSL 3.9.2.8.7 TESTING

All repairs and wrapping shall be tested using a high voltage "spark" tester in accordance with AS3894.1 at an operating voltage of 15 KV.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSL 3.9.3 Protection against electrolytic corrosion

OMIT THE EXISTING CLAUSE AND INSERT THE FOLLOWING:

"All joints and fittings shall be fully wrapped with approved protective tapes. Protective tape shall comply with either Specification A or Specification B as ordered by the Engineer.

Specification A

This tape shall be made up of pre-bonded components to form a composite single wrap tape. The adhesive inner protective tape must provide complete protection to steel piping against electrolytic corrosion. It shall be impermeable to water, chemically inert and physically stable and must provide a perfect seal at the overlap on a spiral-winding pattern.

The adhesive outer protective tapes shall be tough and impact resistant, providing suitable protection of the inner protective tape against mechanical damage. It shall be stable and not crack or deteriorate when buried. The tapes shall be chemically resistant to all common acids and alkalis normally encountered in the soils at the construction site.

The tapes shall be suitable for both machine and hand application.

The Combination electrical characteristics of the inner and outer wrap together must exceed:

Dielectric strength = 25kV/mm

Insulation = 10 Ohm metre

The following minimum criteria shall be satisfied:

	Inner Tape	Outer Wrap
Thickness (mm)	0,3	0,3
Tensile strength (kg/cm width)	3,3	5,0
Elongation at break (%)	200%	50%
Adhesion to primed steel (gm/cm width)	220	220

Specification B

This tape shall be made up of a non-woven synthetic fibre carrier impregnated and coated on both sides with a compound incorporating high melting point bitumen (Densotherm or similar approval). During application the tape shall be correctly heated and laps adequately sealed all in accordance with the instructions and recommendations of the supplier.

Before the application of any protective material, the surface of the pipe shall be thoroughly cleaned and all loose or damaged pipe coating removed. All ridges, depressions and steps in the surface shall be filled with an approved filler so as to present a smooth uniform surface. After the filler has hardened, the entire surface to be wrapped shall be primed with a primer or otherwise treated as recommended by the supplier of the tape.

The protective tape shall be applied as a spiral wrap with not less than 50% overlap. The width of the tape shall be appropriate for the section to be wrapped."

PSL 3.9.5 Joints, nuts, bolts and washers

DELETE AND REPLACE WITH THE FOLLOWING:

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

"All bolts and nuts shall comply with the requirements of the relevant sections of SANS 1700 and shall be of Grade 4.6 steel. Washers shall be provided at each nut and shall be of the same material (or coating where applicable to match the bolt and nut. Nuts and bolts subject to vibration shall be machined finished fitted with plain washers and treated with "Loctite" or equivalent.

Bolts other than jacking bolts shall project not less than 3mm and not more than 10mm from the heads of the nuts after tightening.

All bolts to be built into concrete work as well as bolts to be installed above ground level (outside buildings), directly above and under water shall all be of stainless steel grade 304. Bolts for flexible couplings and flanges for underground installation shall be hot dip galvanized. Bolts to be installed inside buildings shall be hot dip galvanized. Galvanizing shall be in accordance with the Standard Corrosion Protection Specification (Heavy coating).

Suitable plastic sleeves and/or washers shall be used for protection against corrosion by bi-metallic action".

PSL 3.9.6 Corrosive soil

ADD THE FOLLOWING TO THE EXISTING CLAUSE:

"Steel pipes, pipe fittings and steel flanges in contact with soil shall over and above the protection as described above be protected as specified in Clause 3.9.3 with "DENSO" tape and/or mastic or approved similar. Application shall be strictly in accordance with the manufacturer's instructions. A polyethylene tape of 300 microns minimum shall be spirally wrapped over the petrolatum tape and fixed to the clean pipe ends with pressure sensitive tape."

PSL 5 CONSTRUCTION

PSL 5.1 LAYING

PSL 5.1.4 Depth and Cover

PSL 5.1.4.2 Cover

ADD THE FOLLOWING TO THIS SUBCLAUSE:

"The minimum cover to finished surface over water mains shall be at least 1000 mm in trafficked areas and at least 800 mm elsewhere. At valves the depth of the pipeline shall be increased if necessary to ensure a minimum cover of 100mm over the valve cap. The cover shall be maintained as close as possible to the minimum without local sags or humps and shall not be increased above the minimum by more than 200mm without the approval of the Engineer."

PSL 5.2 JOINTING METHODS

PSL 5.2.3 Welding

DELETE THE EXISTING CLAUSE AND REPLACE WITH THE FOLLOWING:

a) General

"Field welding of pipes which have been lined will be permitted only for pipes of DN600 and larger where a man is able to enter the pipe to make good the lining after welding and testing in accordance with Clause 7.2 of SANS 1200L has been completed. Pipes of lesser

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

diameter may be field welded where concrete linings will be made after the pipeline has been laid and all welds have been tested and approved.

At the discretion of the Engineer, roll welding will be permitted, provided pipe alignment is maintained by use of skids or of structural framework to accommodate two or more lengths of pipe with an adequate number of roller dollies to prevent sag in the pipe. The entire root bead, however, shall be made with the pipe in a stationary position.

All pipes welded in the trench shall be properly laid and aligned before welding commences. Bell holes shall be excavated at all field welds. The Contractor shall not lift the pipe to provide adequate access for the welders to enable them to stovepipe weld the joint.

The alignment of abutting ends shall be such that the offset will not exceed 1.7 mm. Line up clamps shall be used for joint "fit-ups". The use of "bridges and wedges" or any method that may induce unnecessary stresses is forbidden.

Both ends of coated and lined pipes shall be wrapped for a distance of at least 800 mm on either side of the weld by means of an asbestos mat or other approved material to ensure that weld spatter or other damage is not caused to the coating and lining during the welding process. The pipe trench shall be kept free of all dirt and water in the vicinity of the weld until after all corrosion protection measures have been completed and approved. "

b) Welding procedure and qualification of welders

Welding shall be done by only qualified welders who satisfy the requirements of API 1104, Clause 3.0. Before any welding of pipeline materials commences, the qualification of welders shall have been approved, all detailed welding procedure specifications with weld diagrams required for their completion shall have been submitted for approval in a neat form and the welding procedure qualification tests shall have been successfully concluded all in accordance with the relevant standard specifications. Each welder shall mark the pipe adjacent to the weld with the figure assigned to him.

Sufficient records shall be kept by the Contractor to ensure that all field welds can be subsequently identified with the welder concerned.

As far as practicable all out of trench welding shall preferably be done by an automatic submerged process and the Contractor shall provide all necessary plant to carry out this process. MSEAP welding may be used where in-trench welding is done.

Heat treatment for welding shall be in accordance with API 1104 if required by same and the Contractor shall provide an approved shield to protect the pipe joint from wind and weather during heat treatment and welding.

c) Line up

Pipes shall be lined up in such a manner as to prevent damage thereto. If the pipe to be used has a longitudinal seam, these seams shall be staggered by not less than twenty degrees and welded sections, or single lengths, shall be assembled in such a manner that this seam shall remain in the top quadrant of the pipe during coating operations and after lowering into the trench.

d) **Cleaning of pipe ends** Before welding, all foreign matter shall be removed from the bevelled ends. If any of the ends of the pipe joints are damaged to the extent that satisfactory welding contact cannot be obtained, the damaged pipe ends shall be cut and bevelled with an approved bevelling machine. These field bevels of pipe ends shall be made to the satisfaction of the Engineer. Should laminations, split ends, or other defects

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

in the pipe be discovered, the joints of pipes containing such defects shall be cropped, repaired, or removed from the line as designated by the Engineer.

e) Inclement Weather

No welding shall be carried out during rain or high wind unless the welder and joint are adequately protected and sheltered, to ensure that the welding is not impaired.

f) Protection of coatings and linings

Before welding commences, a suitable apron at least 800 mm wide shall be wrapped around both sides of the area to be welded to ensure that weld spatter does not damage the coating and lining.

g) Butt-welding

Pipes and specials to be joined by field welding shall be supplied with ends bevelled for welding. All welding of joints shall comply with API 1104 and only approved type welding rods shall be used. If backing rings are permitted, they shall be placed in position and wedged up or adjusted so that the pipe ends are completely circular and properly mated. The space between abutting pipe ends, when aligned for welding, shall be such as to ensure complete penetration without burn-through. For pipes having the same dimensions, the spacing shall be approximately 1.5 mm. The alignment of the abutting pipe ends shall be such as to minimize the offset between pipe surfaces. For pipes of the same nominal wall thickness, the offset shall not exceed 1.5 mm. Internal line-up clamps shall be used wherever practicable and may be removed after the root bead is 50% completed, provided that the completed part of the root bead is in segments of approximately equal lengths, spaced about the circumference of the pipe. If conditions make it difficult to prevent movement of the pipe, or if the weld will be unduly stressed, the root bead shall be completed before releasing clamp tension.

External line-up clamps shall be used where it is impracticable to use internal line-up clamps. Partial root beads made when using external clamps shall be uniformly spaced about the circumference of the pipe, and shall have an accumulative length of not less than 50% of the pipe circumference before the clamps are removed.

Tack welding shall be carried out to maintain the root gap and position of the pipe ends during the welding proper. The number of tack-welds shall be kept to a minimum but shall not be less than four around the circumference of the pipe.

After proper preparation and tack welding, the root bead shall be carried out followed by successive filler passes, and capper pass in accordance with the approved welding procedure.

The filler and finish beads shall be deposited by an acceptable method and each filler bead shall be approximately 3 mm in thickness. Completed welds shall have a reinforcing of not less than 0.8 mm and not more than 1.5 mm above the pipe surface around the entire perimeter of the weld, and the width of the finish or cover shall be not more than 3 mm greater than the original groove. The number of beads required shall be governed by the wall thickness of the pipe, so that the completed weld will have the reinforcement previously specified; provided, however, that each weld shall consist of at least three beads. No two beads shall be started at the same point. No mitre welds will be permitted, and all welds are to be at ninety degrees ($\pm 5^\circ$) to the axis of the pipe. All slag and scale shall be removed from each bead for visual inspection immediately after each bead is run.

In all field butt-welds where it is possible to work inside the pipe, the inside weld shall be done first.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The chemical composition of weld metal and parent metal shall be similar and the inner weld metal or reinforcement shall not extend more than 1 mm above the inside metal surface of a pipe or special, and any excess shall be removed by grinding.

Defects caused by stray welding arc flashes shall be removed by grinding, provided that the pipe wall thickness is not reduced to less than the specified minimum thickness, otherwise the portion shall be cut out and repaired.

h) Fillet welding

Welding shall be as for butt-welding as applicable. All pipes of 600 mm ND and over shall be welded on both the outside and the inside.

i) Repair of welds

Rectification of defective welds shall be in accordance with API 1104 and to the satisfaction of the Engineer. All costs related to the repair of defective welds shall be borne by the Contractor. Defective welds shall be repaired immediately they are found to be so. The Engineer has the right to stop the Contractor proceeding with further pipe laying in the event of the Contractor delaying the rectification of defective welds. Furthermore, no consideration will be given to any claims arising from delays in construction resulting from such action.

All welded joints which have been repaired shall be 100% radiographed or otherwise tested to the Engineer's satisfaction at the Contractor's own expense.

PSL 5.8 BRICKWORK IN CHAMBERS AND MANHOLES

ADD THE FOLLOWING TO THIS SUBCLAUSE:

"The joints of exposed faces shall be flush-trowelled, hard and smooth and shall be rubbed for the full width of the joint as the work proceeds to give a hard polished finish."

ADD THE FOLLOWING NEW SUBCLAUSE

PSL 5.11 WORK ON EXISTING MAINS

Where connections are to be made to existing mains, the Contractor shall excavate back along the existing main only as far as is necessary to complete the connection satisfactorily and shall ensure that the existing mains are disturbed as little as possible. Backfilling shall be carefully placed and properly compacted beneath existing and new work to ensure that the mains, specials, etc. are properly bedded.

Work on existing mains and components of the reticulation system shall be carefully planned in consultation with the Engineer. The work shall be carried out expeditiously to ensure that the disruption of services and inconvenience to the local residents is kept to a minimum. All tie-ins shall be completed within a maximum of 10 hours.

The Contractor under strict supervision by the Engineer or The Employer will do all these connections.

Hand excavation must be used to expose the existing mains and erf connections where required. While every effort has been made to ensure that the information relating to these connections is correct the Engineer or The Employer takes no responsibility for the accuracy, or for the completeness of the information."

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 5.12 CONNECTION TO THE EXISTING MAINS

The Contractor shall supply all necessary fittings / materials for under pressure connections suitable for all pipe sizes.

The Contractor shall confirm all measurement on site prior to ordering any pipe fittings.”

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 5.13 PIPELINE RENEWAL WORK

All material recovered as a result of the repairs or replacement of the components shall be returned to the Contractors store where they shall be cleaned, sorted and listed. A list of the recovered material shall be handed to the Engineer on a monthly basis. All recovered material shall be delivered to the Zandfontein Depot on a regular basis or at the end of the Contract.

ADD THE FOLLOWING NEW CLAUSE:

PSL 5.14 STERILISING OF WATER MAINS

All new water mains shall be sterilised at 10mg/l free chlorine for 12 hours and will then be thoroughly flushed.

PSL 7 TESTING

PSL 7.2 INITIAL TESTS ON WELDED STEEL PIPES

PSL 7.2.2 Radiographic Examination

Fifteen percent of all welded joints, or when ordered by the Engineer, shall be examined radiographically.

ADD THE FOLLOWING NEW CLAUSE:

PSL 7.2.3 Hydrostatic Test

- (a) All pipes and fittings shall be subject to an approved hydrostatic test and to a test pressure determined as follows:

$$P = \frac{2000 \text{ t f}}{D}$$

Where

P = test pressure in kPa

F = 85 percent of the guaranteed minimum yield strength in MPa for steel plate

D = outside diameter of the pipe in mm

T = wall thickness in mm.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

- (b) Hydrostatic testing shall not be carried out until all aspects of fabrication have been completed.
- (c) The pressure shall be applied steadily by approved means and maintained without variation sufficiently long for proof and inspection.
- (d) Should water sweat or ooze from any part or any defects of any nature be discovered the pipe shall be emptied and the defects made good. The pipe shall then be tested again. Should a pipe, after repair, fail to pass the second hydraulic test the Engineer may order its rejection.
- (e) The fact that any pipe may have passed the hydraulic test at the works shall not exempt the Contractor from his liability under Clause 7 of the General Conditions of Contract 2010.
- (f) If a pipe fails to pass any of the above tests in Clauses PSL 7.2.1, PSL 7.2.2 or PSL 7.2.3, it shall be rejected, but the Engineer may permit repairs or alterations to be made to enable the pipe to pass the test.
- (g) The Engineer may require one or more pipes to be tested to destruction. If practicable the Engineer may require the Contractor to repair the pipes and retest them. The cost of repairs will be paid by the Employer as an extra to the Contract."

PSL 8 MEASUREMENT AND PAYMENT

PSL 8.2 SCHEDULED ITEMS

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 8.2.16 Demolish Structure

The unit of measurement shall be sum for various types of structure.

The rate shall cover the cost of excavation, plant and labour required, demolishing the existing chambers, safeguarding the existing valves and specials from damage and safely disposing of the rubble material. It shall also cover the re-instatement of the structure, if applicable, to a state similar or better to pre-construction conditions. Structures to be demolished and re-instated will be identified and / or confirmed during the site visit.

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 8.2.17 Connect to Existing Mains

- a) Description of connection, types and diameters involved.....Unit: No
- b) Etc for the other items

The rate shall cover the cost of isolating, cutting, excavation (up to 2 m deep), bedding, dewatering and exposing the existing main at the connection point, supply necessary fittings for under pressure connections for the section of the mains as required, temporary support, safety precaution backfilling and the removal of surplus and unsuitable material. The supply and installation of fittings and couplings shall be measured separately. Includes arrangements for shut-down.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ADD THE FOLLOWING NEW SUBCLAUSE:

PSL 8.2.18 Recover valves, fittings, specials, etc.

a) Description of item.....Unit: No.

b) Etc for other item

The unit of measurement shall be number of described item to be recovered

The rate for the recovery of the above shall cover the cost of the excavation, breaking out existing brick or precast concrete, and removal of the valves, fittings and specials removal of debris and spoil to Contractor's dump site and importing suitable backfill material, the plugging with concrete of the open ends of the abandoned water mains, the removal of the surface boxes, backfilling to required density, the handling and transporting of the recovered materials to the Hamberg Depot, the listing of the salvaged materials and the backfilling and compaction of the chambers and reinstatement of surface covering.

PSL 8.2.19 Supply and install Valves.....Unit: No

a) Gate Valves

All gate valves shall be flanged wedge type isolation valves to SABS 664, Class as specified, anti-clockwise closing. All valves 400 mm and bigger are to be supplied with an approved **open gear box assembly** as follows:

1. For the 600mm Valve:

Multi-Stage Spur gearing with 6:1 minimum ratio, having operating spindles on the input spindle and at a stage where the valve can be stroked without exceeding the maximum input torque of 275Nm if no differential pressure is applied to the valve.

1.1 For the 450mm Valve:

Single-Stage spur gearing with 4:1 ratio having one spindle to operate with a 1:1 ratio and a second spindle to operate with a 4:1 ratio. A maximum input torque of 240Nm is recommended.

2. The gears shall be robust and machine cut and their mounting shall be of substantial design.

3. Each pinion gear spindle shall be supported between two bearings or alternatively one bearing of sufficient depth to prevent misalignment of the opinion gear and spindle. The bearings shall be fitted with bronze bushes and shall be provided with grease nipple lubricating points and shall be lubricated prior to delivery. All points to be lubricated shall be fitted with 1/8 inch BSP straight nipples for grease-gun lubrication. Adequate lubrication shall be provided for all gear and indicator bushes.

4. All valves shall open by anti-clockwise rotation of the main spindle and gearboxes shall be fitted with an intermediate idler where necessary.

5. In the case of Type A and Type B gearing a shear pin or other safety device shall be incorporated between the high and low gears to prevent damage to the valve if excessive force is applied. Two spare pins shall be attached to each valve.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

6. Shear pins shall be easily replaced in the field. Hard-driven pins will not be accepted as shear pins.

b) Air Valves

Air valves must be double acting air valves of compact single chamber design with both small and large air release orifices inside the chamber. The valve must also act as a vacuum breaker, with intake capacities of 60 % of discharge rates given.

The unit measurement for valves shall be number of each described assembly

The rate shall include supply installation and testing including for all corrosion protection, bolts, gaskets, and any other contingency work.

PSL 8.2.20 **Cathodic Protection**.....Unit: Sum

The rate shall include investigation, design, supply and commission system as per specified and/ or instructed by the Engineer (Provisional Sum)

PSL 8.2.21 **Supply and install fittings assembly**.....Unit: No

The unit of measurement shall be number of a described item to be installed. The applicable particular specification contained herein on various clauses will apply to the various pieces, for example **PSL 8.2.19** will be applicable to any valve and air valve in the assembly.

The rate shall include supply installation and testing including for all corrosion protection, bolts, gaskets, and any other contingency work to enable the proper operation of the fittings assembly.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSLB BEDDING (PIPES)

PSLB 3 MATERIALS

PSLB 3.1 SELECTED GRANULAR MATERIAL

REPLACE THE CONTENTS OF THIS SUBCLAUSE WITH THE FOLLOWING:

“Selected granular material shall have a PI not exceeding 10 and shall be free from sharp-ended particles or particles exceeding 19 mm in size.”

“Selected fill material shall have a PI not exceeding 15 and shall be free from sharp-ended particles or particles exceeding 19 mm in size.”

PSLB 3.3 BEDDING

ADD THE FOLLOWING:

“uPVC and HDPE pipes are deemed to be flexible pipes for the purposes of this subclause.”

PSLB 3.4 SELECTION

PSLB 3.4.1 Suitable material available from trench excavation

REPLACE THE WORDS “(but is not required)” IN THE FIFTH LINE WITH THE WORDS “(at his own cost)”.

PSLB 7 TESTING

PSLB 7.1 DENSITY

REPLACE THE SECOND SENTENCE IN THE FIRST PARAGRAPH WITH “The test will be carried out using the Troxler method.”

ADD THE FOLLOWING SUB-CLAUSE

PSLB 7.1.1 Submission of bedding compaction test results

The Contractor will be required to submit to the Engineer four (4) compaction test results of bedding for every 100metres. Bedding compaction to be 90% MOD AASTHO density. The compaction tests to be performed by the Troxler method.

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.1 PRINCIPLES

ADD THE FOLLOWING TO THIS SUB-CLAUSE

PSLB 8.1.3 Volume of bedding materials

The volume of bedding material shall be measured net i.e. the volume of the pipe is to be deducted.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

PSLB 8.1.5 Disposal of displaced material

DELETE THIS SUB-CLAUSE AND REFER TO CLAUSE PSDB 5.6.3:

PSLB 8.1.6 Free-haul

DELETE THE WORDS "of 0,5 km" IN THE FIRST LINE OF THIS SUBCLAUSE.

PSLB 8.2 SCHEDULED ITEMS

PSLB 8.2.1 Provision of bedding from trench excavations

DELETE THIS SUB-CLAUSE AND REPLACE WITH THE FOLLOWING:

Without the need for screening or other treatments:

a) Selected granular material.....Unit: m3

b) Selected fill material.....Unit: m3

The rates shall cover the cost of acquiring, from any point along the trench excavation as be Selected by the Engineer within 5,0 km, bedding that complies with the relevant requirements of the specification, of delivering it to points alongside the trench spaced to suit the Contractor's methods of working, and of disposing of displaced material within a free haul distance 5,0 km.

Including for screening and/or other treatment:

a) Selected granular material.....Unit: m3

b) Selected fill material.....Unit: m3

The rates shall cover the cost of screening by means of mesh sieves or otherwise treating excavated material, at any point along the trench excavation as may be selected by the Engineer, in order to produce bedding that complies with the relevant specification, delivering it to points along the trench, within 5,0 km, spaced to suit the Contractor's methods of working, of making good any backfill deficiency there may be from points where screened backfill material has been acquired, and of disposing of displace material within a free haul distance of 5,0 km.

PSLB 8.2.2 Supply only of bedding by importation

PSLB 8.2.2.3 From commercial sources (Provisional)

ADD THE FOLLOWING SUB-SUBITEM TO THIS CLAUSE:

“(c) Special bedding material

1) Description of material..... Unit: m² or m³

2) Etc for other items

The unit of measurement shall be the square metre or cubic metre of material as specified.

The rate shall cover the cost as specified for (a) and (b).” The rate shall include the cost of acquiring from commercial sources, transporting regardless of

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Linbro Water Upgrades
CIDB grade 7CE or higher

Scope of Work

distance, off loading and placing in the trench bottom clean where ordered by the Engineer.

ADD THE FOLLOWING SUB-SUBCLAUSE:

PSLB 8.2.6 Compaction Test

Compaction testing using the troxler method.....Unit: No

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSLC CABLE DUCTS

PSLC 3 MATERIALS

PSLC 3.1 DUCTS

ADD THE FOLLOWING:

PSLC 3.1.1 Split uPVC pipes

Split pipes shall only be used to provide ducts for existing services that cannot be severed and threaded through the ducts. The pipes shall be cut accurately in the middle, and opposite halves shall be matched as sawn. Split pipes shall be placed around the service, firmly bound by steel straps, and encased in concrete."

PSLC 3.4 CABLE DUCT MARKERS

ADD THE FOLLOWING:

"A cable duct marker shall consist of a 300 mm x 300 mm x 100 mm deep, class 20 MPa/19 mm concrete block, connected by means of a non-ferrous metal strip to a temporary plug to seal the end of the duct. The plug shall prevent moisture or soil from entering the duct. The metal strip shall be firmly connected to both the plug and the concrete block. The concrete block shall be positioned not further than 0,5 m horizontally from the end of the cable duct. The face of the concrete block shall be clearly marked "E" to indicate electricity cables."

PSLC 8 MEASUREMENT AND PAYMENT

PSLC 8.2 SCHEDULED ITEMS

PSLC 8.2.5 Supply, lay, bed and prove duct

REPLACE THE PAYMENT PARAGRAPH WITH THE FOLLOWING:

"Separate items are scheduled for each diameter of duct.

The rates shall cover the cost of providing all the materials and the cost of laying the ducts, installing the draw wire, jointing, bedding and providing all as specified."

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSLG **PIPE JACKING**

PSLG 8 **MEASUREMENT AND PAYMENT**

PSLG 8.2.1 **Jacking Establishment**

ADD THE FOLLOWING:

“The sum for a) and b) above shall include for the total number of jacking establishments as specified.”

PSLG 8.2.11 **Installation of pipe in a sleeve.....Unit : m**

The steel pipe joints shall be welded on site and the completed pipe pulled through the sleeve, using appropriate guides approved by engineer. All precautions for not damaging the coatings shall be taken.

PSLG 8.2.12 **Grouting of annulus between pipe and sleeve.....Unit : m³**

After securing the steel pipe in position the annulus between the pipe and the sleeve shall be grouted. The grout shall be sand/cement (CEM 11 42.5) mix with a minimum of 375kg/m³ cement content.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PORTION C: PARTICULAR PROJECT SPECIFICATION FOR PIPES EQUAL OR LARGER THAN 400MM ND

SECTION A: EXCAVATION, BACKFILLING, ETC OF PIPE TRENCHES

ASC 1. GENERAL REQUIREMENTS

Under this Section of the contract the Contractor shall:

- Set out the works, clear the working strip, construct and maintain causeway and provide pipe storage strip, pipe storage mounds and pipe laying platform alongside the trench.
- Remove, store and replace topsoil.
- Excavate the trench and prepare the trench floor for the pipeline in accordance with the dimensions detailed on the drawings and stated in the price schedule.
- Enlarge and deepen the trench for joint holes and band holes where required, excavate for valve chambers, structures and any additional excavation as required by the Engineer.
- Carry out crossings of roads and other services.
- Expose existing pipelines for sufficient length to allow connections between new pipe and existing pipe to be installed.
- Construct the pipe bed foundation and the pipe bed.
- Supply fill and backfill the trench after the pipe installation has been completed and backfill the structures after construction is completed, cart away and dispose of surplus spoil where required and generally reinstate the working strip.
- Maintain the trench, trench floor and or pipe bed until the pipe and fittings are installed, maintain the trench until backfilling is instructed by the Engineer, and maintain the backfilled trench for twelve months after the final completion of the works.

ASC 2. RATE OF PROGRESS

- ASC 2.1 The Contractor shall maintain a rate of progress of the excavation work, preparation of the trench floor, the pipe bed, backfilling and reinstatement not less than the stipulated in the programme set out in the Special Conditions of Contract. In this connection, continuous stretches of trench shall be excavated and rock shall be removed as encountered.
- ASC 2.2 No payment shall be made for discontinuous stretches of trench except where reasonable lengths of trench in hard material have been completed ahead of the work.
- ASC 2.3 The length of open trenches ahead of the pipe laying shall not exceed 150m, unless otherwise directed by the Engineer.
- ASC 2.4 Where the route of the pipeline is in soil of low shear strength and/or waterlogged, the Contractor shall excavate the trench, prepare the trench floor, construct the pipe bed and complete the backfilling to fit in with the pipe laying so that the trench shall be open for as short a time as possible.
- ASC 2.5 The Employer shall not be liable for any additional costs incurred by the Contractor while the work proceeds at a rate slower than the average rate as set out in the construction programme.
- ASC 2.6 Joint holes, valve chambers and thrust blocks shall be excavated to suit the construction programme.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ASC 2.7 At all stages of the excavation including portions in rock the Contractor shall obtain the position of joint holes, valve chambers and thrust blocks timeously so that no delay to pipelaying and chamber construction occurs from the blasting, breaking, trimming and clearing operations for these items.

ASC 2.8 The installation of pipes will commence as soon as the excavation and preparation of the trench floor, pipe bed and excavation of joint and band holes has proceeded far enough.

ASC 3. ACCESS TO WORKING AREA

ASC 3.1 Prior to carrying out the excavation the Contractor shall clear the working strip to accommodate the trench, banks of spoil, a pipe laying platform, an access road and a pipe storage strip, of all trees, bush, rubbish, boulders, rock outcrops and other objectionable material.

ASC 3.2 The bulk excavation shall be undertaken in such a way that reasonable access to the trench side for the delivery of pipes and pipe laying operations is provided within the working strip along the entire length of the trench.

ASC 3.3 The Contractor shall be responsible for providing the pipe laying platform, the access road and the pipe storage stop. Soft and wet areas shall be stabilised by the addition of suitable compacted material from the excavations and the Contractor shall maintain the working strip in a reasonable condition during the period when pipes are being delivered and during the installation of the pipes and construction of the structures.

ASC 3.4 In addition, the Contractor shall prepare and maintain access tracks from public or private roads to the working area for use by the pipe delivery vehicles and pipe laying equipment. A track shall be formed only on the express instruction of the Engineer and shall be constructed by clearing vegetation, boulders and rock outcrops etc from the width of the track and where instructed by the Engineer, the Contractor shall obtain, transport, dump, level and compact suitable selected material from the excavations to form the track.

ASC 3.5 The Contractor shall take the necessary measures to control dust resulting from his activities on public roads and on the working area. Loaded trucks shall be covered by tarpaulins and all access roads and working areas shall be regularly sprayed with water.

ASC 3.6 The Contractor shall provide and maintain suitable access to each house, garage, stand, plot, farm, business premises etc. on the pipeline route. Where necessary a temporary bridge shall be constructed across the trench to maintain access and these bridges shall be safe and suitably protected by approved guards, fencing, lights, etc.

ASC 3.7 The Contractor shall timeously provide pipe storage mounds for the temporary storage on site of the pipes.

ASC 4. NATURE OF MATERIAL

ASC 4.1 Material is defined as soft material, rock, pavement, road surfacing and foundations concrete and other substances encountered during the excavation of the trench.

ASC 4.2 The Contractor shall inspect and examine the site and its surroundings and shall satisfy himself before submitting his tender as to the nature of the material, and sub-soil (so far as it is practicable), and shall himself obtain all necessary information as to risks, contingencies and other circumstances that may influence or affect his tender.

ASC 4.3 It is expected that a certain portions of the trench will be in continuous and discontinuous rock, particularly in the lower portions of the trench, and can require blasting and hand labour.

ASC 4.4 Sections of the trench will traverse unstable material such as saturated clay soils, water courses, etc., and in such circumstances the trench will be required to be excavated and the trench floor and pipe bed prepared in close conjunction with pipe laying operations. At all times the excavation shall comply with safety requirements stipulated in ASC 6.5 and ASC 20.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Work**

ASC 4.5 The Contractor shall make provision for dealing expeditiously with the excavation of trench in hard material as encountered and shall provide separate rock blasting gangs to work ahead of the normal trenching and trimming gangs.

ASC 4.6 The material is classified in the price schedules under two headings, i.e. soft material and rock and the following shall be determining factors in the classification of the material:

(a) "Soft material" shall mean all material not classified below, and shall include all material that is pickable and can be excavated by machinery of appropriate capacity and power for the rate of excavation required, including hard clay, calcareous material and soft rock that has not been consolidated into a hard unpickable mass. "Soft material" shall not require the use of explosives.

(b) "Rock" shall mean all rock that is partially jointed, or unweathered and shall include oxidised hard shale, hard fireclay, hard coal conglomerate, hard homogenous ouklip, granite, quartz, dolomite, etc or materials of similar hardness which in the opinion of the Engineer can only be removed by drilling and blasting. Solid boulders in excess of 0,5 m³ in size shall be classified as rock.

ASC 4.7 The decision of the Engineer as to the classification of the material shall be final and binding and any objection to the classification shall be made before the trench is backfilled.

ASC 5. TOPSOIL

ASC 5.1 Topsoil is defined for the purpose of this contract as the upper layer of soft material with a depth not exceeding 300 mm below the natural ground surface in which veld or cultivated grass is growing.

ASC 5.2 The Contractor shall strip the topsoil over the pipe trench to the width shown on the drawings and place it in stockpiles, heaps or layers separate from the other excavated material for later replacement in the upper layer of the backfilled trench. In order to conserve the bacteriological life in the topsoil the storage heaps, strips or layers shall not exceed 1,5 m in total depth.

ASC 5.3 The topsoil shall be returned to the upper 300 mm layer from which it was removed. The topsoil shall be evenly spread and lightly compacted to leave the upper ground surface in a neat and tidy condition as near as may be to the original condition encountered before excavation commenced, all in accordance with the details shown on the drawings.

ASC 5.4 No topsoil shall be transported from the area from which it was excavated.

ASC 6. SIZE OF TRENCHES

ASC 6.1 Before commencing the work the Contractor shall apply for and obtain detailed longitudinal section drawings and instructions to enable the work to be set out.

ASC 6.2 The trench shall be excavated to the minimum specified width and be generally in accordance with the relevant details shown on Drawings. This pipeline shall be deemed to have a diameter as detailed.

ASC 6.3 The actual depths computed from the details on the longitudinal section drawings will vary to avoid existing services, etc, and relate to the contours of the ground and the levels necessary to obtain a true grade for the bottom of the trench.

ASC 6.4 During the course of the work the Engineer will prescribe the actual depth of the trench floor below the specified pipe invert level to take into account local soil conditions.

ASC 6.5 To comply with the regulations promulgated under the Occupation Health and Safety Act, (85 of 1993) it may be necessary to either batter the trenches to the angle of repose of the in-situ material or to shore the sides of the trench. The responsibility to comply with the requirements of the above Act, however, shall be that of the Contractor. The cost for these activities shall be included in the rates for excavation.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ASC 7. JOINT, LIFTING BAND AND STIFFENER HOLES

Before the pipes are laid, joint, lifting band and stiffener holes shall, where applicable, be excavated where required to the minimum dimensions shown on the relevant drawings. This work shall be carried out as directed and shall be completed well in advance of the pipe laying.

ASC 8. ADDITIONAL EXCAVATION

ASC 8.1 Excavation, which is of a greater width or depth than the prescribed dimensions for the trench bulk excavation, or sundry additional excavation of any nature shall be carried out by the Contractor to the Engineers instructions. Such additional excavation shall include widening and deepening the normal pipe trench for valve chambers, thrust blocks, and other structures and for excavations ordered by the Engineer and not described under ASC6 and ASC7. Such additional excavations shall be carried out as and when required by the Engineer. Only that portion of the excavations in excess of the prescribed dimensions for the trench shall be paid for as additional excavations.

ASC 8.2 Additional excavation will be required to expose existing water pipelines to allow the installation of connections to the new pipeline. The Contractor shall excavate by hand if around and under the pipelines taking care to avoid damage to the pipes. Any damage caused to pipes during excavations will be made good by Johannesburg Water and any costs so incurred will be deducted from monies due to the Contractor. It is likely that the additional excavations will have to be carried out at points distant from the main excavating head or in congested areas. The Contractor shall provide at the site separate excavating machines and hand labour to deal with the additional excavation expeditiously.

ASC 8.3 In the case of isolating valve chambers, thrust blocks, support and anchor blocks, the floor and wall surfaces of the excavation shall be neatly cut and trimmed to within 50 mm of the specified dimensions.

ASC 9. SETTING OUT AND CARE OF SURVEY PEGS

ASC 9.1 Line and level pegs for the centre line of the pipeline only will be set out by a Surveyor (appointed by the Contractor and paid for under a separate item) every 50 m and at all changes of direction and grade. The Contractor shall be responsible for the transfer care and accurate referencing of all pegs and no peg shall be taken out or moved without the permission of the Engineer.

ASC 9.2 In the event of pegs being damaged or removed as a result of the Contractor's activities the pegs will be replaced by the Surveyors at a cost of R1 000 per peg and the cost thereof will be deducted from any monies due to the Contractor.

ASC 9.3 The Contractor shall be responsible for locating servitude and property beacons and pegs along the route of the pipeline and shall be responsible for the care of these beacons or pegs. The cost of replacing damaged survey beacons or pegs will be recovered from the Contractor.

ASC 9.4 The Contractor shall check the condition of all line and level pegs and satisfy himself that they have not been disturbed and are true in regard to position and level. If a peg has been destroyed, disturbed or damaged before the site is handed over to the Contractor, the Engineer will arrange to have a new peg installed. A peg, which has been disturbed, shall not be used unless its true position and level has been re-established and the new values have been verified by the Engineer.

ASC 10. LINE AND GRADE OF TRENCH

ASC 10.1 The Contractor shall set out the trench accurately in accordance with the data supplied by the Engineer in terms of ASC9.

ASC 10.2 Before commencing, the setting out the Contractor shall clear and roughly grade the surface over the full width of the trench.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ASC 10.3 The Contractor shall provide, erect, set to line and level and maintain approved substantial profiles along the length of the trench at the 50 m line and level pegs and at changes of grade and direction. Each profile shall have its chainage marked on it and shall be fitted with a horizontal cross-bar set at a predetermined height above the trench floor level and have setting marks which will define the centre-line of the trench. Where required by the Engineer, the Contractor shall provide a profile with the cross-bar extending across the full width of the trench. A profile shall remain in position during all stages of the trench excavation, the trench floor and pipe bed preparation and until the backfilling is completed past the chainage of the profile.

ASC 10.4 The Contractor shall provide sets of boning rods, templates and piano wire, for the sole use of the Engineer, for checking the level, grade and width of the trench relative to the centreline. The Contractor shall also provide, set and level all the pegs required to transfer lines and levels to the trench floor to control the preparation of the trench floor and pipe bed.

ASC 10.5 The Contractor shall maintain correct line and grade throughout the work. Precise control of the grade of the trench floor and pipe bed is required and the Contractor shall compute the trench floor and pipe bed levels at each pipe joint position indicated by the Engineer and install a level peg at the position of each joint and each change of grade to enable the pipe to be installed in accordance with the levels and grades shown on the relevant longitudinal section drawings. The accuracy of the computation of and transfer of levels from the levelled pegs provided by the Engineer at the trench centre line to those installed by the Contractor to establish the trench floor shall be within 3 mm of the correct level. The competent person appointed by the Contractor as Site Agent in terms of the General Conditions of Contract shall be fully experienced and competent in the use of engineering surveying equipment and techniques.

ASC 11. HANDLING EXCAVATED MATERIAL

ASC 11.1 Spoil is defined for the purpose of this Contract as excavated material from the trench and other excavations placed and stored in temporary piles to be used for filling, backfilling into the trench or loaded and transported from the site as the work proceeds.

ASC 11.2 Insofar as space is available within the working strip, such space may be used within the limitations imposed by ASC 11 for temporary storage of spoil in the pipe laying platform, pipe mounds and stockpiles to be used for backfilling provided that no material shall be sorted in violation of any ordinance and that no watercourse or drainage channel is obstructed.

ASC 11.3 All spoil from the trench shall be kept within defined limits and deposited alongside the trench as directed by the Engineer. All spoil shall be deposited so as to cause the minimum inconvenience to traffic, and shall be kept well clear of all manholes, culverts, railway tracks, etc, and free access to fire hydrants is to be maintained at all times.

ASC 11.4 Rubble, road materials, broken pavement, unsuitable soil, waste concrete, rock or boulders over 150 mm in greatest dimensions and other undesirable materials together with the excavated material that cannot be utilized shall not be mixed with suitable backfill material but shall be loaded and carted off site by the Contractor as the excavation proceeds. (See ASC 28).

ASC 11.5 The toe of the spoil bank shall be trimmed well back from the edge of the trench so as to leave the minimum of 1,0 m clear between the edge of the spoil bank and the edge of the trench. The Contractor shall keep this strip clear of spoil at all times.

ASC 11.6 The spoil bank on the side of the trench where the pipe laying plant will operate shall be levelled, trimmed and in some cases cleared down to ground level to the Engineer's instructions.

ASC 11.7 Where the pipeline is located in or adjacent to a road a limited amount of suitable spoil excavated from the trench shall be spread to a depth of 300 mm over the working area on road surfaces and on pavements in accordance with ASC 15.4.3. The material excavated from the trench that is surplus to this requirement shall be either stored in temporary stockpile areas arranged by the Contractor as an interim measure prior to the return of the material to the trench side for backfilling purposes or removed to permanent disposal sites in

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Work**

accordance with ASC 28. The cost of arranging for the temporary storage of material, either at the trench side or at suitable adjacent sites within 200 m of the applicable trench section and for the transportation to and loading up and returning therefrom shall be included in the rate for bulk excavation and no separate payment will be made in respect of this activity.

ASC 12. MATERIAL FOR FILL**ASC 12.1** Selected fill (Class I) :

ASC 12.1.1 Only approved selected fill (Class I) shall be used for the preparation of the pipe bed and for backfilling around bitumen coated steel pipes up to 300 mm above the top of the pipe, unless directed otherwise by the Engineer.

ASC 12.1.2 Selected fill (Class I) for the pipe bed and/or backfilling bitumen coated steel pipes shall comprise loose, fine soil being mainly sandy or clayey-sand material with a plasticity index not exceeding 15. The fill shall contain no hard rock material or materials chemically deleterious to the pipe and shall be free of pebbles, stones and fragments of shattered rock with maximum dimensions exceeding 10 mm.

ASC 12.1.3 The Contractor, when excavating the trench, shall place material that is free of hard rock material on one side and shall not allow hard rock material to be thrown on or mixed with it. If such precautions are not observed the Contractor shall replace all such mixed material with selected material without cost to the Employer.

ASC 12.1.4 Selected fill for backfilling shall be obtained from suitable material excavated from the trench and temporarily stored in the working strip. If the spoil consists of a mixture in any proportion of soil, gravel and rock then the fine material shall be mechanically screened out to provide the selected fill.

ASC 12.2 Selected fill (Class II) :

ASC 12.2.1 Selected fill (Class II) shall comprise mainly soil, fine material, gravel or shattered rock available from the trench excavation but shall not contain any stones, boulders or shattered rock fragments with maximum dimensions in excess of 150 mm.

ASC 12.2.2 Selected fill (Class II) shall be provided for backfilling the trench from the level 300 mm above the pipe in the case of bitumen coated steel pipes. The top of the backfill is here defined as the underside of the 300 mm topsoil layer, or the underside of the foundation of the road, whichever is applicable, the natural ground level as determined by the Engineer, or in special circumstances such as in agricultural lands or market gardens, the level prescribed by the Engineer.

ASC 12.2.3 Where special precautions have been taken to protect the bitumen wrappings of the pipe the Engineer may require that selected fill (Class II) be provided for the preparation of the pipe bed and for backfilling around bitumen coated steel pipes up to 300 mm above the top of the pipe.

ASC 12.3 General specifications for both classes of selected fill - Class I and Class II :

ASC 12.3.1 Where in the opinion of the Engineer no material suitable for use as selected fill is available from the excavations within 200 m distance of where it is required then the Contractor shall either import selected fill to the trench side or load and transport selected fill from material selected and stockpiled at another point along the pipe trench.

ASC 12.3.2 Importation of selected fill shall be undertaken by the Contractor from approved borrow pits away from the working strip which shall be negotiated for, established, worked and finally smoothed over and tidied or reinstated by the Contractor in accordance with the property owners requirements.

ASC 12.4 38-mm stone :

ASC 12.4.1 38-mm Stone shall be hard non-friable quartzite, dolomite or other suitable rock, in accordance with SABS 1083 (latest edition) crushed and screened to the specified sizes, of good shape, clean and free from dust. The voids ratio of the stone shall not exceed 47 per cent and the maximum dimensions shall not be more than 38 mm.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

Samples of the stone shall be submitted to the Engineer for his approval before use.

ASC 12.5 Soil cement fill :

ASC 12.5.1 Soil for soil cement shall be selected from the trench excavations or, if no suitable soil is available from that source, imported from a borrow area to be negotiated for by the Contractor. The material shall be a fine sandy or clayey-sand soil with a plasticity index of not more than 10 and shall comply with the following grading requirements

Sieve size mm Percentage passing

9,5	100
6,7	95 - 100
4,75	90 - 100
2,36	85 - 100
1,18	80 - 100
0,60	70 - 100
0,30	60 - 90
0,15	10 - 70
0,075	0 - 25

ASC 12.5.2 The soil cement fill shall be prepared by mixing selected soil with a quantity of six per cent by mass of ordinary Portland cement (CEM 1 42,5) and up to 25 per cent by mass of water. Soil cement shall be thoroughly mixed and shall contain no lumps, clods or foreign matter. The plastic consistency shall be such that it will flow freely into the trench or formwork without segregation. Cement, soil and water shall be machine mixed in a pugmill, rotary drum, or other approved continuous type mixer.

ASC 12.5.3 Prior to the placing of any soil cement fill the Contractor shall submit a detailed report from an approved soil testing laboratory stating the grading analysis, plasticity index and the 7 and 28 day test cube strengths obtained for mixes with water contents of 20, 25 and 30 per cent for each type of soil proposed for use in the soil cement fill.

ASC 12.5.4 The Engineer will select the optimum water content of the soil cement fill and notify the Contractor. During the progress of the placing of the soil cement fill, tests shall be made by the Contractor under the direction of the Engineer to determine whether the soil cement being produced complies with the required consistency. Soil cement fill with a consistency below that selected by the Engineer will be rejected.

ASC 12.6 Crusher run fill :

ASC 12.6.1 Crusher run fill shall comprise a stable mixture of fragmented rock and fine binder material complying with the following grading requirements :

Sieve size mm Percentage passing

26,5	100
19	85 - 95
13,2	71 - 84
4,75	42 - 60
2,0	27 - 45
0,425	13 - 27
0,075	5 - 12

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

The following indices and limits shall not be exceeded:

Maximum flakiness index: 35

Atterberg Limits : Liquid limit : 25; plasticity index : 6 and linear shrinkage : 3.

ASC 12.6.2 The crusher run fill shall be thoroughly mixed to provide a homogeneously graded material and the quantity of water to provide the optimum moisture content for compaction to the required density shall then be added and the material again thoroughly mixed.

ASC 12.6.3 The crusher run fill shall be placed in the trench and compacted as required at the optimum moisture content. The Contractor shall take all necessary measures to prevent drying out of the material prior to the completion of compaction.

ASC 13. PREPARATION OF THE TRENCH FLOOR

ASC 13.1 Overbreak and over-excavation :

ASC 13.1.1 It is to be expected that during the bulk excavation material will be removed from below the prescribed trench floor position. In cases where the floor is formed of rock the additional depth will for purposes of this contract be termed overbreak and this can be expected to vary according to the nature of the rock, the jointing planes, the extent of weathering of the rock, the methods and procedures used in the blasting of the rock and the expertise of the personnel undertaking the blasting. In the case where the trench floor is founded in soil the additional depth will for purposes of this contract be termed over-excavation.

ASC 13.1.2 There will be no direct payment for the cost of removing and disposing of the volume of material removed from below the prescribed floor level or for the cost of rebuilding overbreak and over-excavation to the prescribed floor level, or for trimming the actual floor surface to the required grade and preparing it to the degree of evenness and to the specified tolerance to receive the pipe bed foundation. The cost of all these operations shall be included in the scheduled rate for preparing the trench floor set out in ASC13.2 to ASC13.6.

ASC 13.1.3 The overbreak and/or over-excavation shall be rebuilt to the prescribed trench floor level using either Class I selected fill or 38-mm stone in accordance with ASC12.1 and ASC12.4 placed in 200 mm finished thickness layers each layer compacted in accordance with the relevant specification set out below.

Selected fill : To at least 90 per cent modified AASHTO density at optimum moisture content. The Engineer will determine and prescribe the degree of compaction to suit the floor condition encountered.

38-mm stone : Each layer shall be compacted by three passes of an approved "walk behind" vibratory roller with a static mass exceeding 1 000 kg.

ASC 13.2 Cleaning floor surfaces :

The Contractor shall clear and clean the floor of all disturbed material, rubble, shattered rock, mud and standing water before placing a filling layer. Each interface between filling layers shall be cleared and cleaned of all loose material, rubble, shattered rock, mud and standing water before the succeeding filling layer is placed.

ASC 13.3 Preparation of the floor where it is founded in soil of inadequate bearing capacity:

ASC 13.3.1 The bearing capacity of the material encountered at the prescribed floor level of the trench will be determined by the Engineer from time to time as the excavation of the trench proceeds. Should the bearing capacity be inadequate the Contractor shall further excavate the floor to a depth to be specified by the Engineer. When the bulk excavation has been approved by the Engineer the Contractor shall supply and place a layer of U44 KAYMAT geofabric on the trench floor and refill to the specified trench floor level with 38-mm stone in accordance with ASC12.4 placed in 200 mm finished thickness layers compacted by three passes of an approved "walk behind" vibratory roller with a static mass exceeding 1 000 kg. A subsequent layer of geofabric shall be placed on top of the compacted stone before the pipes are installed.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ASC 13.4 Preparation of the floor where it is founded in suitable soil of adequate bearing capacity:

ASC 13.4.1 The Contractor shall carry out the bulk excavation to slightly above the specified pipe invert level and then after trimming and grading the surface, the floor shall be compacted to a smooth surface at pipe bed level by an approved vibratory roller to at least 90 per cent modified AASHTO density at optimum moisture content.

ASC 13.4.2 If the trench is dug to a depth below the prescribed floor level the Contractor shall at his cost, refill the over-excavation with selected fill in accordance with ASC12.1 placed in 150 mm finished thickness layers with each layer compacted to at least 90 per cent modified AASHTO density at optimum moisture content.

ASC 13.5 Preparation of the floor where there is a change in the relative compressibility at a soil-to-rock interface :

Where instructed by the Engineer the Contractor shall form a transition zone by ramping the floor down as the soil-to-rock interface is approached. The ramp so formed shall be filled with Class I selected fill in accordance with ASC12.1 placed in 200 mm finished thickness layers compacted to at least 90 per cent modified AASHTO density at optimum moisture content.

ASC 13.6 Finish of trench floor surface :

ASC 13.6.1 The finished surface of the trench floor shall be a plane with a vertical alignment that does not deviate from its designed position by more than 50 mm. At points of change in the grade of the pipeline the Contractor shall obtain from the Engineer a ruling on whether the trench floor grade is to be fixed between joint holes or between the grading pegs designated on the section drawing.

ASC 13.6.2 After completion of the trench floor surface the Contractor shall excavate the joint holes in accordance with the details on the drawings and clean the surface in accordance with ASC13.2.

ASC 14. CONSTRUCTION OF PIPE BED

ASC 14.1 Pipe bed foundation :

ASC 14.1.1 When the trench floor has been brought to the prescribed level the Contractor shall construct the pipe bed by placing one 150 mm finished thickness layer of Class I selected fill, in accordance with ASC 12.1 compacted to 90 per cent modified AASHTO density at optimum moisture content.

ASC 14.2 Pipe bed :

ASC 14.2.1 Immediately before the pipe is installed the pipe bed shall be boned between, or set from piano wires strung between pegs placed at each pipe joint and, at each change of grade.

ASC 14.2.2 The levels, grades and lines of the finished 1 m middle width of the pipe bed shall be within 10 mm of that stated on the longitudinal section drawings. The transverse gradient of the pipe bed across the trench shall not exceed 1 to 50.

ASC 14.2.3 At points of change of grade the Contractor shall obtain a ruling from the Engineer on whether the grade of the pipe bed shall be fixed between joint holes or between the survey pegs for the grading stated on the longitudinal section drawings.

ASC 14.2.4 After completion of a length of pipe bed and its approval by the Engineer the Contractor shall carry out the excavation of the joint holes and pipe lifting band holes in accordance with the details on drawings and clean the surface of the pipe bed in accordance with ASC13.2.

ASC 14.2.5 The trench shall not be considered complete for pipe laying purposes until the pipe bed, joint holes and pipe lifting band holes have been constructed by the Contractor and accepted by the Engineer.

ASC 15. WORKING IN ROADS

ASC 15.1 General :

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Work**

- ASC 15.1.1 Before excavating the trench along or across any road the Contractor shall notify the property owners, controlling authority for the road and the Engineer that the work is to be commenced and ascertain and comply with the conditions have been imposed for working in or across the road.
- ASC 15.1.2 The Contractor shall arrange the work to ensure a minimum of interruption to traffic and shall be liable for any injury to persons or animals and for any damage to property or things due to negligence on the part of the Contractor or his employees.
- ASC 15.2 Closing of roads :
- Where permitted by the controlling authority the Contractor shall arrange for and carry out the closing of the road to traffic during the excavation and pipe laying operations and shall provide protective barriers, warning signs, lights and all other measures prescribed by the controlling authority to ensure the safety of traffic, pedestrians and animals. When the work in the road has been completed and the road surface reinstated the Contractor shall remove all barriers etc in accordance with procedures to be laid down by the controlling authority.
- ASC 15.3 Construction of deviations :
- ASC 15.3.1 Where the controlling authority will not permit the closure of the road the Contractor shall construct a suitable deviation to carry the traffic for the duration of the excavation and installation of the pipeline along or across the permanent road.
- ASC 15.3.2 A deviation shall be constructed to the approval of the property owners, controlling authority and shall be capable of safely carrying the density and type of traffic normally using the road. The Contractor shall provide all necessary barriers, warning signs, lights and all measures required by the S A Manual for Road Traffic Signs.
- ASC 15.3.3 The area on which the deviation is to be constructed shall be cleared of all vegetation and loose material by grading, loading and transporting undesirable material to suitable disposal sites.
- ASC 15.3.4 Where necessary for the alignment of the deviation suitable fill material shall be provided by the Contractor and spread and compacted in 200 mm thickness layers to 95 per cent of modified AASHTO density at optimum moisture content.
- ASC 15.3.5 If a cut is required to form a suitable alignment the material removed shall be set aside for subsequent reinstatement of the original ground surface after the permanent road is reopened to traffic.
- ASC 15.3.6 A 150 mm finished thickness layer of suitable gravel shall be provided by the Contractor and spread and compacted over the full trafficable surface of the deviation for a minor macadamised road and a major road. The gravel surface layer shall be compacted to 95 per cent of modified AASHTO density at optimum moisture content.
- ASC 15.3.7 When the installation of the pipeline in the road has been completed the deviation shall be removed and the ground surface restored as near as possible to its original condition all to the satisfaction of the controlling authority and the Engineer.
- ASC 15.4 Bituminous surfaced roads :
- The excavation of the trench through a bituminous surfaced road shall be carried out by the Contractor in accordance with the following procedures :
- ASC 15.4.1 The edge of the trench shall be cut through both road wearing surface and foundation material using mechanical or pneumatic paving breakers, spades or rotary cutting discs to provide a clean straight edge to the trench side.
- ASC 15.4.2 The wearing surface and graded crushed rock foundation material shall be removed and disposed of in accordance with ASC11.4.
- ASC 15.4.3 The surface of a macadamized street shall be protected from excavation and pipelaying machinery and equipment by the spreading of a layer of spoil of at least 300 mm over the full extent of the street surface area that is to be subjected to the passage of machines and

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

equipment. The composition and grading of the spoil and area of street surface to be covered shall be to the approval of the Engineer.

ASC 15.4.4 When the procedures set out in ASC15.4.1, 2 and 3 above have been completed and approved by the Engineer the excavation of the trench by machine may proceed and the utmost care shall be exercised to prevent damage to the road surface by the ripping action of the excavator bucket. The cost of reinstatement of any unreasonable damage or disintegration caused to the road surface and foundation by careless or uncontrolled operation of excavation machinery shall be recovered from monies due to the Contractor.

ASC 15.4.5 When the pipe installation has been completed and the trench has been backfilled the 300 mm layer of spoil spread to protect road and pavement surfaces shall be lashed by hand into piles, loaded up and disposed of. The removal of the remainder of the soil and the cleaning of the road surfaces and pavements shall then be carded out using hand tools such as spades, bass brooms, rakes, etc to leave the surfaces in a condition as near as may be to the original condition before excavation commenced.

ASC 15.4.6 The Engineer will arrange for the reinstatement of the asphalt surface by the roads authority and payment to the roads authority will be by means of a provisional sum allowed for in the schedule of quantities.

ASC 15.4.7 Where pre-cast kerb stones and paving are liable to be damaged as a result of construction activities, the kerb stones shall be carefully removed and stored in a safe position next to the street for later re-use by the authority carrying out the reinstatement of the road. The Contractor shall be liable for the cost of replacing damaged kerb stones and paving resultant from failure to adequately protect the works, and such costs shall be deducted from any monies due to the Contractor.

ASC 16. CROSSING OF ROADS AND RAILWAYS

ASC 16.1 Minor roads :

The pipeline to be laid across any road designated as a "Minor road" shall be installed in a trench of normal width and depth for the full width of the road in accordance with the details shown on drawings.

ASC 16.2 Major roads :

The pipeline shall be laid across roads designated as "major roads" by the following means:

ASC 16.2.1 In a trench of normal width and depth

The pipeline shall be installed in accordance with the details shown on the drawings for the full width of the bituminous surface and a minimum further length along the trench of 3 m or as otherwise ordered by the Engineer from each edge of the surface. From this position to the boundary on both sides of the road the pipeline shall be installed in accordance with the details shown on the drawings for a minor road crossing. The Employer will arrange for the local authority to undertake the reinstatement of the macadamised surface and until reinstatement is completed the Contractor shall maintain the crusher run base course so that the road surface is suitable for traffic.

ASC 16.2.2 In a jacked steel pipe or existing culvert: (not applicable)

Refer to clause BSC8.

ASC 16.2.3 In a jacked concrete sleeve pipe installed by the Contractor:

Refer also to BSC8. The pipeline shall cross the road as detailed on the drawings. From the end of the sleeve to the road reserve boundary on either side of the road, the pipeline shall be installed in accordance with the details shown on the drawings for a minor road crossing.

The annulus between the 800 mm steel pipe and the concrete sleeve shall be grouted up with a cement-rich grout. (Minimum cement content = 375 kg/m³).

ASC 16.3 Railways (not applicable)

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Work**

Prior to the pipe laying head reaching the railway crossing, the Contractor shall liaise with the relevant authority to obtain an "outage" of the railway line. The line shall be strapped to the authorities approval. A 1 000-mm wide trench shall be excavated beneath the railway line, and the installed pipeline shall be encased in concrete which shall extend 4000 mm either side of the railway centreline. The backfilling operation shall include for the repacking of the ballast.

ASC 17. CROSSING STREAMS, WATER COURSES AND FURROWS**ASC 17.1** Generally

ASC 17.1.1 Where the trench crosses a stream, water course or furrow the Contractor shall take all measures necessary to control the entry of water into the trench and shall design and construct any temporary embankments, diversion channel or overpass and supply and operate such pumping plant as may be necessary for this purpose. The proposed plan of the dewatering system shall be submitted to the Engineer for approval prior to the installation of the system.

ASC 17.1.2 At all streams, water course and furrow crossings the Contractor shall estimate the flood that can be expected in the stream, water course or furrow and design, provide and maintain a suitable diversion channel or overpass with adequate capacity to convey the estimated flood past the excavations. Each embankment shall be of adequate height and strength and shall be arranged to train the stream flow into the channel or overpass.

ASC 17.1.3 The Contractor shall make all necessary arrangements and obtain permission from the property owners to construct the necessary diversion channel and on completion of the crossing shall refill the channel, remove embankments and clean up and reinstate the working area to the satisfaction of the owner and the Engineer.

ASC 17.1.4 The Contractor shall construct all necessary embankments, causeways, fords or bridges from which the pipe installation can be undertaken across the stream, water course and/or furrow and associated low lying wet marshy areas, reinstate temporary works in the event of flooding or washaways, clear all temporary works after the crossing has been completed.

ASC 17.1.5 Except for shutdowns for maintenance of dewatering equipment, or other shutdowns approved by the Engineer, no interruptions in the approved dewatering system procedures will be permitted during excavation operations and pipe installation. Full time surveillance, 24 hours per day, and maintenance shall be provided to avoid breakdowns.

ASC 18. PLANTATIONS AND TREES

ASC 18.1 In sections along the pipeline route it may be necessary to remove a number of trees occurring within the working strip in order to conduct excavations and pipe laying activities.

ASC 18.2 Where ornamental shrubs and fruit trees are to be removed these shall be carefully excavated and set aside without being damaged for replanting by the property owner.

WHEREVER POSSIBLE THE NATURAL FAUNA AND FLORA SHALL BE PRESERVED

ASC 18.3 On no account shall the Contractor fell or trim trees without the permission of the Engineer.

ASC 18.4 The operation required shall be as follows :

ASC 18.4.1 Fell trees and coppice, remove lop and top and transport logs lop and top to suitable sites to be negotiated by the Contractor.

ASC 18.4.2 The ground shall be destumped and the stumps and roots shall be disposed of to suitable sites to be negotiated by the Contractor. No roots, stumps, logs, branches or any part of the trees shall be disposed of on or alongside the working strip.

ASC 18.4.3 All stumpholes shall be backfilled with soil.

ASC 19. FENCES AND WALLS**ASC 19.1** Permanent fences

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Work**

Where instructed by the Engineer, the Contractor shall provide all materials and erect a permanent fence to enclose certain areas or replace existing fences that are damaged or removed during pipe laying operations. The fence shall comprise five strands of new Campeon type galvanized barbed wire on approved galvanized fencing standards at 9 m spacings, and with approved galvanized fencing droppers at 3 m spacing between standards. The top strand shall be 1,2 m above ground level. A corner post shall comprise 100 mm diameter new galvanized tube 2,10 m long with cap plate and base plate with two 50 mm diameter new galvanized tube struts each with a base plate. Straining posts, similar to a corner post, shall be provided at spacings not exceeding 450 m.

Each post shall be set 850 mm deep in a 500 mm square by 950 mm deep 6:3:1 concrete base and each strut shall be set 250 mm deep in a 600 mm by 300 mm by 400 mm deep 6:3:1 concrete base. Straining eyebolts and staybolts shall be, galvanized and be 12 mm diameter with washers and nuts.

ASC 19.2 Temporary fences

Where instructed by the Engineer, the Contractor shall provide all materials and erect a temporary fence to protect the excavations. The fence shall be of similar construction to that specified in ASC 19.1 except that a post or stay need not be galvanized and need not be set in a concrete base. A temporary fence shall remain in position until its removal has been authorized by the Engineer. Material recovered from a temporary fence may be used in a subsequent position.

ASC 19.3 Existing fences and walls

ASC 19.3.1 Where the pipeline crosses or runs adjacent to an existing fence or wall, the fence and/or wall shall be temporarily stayed and a temporary concertina gate effected where required, to facilitate excavation and pipe laying operations. The concertina gate shall be chained and padlocked each night and over weekends and guarded during working hours when gates are open for pipeline construction. The Contractor requiring access to work in the property shall provide his own identified lock to interlink with the chain and padlock. Upon completion of all works the Contractor shall remove the temporary fences and concertina gates and restore the permanent fences and walls where necessary. Gates, shall be installed where required.

ASC 19.3.2 The Contractor shall be responsible for, and shall immediately repair, any damage caused to a fence or wall from any aspect of the pipeline construction. Where the damage to the fence or wall is caused by other parties the cost of repairs will be paid for at a rate fixed by the Engineer.

ASC 19.3.3 Each fence shall be regularly patrolled and should claims arise as a result of the failure of the Contractor to timeously reinstate a fence or to detect damage to a fence, or because the Contractor has been negligent in not repairing reported damage to a fence expeditiously, or has not ensured that gates are guarded while open during working hours or padlocked outside working hours then the Contractor shall be liable for the settlement of such claims.

ASC 19.4 Security type fences

ASC 19.4.1 Where the pipeline crosses an existing security fence the Contractor shall call on the owner of the fence and make arrangements to remove temporarily or roll back a portion of the fence to permit the work to proceed.

ASC 19.4.2 During working hours the Contractor shall watch and guard the dismantled portion of the fence to prevent ingress or egress by unauthorised persons and such policy shall be to the satisfaction of the owner of the fence and the Engineer.

ASC 19.4.3 Outside working hours and at weekends the Contractor shall reinstate temporarily the dismantled portion of the fence by means of removable fence panels or frames which shall be securely chained or padlocked in position to prevent ingress or egress by persons through the fence opening.

ASC 19.4.4 On completion of the work the security fence shall be reinstated to the satisfaction of the owner and the Engineer.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Work****ASC 19.5** Electrified fences

ASC 19.5.1 The provisions of ASC 19.4.1 to ASC 19.4.3 shall apply.

ASC 19.5.2 Where the pipeline runs parallel to electrified fencing the Contractor shall ensure his staff are instructed regarding the dangers of working in close proximity to said fencing. He shall also ensure no material or machinery, etc. touches the fence during construction.

ASC 19.5.3 The Contractor shall engage the services of a specialist electrified fencing sub-contractor to provide electrical continuity connections across the temporary breach in the fencing to enable all portions of the fencing to remain operational 24 hours per day.

ASC 19.5.4 The temporary access points detailed in ASC 19.4.1 shall only be sufficient to allow the excavation operation to proceed. All other activities shall be conducted via the formal entry points in the electrified fencing.

ASC 20. SAFETY OF TRENCH AND OTHER EXCAVATIONS

ASC 20.1 The Contractor shall provide all necessary timbering and shoring of the sides of the trench. Such timbering shall consist of open planking, walling and substantial struts and shall be carried out in a workmanlike manner to the satisfaction of the Engineer.

ASC 20.2 The shoring method adopted shall be compatible with the excavating, backfilling and pipe laying method and shall cause minimum restrictions to the laying of the pipes. Shores shall be designed to withstand the earth pressures exerted upon them from the trench side which shall include the superimposed loading of pipe laying equipment with pipes working at the side of the trench.

ASC 20.3 The mass of a 500 mm diameter, approximately 12,2 m long and 6 mm thick steel pipe is $\pm 1\ 000$ kg (excluding the weight of the linings)

ASC 20.4 The Engineer may call upon the Contractor to timber the sides of the trench at any point that he may consider in any way dangerous. Such timbering shall be left in place until after the completion of the pipe laying at the point affected.

ASC 20.5 The Contractor shall carry out the removal of timbering immediately prior to backfilling or on the instructions of the Engineer.

ASC 20.6 As an alternative to timbering the Contractor may prefer to batter the sides of the trench in accordance with the regulation promulgated under the Occupational Health and Safety Act (85 of 1993) and the latest Construction Regulations.

ASC 20.7 All battering of trench sides and forming of suitable steps to ensure the safety of the excavations are to be undertaken as a safety precaution on the part of the Contractor to comply with the requirements of the Occupational Health and Safety Act, 1993 (85 of 1993).

ASC 20.8 MAINTAINING THE SIDES OF THE TRENCH IN A SAFE CONDITION DURING EXCAVATIONS, PREPARATIONS OF TRENCH FLOOR, DELIVERY OF PIPES TO SITE, PLACING OF PIPE BED, LAYING OF PIPE, AND BACKFILLING AND THE PROTECTION OF THE TRENCH TOGETHER WITH PREVENTING GENERAL ACCESS TO THE TRENCH BY UNAUTHORIZED PERSONS, BY CHILDREN AND BY ANIMALS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NO UNDERCUTTING OF THE SIDES OF THE TRENCH WILL BE ALLOWED.

ASC 20.9 The Contractor shall take every precaution to prevent water from any source entering the excavations and shall keep the pipe trench free from water while carrying out excavation, preparation of the trench floor, while forming pipe bed and until the excavations are backfilled. The Engineer may order additional precautions to be taken where he is not satisfied with the Contractor's arrangements. Any water, including seepage, entering the trench shall be removed immediately if directed by the Engineer.

ASC 20.10 If required by the Engineer, the Contractor shall leave unexcavated blocks in the trench to prevent the flow of stormwater down the trench. These blocks shall be at least 1 m thick and spaced as directed by the Engineer.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ASC 21. MAINTENANCE OF OPEN TRENCH

- ASC 21.1 After excavation the trench floor and/or pipe bed shall be maintained until the pipes are installed. Should the sides fall in or any debris or water accumulate in the trench due to any cause the trench shall be cleared and the floor made good when so directed by the Engineer. After the installation of the pipes has been completed, the trench shall be maintained until its backfilling is instructed by the Engineer.

ASC 22. LAYING AND JOINTING OF PIPES

- ASC 22.1 The Contractor will unload and string the pipes alongside the trench and will then install the pipes in the trench and make the joints.
- ASC 22.2 The pipe laying gang will NOT be allowed to move into a section of trench or excavation unless it is in a safe condition, complies with the requirements of the regulations promulgated under the Occupational and Safety Act, (85 of 1993) and is approved by the Engineer and accepted by the responsible person for the installation of the pipeline.

ASC 23. FILLING OF TRENCHES

- ASC 23.1 As the pipe is laid and the valve chambers, thrust anchors, sleeve/culvert brickwork and other structures are completed the Contractor shall fill in the trench without delay to the full extent as and when directed by the Engineer in accordance with the details shown on the drawings. Where the Contractor has completed backfilling of the trench and tidying up of the site prior to the completion of the valve chambers, and sleeve/culvert brickwork the Contractor shall return to site to complete the reinstatement of the trenches around the chambers and brickworks.
- ASC 23.2 Generally :
- ASC 23.2.1 Not required
- ASC 23.2.2 The 300 mm layer of soil cement grout detailed on the drawings shall not be applicable to this contract and shall be replaced by Class I selected material as per ASC23.2.3.
- ASC 23.2.3 Except in roadways, the earth filling under, around and over the pipe up to 300 mm above the pipe (Stage I) shall be Class I selected material in accordance with ASC12.1 compacted by power rammers or other approved equipment in 200 mm finished thickness layers to at least 90 per cent of modified AASHTO density.
- ASC 23.2.4 Except in roadways the remainder of the earth filling (Stage II), to underside of topsoil layer or to ground level, shall be Class II fill selected from the excavations or provided in accordance with ASC12.2 and placed in temporary piles in accordance with ASC11.2 recovered, refilled in the trenches and compacted by power rammers or other approved equipment in 300 mm finished thickness layers to at least 85 per cent of modified AASHTO density.
- ASC 23.3 Filling of trenches at road crossings :
- ASC 23.3.1 Major roads :
- The filling of the trench at major road crossings shall be graded crusher run material in accordance with ASC 12.6 compacted by power rammers or other approved equipment in 200 mm finished thickness layers to 85 per cent of the solid density of the material.
- ASC 23.3.2 Minor roads :

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

**Scope of Work**

The earth filling of the trench at minor road crossings shall be Class I selected stabilized material in accordance with ASC 12.5 as directed by the Engineer compacted by power rammers or other approved equipment in 200 mm finished thickness layers to 95 per cent of modified AASHTO density.

ASC 23.3.3 Major roads (in pipe sleeve installed by Contractor)

The sleeve pipe shall be bedded in 150 mm of river sand and filled to the overt with soil cement fill (ASC12.5) placed in 2 pours to prevent flotation. Subsequent filling shall incorporate the reinstatement of the road structural layers.

ASC 23.4**General :**

ASC 23.4.1 Where required by the Engineer the degree of compaction of the Stage I backfill shall be increased from 90 per cent to 95 per cent of modified AASHTO density at optimum moisture content. Similarly the Engineer may instruct that the degree of compaction of the Stage II backfill be increased from 85 per cent to 95 per cent of modified AASHTO density at optimum moisture content.

ASC 23.4.2 No rock with any dimensions greater than 150 mm shall be returned to the trench. (Refer ASC12.2.1).

ASC 23.4.3 An adequate mound shall be formed over the backfilled trench to allow for settlement and suitable gaps at approximately 60 m intervals shall be left in the raised backfill to allow for stormwater drainage.

ASC 24. MAINTENANCE OF BACKFILLED TRENCHES

ASC 24.1 After completion of backfilling of the trench the Contractor shall maintain the trench and for this purpose shall patrol the trench daily for 30 days, and thereafter fortnightly for the remainder of the maintenance period. In addition the entire length of the trench shall be patrolled after each rainfall exceeding 10 mm.

ASC 24.2 During the maintenance period, the Contractor shall submit monthly patrol reports to the Engineer.

ASC 24.3 The period of maintenance shall extend until twelve months after the date of the Certificate of the Engineer that the whole of the work has been satisfactorily completed. Any settlement shall be filled in and made good immediately.

ASC 24.4 If instructions are issued by the Engineer for any repairs and if a delay occurs in the making good of any portion of the trench, the Employer will repair the trench at the expense of the Contractor.

ASC 24.5 The Contractor shall be liable for all claims arising out of any accidents that may occur during the whole period of maintenance.

ASC 25. FIRE BREAKS

ASC 25.1 Where directed by the Engineer, the Contractor shall clear an area around the pipes, which will be placed temporarily alongside the pipe trench, of all vegetation so that no damage can be caused to the pipes by grass or veld fires. The Contractor shall maintain the fire breaks until the backfill of the trench is completed.

ASC 25.2 On receiving an instruction to form a fire break the Contractor shall put this work in hand immediately.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ASC 26. EXPLOSIVES

- ASC 26.1 The Contractor shall, in the first instance, comply with all of the requirements contained in Health and Safety Specifications document issued by the Employer.
- ASC 26.2 The Contractor shall be responsible for the acquisition, custody, control and use of explosives on the contract and shall comply with the requirements of the Minerals Act, 1991 and Regulations and all amendments thereto and to the relevant requirements of the South African Police and other Authorities where blasting is in the vicinity of their installations and property. Copies of all returns, reports and applications to, and licenses, permits and authorities issued by such Statutory Bodies shall be furnished to the Engineer by the Contractor. Nothing contained in this contract nor any approval or instruction by the Engineer shall relieve the Contractor of any of his obligations and responsibilities under any Statutory Acts or Regulations existing or introduced during the period of contract.
- ASC 26.3 The Contractor shall be responsible for the siting, erection, fencing maintenance and licensing of explosive and detonator magazines required for the satisfactory performance of the Contract. Proposals for the siting shall in the first instance be submitted to and receive the approval of the Engineer prior to any approach being made to the authorities concerned.
- ASC 26.4 The Contractor shall be responsible for the guarding of magazines in terms of any regulations which may be in force or come into force during the period of contract and shall comply with any instructions given from time to time by an Statutory or Local Authority in this connection.

ASC 27. BLASTING

- ASC 27.1 All blasting shall be carried out under proper control, by licensed persons, and shall be adequately protected by steel mats and/or other approved methods. The Contractor shall be liable for any damage of any nature caused by such blasting to persons, animals, materials, pipes laying alongside the trench, installed pipelines belonging to Johannesburg Water, surrounding properties, etc, and shall observe all government and/or local regulations.
- ASC 27.2 No blasting will be permitted within 30 m of existing structures or any existing pipelines and services until a specific report containing the recommendations of the Explosives Division of AECI Ltd, is approved by the Engineer. The report shall recommend the detailed procedures for blasting in the various conditions encountered on the route of the pipeline such that damage to the aforementioned structures, pipelines and services can be avoided. Any blasting which is to be undertaken at a distance greater than 30 m from existing structures and services shall be carried out in accordance with the general recommendations of AECI Ltd, contained in published information sheets.
- ASC 27.3 No blasting shall be permitted until the blasting indemnity certificate has been signed submitted to the Engineer, who may prohibit the use of explosives in close proximity to buildings, pipelines, sewers or cables, etc.
- ASC 27.4 The Engineer's authority to proceed with blasting shall not absolve the Contractor from his liability under ASC 27.1 and ASC 27.2.
- ASC 27.5 Appropriate notices shall be served to all affected parties prior to commencement of blasting. The conditions set out in the wayleaves shall be complied with.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ASC 28. DISPOSAL OF SURPLUS SPOIL AND UNDESIRABLE MATERIAL

- ASC 28.1 As the excavation of the trench proceeds all spoil from the excavations that will become surplus over the requirements for backfill shall be loaded up, transported, dumped and levelled on suitable sites, negotiated between the Contractor and the relevant owner, and the finished surface of the working space shall be in accordance with the drawings.
- ASC 28.2 The assessment of the quantity of spoil to be removed shall be the Contractor's responsibility entirely and any deficit shall be made good by the Contractor without further cost to the Employer.
- ASC 28.3 The undesirable material described in ASC11.4 shall be loaded transported, deposited on suitable sites, negotiated between the Contractor and the relevant owner, and levelled off as it is excavated from the trench and other excavations. No undesirable material shall be disposed of within 50 m of the trench.
- ASC 28.4 No material or surplus spoil shall be disposed of either temporarily or permanently, or privately or publicly owned property unless the Contractor shall first obtain permission therefore. The Contractor shall furnish satisfactory evidence to the Engineer that such consent has been obtained.
- ASC 28.5 Notwithstanding ASC 28.1 above the Engineer may, where circumstances permit, instruct the Contractor to spread the surplus material over the trench width and on either side of the backfilled trench in accordance with the details shown on the drawings.

ASC 29. FINAL REINSTATEMENT OF WORKING AREA

- ASC 29.1 The Contractor shall restore the surface of the ground for the full width of the working areas to a condition as near as may be equivalent to that which existed at the time of beginning construction operations on each such areas.
- ASC 29.2 In all areas of the working space the surface area shall be free of bumps and hollows caused by the construction activities and, where required by the Engineer, bumps shall be cut away and hollows filled and lightly compacted to leave the surface of the site in smooth, even and tidy condition.
- ASC 29.3 The surface of access ways to residential properties shall be reinstated to the owners satisfaction and any stones, gravel or other deleterious material left from spoil piles shall be removed and disposed of as in ASC28.1. All stormwater channels and drains shall be cleaned.
- ASC 29.4 In roadways the surface reinstatement shall be in accordance with the provisions of ASC15 and ASC16.
- ASC 29.5 The grassed surfaces of parks, road pavements and median islands between carriageways shall be cleared, as far as practicable, of all spoil spread over the working strip during the course of excavation and pipe laying operations, and the grassed areas shall be loosened by means of spiked rollers or other approved equipment, in order to ensure that the top soil compacted during the construction of the pipeline is rendered suitable for sustaining the growth of grasses.
- ASC 29.6 Veld grass areas shall be cleared of surplus spoil, where required, but clearing operations shall be carried out by methods that will cause as little disturbance as possible to the grass root systems.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



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Linbro Water Upgrades
CIDB grade 7CE or higher

Scope of Work

ASC 29.7 Where, in terms of ASC 28.5, the Contractor is instructed to spread surplus material over the trench width and on either side of the backfilled trench, the completed work shall be free of bumps and hollows and shall be graded to be smooth in appearance, even and tidy, all to the satisfaction of the Engineer.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PART 1: GENERAL CONDITIONS AND SPECIFICATION

SECTION Z: SPECIFICATION FOR THE FABRICATION, COATING AND DELIVERY TO SITE OF STEEL PIPES.

PSZ 1. APPLICABLE STANDARDS

PSZ 1.1 Reference is made to the latest issues of the following standards:

PSZ 1.1.1	SABS 763	Hot-dip (Galvanized) Zinc Coatings (other than on continuously Zinc-coated sheet and wire).
PSZ 1.1.2	SABS 1178	The Production Of Lined And Coated Steel Pipes Using Bitumen Or Coal Tar Enamel.
PSZ 1.1.3	SABS 1217	The Production Of Painted And Powder-coated Steel Pipes.
PSZ 1.1.4	SABS 044 pt 1	Glossary of Terms.
PSZ 1.1.5	SABS 054	Tensile Testing Of Metallic Materials.
PSZ 1.1.6	DIN 50049	Material Testing Certificates.
PSZ 1.1.7	AWWA C205	Protection of steel pipes
PSZ 1.1.8	SABS 1130	Fibreglass Wrapping
PSZ 1.1.9	API5L	Specification for Line Pipes of the American Petroleum Institute.
PSZ 1.1.10	SABS 719	Electric welded low carbon steel pipes for aqueous fluids.

PSZ 2. REQUIREMENTS THAT MUST BE SPECIFIED WHEN ORDERING THE PIPES FOR THIS CONTRACT

PSZ 2.1.1 The pipe grade shall be API 5L X52, or equivalent approved alternative.

PSZ 2.1.2 The standard pipe length of 12.192 m shall be used.

PSZ 2.1.3 The pipe sizes are as follows:

Length (m)	Pipe ND (mm)	Pipe ID (mm)	Pipe OD (mm)
680	1 100	1 094	1 118
100	1 000	996	1 016
220	400	394	406

An allowance for variation of the final quantity of plus or minus 5 % shall be provided.

PSZ 2.1.4 The nominal wall thickness of the pipes shall be:

Pipe ND (mm)	Wall thickness (mm)
1 100	12
1 000	12
400	6

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSZ 2.1.5 The 406mm OD pipes shall be flanged. All other pipe ends shall be plain ended on both sides and the corrosion protection shall be cut back as follows:

- External coating: 100 mm from the end
- Internal lining: 100 mm from the end

PSZ 2.1.6 The following lining and coating as shall be applicable for this contract:

- Internal lining: Hot applied Solvent Free Epoxy lining with a thickness of 600 microns. See more details in Section Y.
- External coating: Rigid Polyurethane applied in a single coating operation to a thickness of 1.7 mm, as detailed in Section Y.

PSZ 2.1.7 The following additional markings shall be applicable for this contract :

The words “Johannesburg Water” and the mass in kg shall be painted on the outside of each pipe.

PSZ 3. REQUIREMENTS TO BE AGREED BETWEEN THE ENGINEER AND THE CONTRACTOR

PSZ 3.1 The following agreements must be reached and confirmed in writing:

PSZ 3.1.1 The wall thickness and/or tolerance, if other than as specified (see PSZ 6.1.3).

PSZ 3.1.2 The hydraulic test pressure, if other than as specified (see PSZ 6.2.5).

PSZ 3.1.3 When relevant, the type of coating or lining or both (see PSZ 6.2.6).

PSZ 3.1.4 The length tolerance when exact lengths are ordered.

PSZ 3.1.5 The delivery schedules.

PSZ 4. DEFINITIONS

PSZ 4.1 The definitions given in SABS 044 pt 1 shall apply, with the following additions:

Acceptable : Meeting all of the requirements of this specification.

Defective : Failing in one or more respects to meet the requirements of this specification.

Exact length : A length and tolerance as agreed.

Lot : A lot shall consist of 200 pipes or part thereof, of the same grade and nominal size, from one manufacturer, submitted at any one time for inspection and testing.

Nominal size : The nominal bore.

Random length : A normal manufacturing length that is within a limited percentage of the average length required.

Standard length : A pipe length of 6.096, 9.144, 12.192 or 18.288 metres with a tolerance of – 0 mm + 50 mm.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSZ 5. MATERIAL

PSZ 5.1 Steel plate and strip :

PSZ 5.1.1 The steel strip used for the manufacture of the pipes shall have been produced by the electric furnace, basic open hearth or basic oxygen process, shall be fully killed, fine grained and shall be free from seams, cracks, laminations and other injurious defects.

PSZ 5.2 Chemical composition :

PSZ 5.2.1 The ladle analysis of steel used to manufacture pipes under this specification shall comply with the requirements of the relevant plate grade.

PSZ 5.3 Mechanical properties :

PSZ 5.3.1 The mechanical properties of the steel shall comply with the requirements appropriate to the grade of steel specified.

PSZ 5.4 Heat treatment :

PSZ 5.4.1 The weld seam and the entire heat affected zone shall be subjected to a normalising heat treatment.

PSZ 6. GENERAL REQUIREMENTS

PSZ 6.1 **Dimensional requirements :**

PSZ 6.1.1 Length :

The pipes shall be of random length, standard length or exact length, as required by the Engineer and as specified in PSZ 2.

Random lengths shall be between 6m and 18.5m. Not more than 10% of random lengths, per contract item, shall be shorter than 75% of the average length specified by the Engineer and no pipe shall be shorter than 40% of the average length.

Standard lengths shall be 6.096m, 9.144m, 12.192m or 18.288 metres and shall have a tolerance of – 0 mm + 50 mm.

PSZ 6.1.2 **Nominal size and outside diameter :**

The nominal size and outside diameter of a pipe shall conform to the values given in columns 1 and 2, respectively, of Table 2 and as specified in PSZ 2.

The actual outside diameter, when determined in accordance with PSZ 10.1.1 (a) or 10.1.1 (b), as relevant, shall not differ from the specified value by more than the following tolerances:

- (i) Over the appropriate length (measured from each end of the pipe) given in column 3 or 5, as relevant, of Table 3A the corresponding tolerance given in column 2 or 4 of that table.
- (ii) Over the rest of the pipe the appropriate tolerance given in Table 3B.
- (iii) Any out-of-roundness in the body of the pipe shall not exceed $\pm 1\%$ of the nominal outside diameter.

PSZ 6.1.3 **Nominal wall thickness :**

Unless otherwise agreed upon between the Contractor and the Engineer the nominal wall thickness of a pipe shall, subject to a tolerance of $-1.75\% + 10\%$, be one of the relevant values given in columns 3 to 6 of Table 2.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



The wall thickness shall not cause the diameter-wall thickness ratio to exceed 100:1.

PSZ 6.1.4 Straightness :

Any deviation from straight, determined in accordance with 10.1.1 (c) shall not exceed 0.2 % of the length of the pipe. (2 mm per metre of length).

PSZ 6.1.5 Pipe ends ;

Pipes with 550 mm ND and smaller shall be flanged both ends. Flanges shall be in accordance with SANS 1123.

Pipes with nominal diameter of 600mm and larger shall be plain ended (refer to Drawing JW13572 – DET09).

Pipe ends shall be clean cut, free from burrs and shall not deviate from squareness to the axis of the pipe by more than 1.5 mm.

Pipes with wall thicknesses of 4.5 mm or less shall have square cut ends.

Pipes with wall thicknesses greater than 4.5 mm shall be bevelled for field welding unless otherwise specified.

Ends prepared for field welding shall be bevelled to an angle of 30° -0° + 5° and shall have a root face of 1.5 mm - 0.5 mm + 1.0.

PSZ 6.1.6 Trueness and finish of pipes :

All pipes shall be truly cylindrical, shall be free from injurious surface defects, laminations and dents, and any pipe that has flattened areas in the steel wall will be rejected. Helical forming of strip at the beginning and end of coils and across butt-weld joining coils shall be accurate and true. Flat areas, re-entrants, bamboo effects or dents etc., will not be accepted. Special precautions shall be taken to avoid lack of trueness resulting from variations in width of steel strip. All weld spatter shall be removed by chipping or grinding.

PSZ 6.1.7 Fabrication requirements :

General:

The pipes shall be manufactured exclusively at the Works of the Contractor or by such makers as may be approved by the Engineer and at only one Works unless otherwise agreed to by the Engineer in writing.

The method of manufacture of the pipes shall be detailed. All welding procedures shall be described and approved by the Engineer and all welders and welding operators employed on the Works shall have passed an approved qualification test. The Contractor shall maintain a record of the procedure, performance and qualification tests.

Full details of welding electrodes and fluxes, where applicable, shall be given.

Welding :

All welding shall be electric fusion welding for pipes with outside diameter ranging from 219mm to 508mm and submerged arc spiral welding for pipes with outside diameter ranging from 508mm to 813mm, and shall be acceptable to the Engineer.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



TABLE 2 - STANDARD NOMINAL SIZES, OUTSIDE DIAMETERS AND WALL THICKNESSES OF PIPES

Nominal size, mm	Outside diameter, mm	Nominal wall thickness, mm			
200	219.1	4.5	6.0	8.0	9.5
250	273.1				
300	323.9				
350	355.6				
400	406.4				
450	457				
500	508				
600	610				
700	711				
800	813				

Other wall thicknesses are subject to agreement between the Contractor and the Engineer.

TABLE 3A - TOLERANCES ON O.D. OF PIPE ENDS

Nominal size, mm	Pipes to be joined by field welding		Pipes to be joined by couplings	
	Tolerance, mm	Length of ends subject to tolerance, mm	Tolerance, mm	Length of ends subject to tolerance, mm
200 & 250	-1.0 +1.5	100	-1.0 +1.5	100
>250 □ 450	-1.0 +2.5	100	±1.5	150
>450 □ 800	-1.0 +2.5	100	±1.5	150

TABLE 3B - TOLERANCES ON O.D. OF BODY OF PIPES

Specified outside diameter, D, mm	Tolerance, mm
219.1	± 2.0
> 219.1 < □355.6	± 2.5
> 355.6	± 3.0

PSZ 6.2

Fabrication :

PSZ 6.2.1

Misalignment :

Any misalignment or offset of plate edges shall be limited to 1.5 mm

PSZ 6.2.2

Welds ;

The weld area on the outer surface shall be trimmed to an essentially flush condition, except as allowed for in PSZ 6.2.1. There shall be no visible evidence of lack of fusion throughout the entire weld length.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



The height of upset metal and flash on the inner surface shall not exceed 1.5 mm. Any surface indentations resulting from the removal of excess material shall not cause the wall thickness to be reduced by more than 8% of the specified wall thickness.

The weld area and the parent metal shall be free from cracks.

Test specimens, prepared and tested in accordance with PSZ 10.3.1 shall have an ultimate tensile strength at least equal to the minimum specified for the appropriate parent plate.

Test specimens, prepared and tested in accordance with PSZ 10.3.2, shall show no evidence of opening, cracks, laminations or burnt metal in either the weld or the parent metal.

PSZ 6.2.3 **Dents :**

A pipe shall contain no dents greater than 6 mm, measured as the gap between the lowest point of the dent and a straight edge placed along the pipe surface, above the dent.

The length of the dent in any direction shall not exceed one-half of the diameter of the pipe.

Any sharp gouge within a dent shall be considered a defect.

PSZ 6.2.4 **Rectification of defects :**

Surface defects in the parent metal that have not or will not cause leaks may be repaired by welding, provided that the welds comply with the requirements of PSZ 6.2.2.

Repair to defects in the weld zone is not permitted. The weld zone is defined, for this purpose, as being 15 mm on each side of the fusion line.

PSZ 6.2.5 **Resistance to hydraulic pressure :**

When tested in accordance with PSZ 10.4, pipes shall be capable of withstanding, without weeping, leaking or bursting, the hydraulic test pressure, "P".

The test pressure shall be calculated from the following formula, based upon 75% of the minimum specified yield strength of the steel, with a maximum of 200 Bar.

$$P = \frac{20 \times Y \times 0.75 \times T}{D}$$

Where P = hydraulic test pressure, Bar

Y = minimum specified yield stress of steel plate or strip, MPa.

T = nominal wall thickness of pipe, mm

D = nominal outside diameter of pipe, mm

PSZ 6.2.6 **Coatings and Linings**

When so required by the Engineer, the pipes shall have been cleaned and coated and/or lined in accordance with the relevant requirements of, SABS 1178 and AWWA C205-89 or as agreed upon between the Engineer and the Contractor. In the case of this contract, refer also to Section Y.

PSZ 7. **TRACEABILITY**

PSZ 7.1 As soon as possible during or immediately after manufacture, each pipe shall be indelibly marked, approximately 150 mm from one end, with a unique pipe number giving traceability, to the steel used and all inspections and tests performed.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSZ 7.2 Where die stamps are used they shall be blunted or round nosed in design.

PSZ 8. MARKING

PSZ 8.1 Pipes manufactured to this specification shall be marked as follows :

PSZ 8.1.1 The manufacturer's logo, the specification and grade, month & year of final inspection, diameter, wall thickness, measured length and unique pipe number.

PSZ 8.1.2 For example a 457 x 9.5 grade D320 pipe, 12.199 metres long, released for dispatch during June 97 and manufactured by Bills company, with a pipe number of 970543, would be marked.

Bco HL006-D320 6-97 457 9.5 12.199 970543

PSZ 8.1.3 The Engineer's requested data (if any) and the Contractors data shall follow.

PSZ 8.1.4 Pipe marking shall be carried out using paint/ink stencils. The colour shall be in contrast to the steel or coating colour. At the Contractors choice a black rectangular background may be applied prior to the paint marking. All marking paint used shall be weather proof and shall be compatible with any pipe coating that may be in place.

PSZ 9. SAMPLING AND COMPLIANCE TO SPECIFICATION

PSZ 9.1 Sampling :

PSZ 9.1.1 After each pipe has been inspected and tested as described in PSZ 10.1, 10.2 and 10.4, the following sampling procedure shall be applied in determining whether a lot complies with the appropriate requirements of the specification.

First sample: From an end of one pipe taken at random from the lot cut a section long enough to provide the appropriate test specimens required in terms of PSZ 10.3.

Second sample: If a test specimen from the first sample fails to comply with the appropriate requirements, cut a section, long enough to provide the specimen for each test that the first sample failed, from each of two further pipes taken at random from the lot.

Third sample: If a test specimen from the second sample fails to comply with the appropriate requirements, cut a similar section from each pipe in the lot or each of 10 further pipes taken at random from the lot, whichever is less.

PSZ 9.2 Compliance:

PSZ 9.2.1 The lot shall be deemed to comply with the requirements of the specification if:

After inspection and testing of the lot in terms of PSZ 10.1, 10.2 and 10.4 no defect is found and;

After testing of the first sample no defect is found or;

After testing of the second sample no defect is found or; and

After testing of the third sample no defect is found.

PSZ 10. INSPECTION AND TESTING

PSZ 10.1 Dimensions:

PSZ 10.1.1 Using any method that will provide the required accuracy, measure the dimensions of each pipe in the lot for compliance with PSZ 6.1. When measuring outside diameter and straightness, follow the following rules:

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Pipe ends - use a ring gauge machined to the greater dimension given in columns 2 or 4 of table 3A to check the pipe ends. (Relative to the size and jointing system specified).

Pipe body - use a diameter tape or calliper to check the body.

Straightness - measure any gap between the pipe surface and a taught wire stretched over the full length of the pipe and clamped at pipe ends on spacers of equal thickness. The gap measured after deducting the spacer thickness shall not deviate from the requirements of PSZ 6.1.4 (a).

PSZ 10.2 Welds :

PSZ 10.2.1 Visually examine the weld zone and the surrounding parent metal of each pipe for compliance with the requirements of PSZ 6.2.2 and, when relevant, PSZ 6.2.4.

PSZ 10.3 Destructive Tests :

PSZ 10.3.1 Transverse tensile test :

From a cold-flattened section of pipe, from each lot, cut a transverse test specimen conforming to the sketch at table 3 of SABS 054, with the weld across the centre. Dimension b shall be 38 mm, lc = 58 mm and r = 25 mm. Determine the ultimate tensile strength (UTS) by the method given in SABS 054. Refer to API 5L Grade B for compliance.

PSZ 10.3.2 Flattening tests :

Cut two cylindrical test specimens approximately 100 mm wide from each lot produced. Flatten the specimens between two parallel flat surfaces, one with the weld at 0° to the direction of load the other with the weld at 90° to the direction of load, until the outside diameter to which the compression is applied is reduced to two-thirds of its original value. The flattened specimens shall comply with PSZ 6.2.2 (e).

PSZ 10.4 Hydraulic tests :

PSZ 10.4.1 Subject each pipe in the lot to the relevant hydraulic test pressure specified in PSZ 6.2.5. Maintain the pressure for the length of time necessary to inspect the welds for leaks and to check for compliance with the requirements of PSZ 6.2.5.

PSZ 10.5 Coatings and linings :

PSZ 10.5.1 When applicable, inspect and test the coatings and linings of the pipes for compliance with the requirements of PSZ 6.2.6. In the case of this contract, refer also to Section X and Section Y.

PSZ 11. CERTIFICATION

PSZ 11.1 A mill certificate in accordance with DIN 50049 3.1.b shall be issued by the pipe manufacturer for each consignment of pipes manufactured in accordance with this specification.

PSZ 11.2 3.1.b certificates shall show the actual chemical and mechanical properties of each heat of steel used, the corresponding unique pipe numbers made from each heat and shall demonstrate that all required inspections and tests were carried out with acceptable results.

PSZ 11.3 Every 3.1.b mill certificate shall bear the date of the final acceptance inspection of it's relative consignment and shall be valid for a period of 30 days from that date.

PSZ 11.4 Companies wishing to update the validation of a certificate may do so through contact with the pipe manufacturer or through the intervention of an independent third party inspectorate.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PSZ 12. DELIVERY OF COATED PIPES

PSZ 12.1 The Contractor is responsible for coating the pipes and he shall make all arrangements for transporting the pipes from the place of coating to the site.

PSZ 12.2 The Contractor will be required to deliver coated pipes from the place of manufacture to the proposed pipeline route on site as and when directed by the Engineer, or to suit the production rate for installation of pipes on site.

PSZ 13. STORAGE OF PIPES AT PLACE OF MANUFACTURE

PSZ 13.1 All pipes that have been coated shall be stored at the place of coating until they can be accepted at the pipeline route. The pipes shall be placed on approved supports in a demarcated area which has been cleared of all vegetation and treated with an effective weed killer. The supports shall be arranged so that the bearing area is adequate to prevent damage to the external coating.

PSZ 13.2 Each bitumen coated pipe shall be coated with lime wash to reduce the effect of solar heat on the coatings for the duration of the storage period. Each pipe end shall be enclosed with a white polyethylene sheet cover secured to the pipe by a metal strap. The cover shall be perforated to allow the flow of a small quantity of air through the pipe.

PSZ 13.3 During inclement weather or for any other reason that may prevent acceptance of pipe deliveries at the site the Engineer may instruct that pipes be stored at the place of coating.

PSZ 14. PROTECTION OF PIPES DURING TRANSPORTING

The coated pipes at all stages during its transportation to the site of delivery shall be protected against damage. The pipe shall be lifted by means of broadband slings and the use of chains, wire ropes, etc. will not be permitted. Wooden chock blocks, at least 150 mm wide, suitably padded for the pipes to rest on, shall be provided on each transport vehicle. Should the Tenderer consider that the ends of the pipe require special protection; his proposals in this connection shall be stated at the time of tendering. The cost of such protection shall be included in the tendered rates.

PSZ 15. REPAIR OF DAMAGED PIPE SHELLS AND COATED PIPES

The Contractor shall repair at his own cost and expense all damage to a pipe and/or its internal and external coating that may occur to the pipe up to the time of installation.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



SECTION D: MEASUREMENT AND PAYMENT

THE FOLLOWING NOTES REGARDING MEASUREMENT AND PAYMENT ARE ARRANGED TO CORRESPOND WITH THE RELEVANT ITEMS IN THE PRICE SCHEDULE TO WHICH THEY REFER

PRICE SCHEDULE A - EXCAVATIONS AND BACKFILLING PIPE TRENCH ETC

ITEM A1 (a): SET OUT AND CONTROL LINE AND GRADE OF TRENCH

(ASC 9; ASC 10; ASC 13)

The whole cost involved in referencing existing centre line survey pegs, setting out the work, demarcating existing pipelines and controlling the line of the trench, the grade and levels of the trench floor and pipe bed, protecting pegs and beacons and the data and pegs to install the pipeline shall be included in the price tendered for the item. Payment will be made pro rata for the length of completed trench.

ITEM A1 (b) : CLEAR WORKING SPACE ETC, PROVIDE PIPE LAYING PLATFORM, ACCESS ROAD, PIPE STORAGE STRIP AND THE STORAGE MOUNDS (ASC 3).

The whole cost involved in clearing the working space for excavations and pipe laying operations and for arranging for the stockpiling and depositing of the spoil from the trench to provide a continuous pipe laying platform alongside the trench, an access road for the passage of pipe delivery vehicles and for construction plant and equipment along the working strip and for a pipe storage strip and pipe storage mounds within the working strip shall be included in the price tendered for this item. In addition the price shall include for disposing the cleared material off the site, maintenance and dust and pollution control of the above work. Payment will be made pro rata to the length of completed trench.

ITEM A2: TOPSOIL (ASC 5)

Measurement for payment for excavating and stockpiling, and replacing topsoil will be made of the volume of material in place before excavation with a depth of 300 mm over the width and length prescribed by the Engineer.

ITEMS A3 TO A5: EXCAVATION (SECTION A OF THE SPECIFICATION)

The measurement of quantities for payment will be the net quantities calculated from the dimensions indicated on the drawings and in the price schedule related to the work actually performed by the Contractor. Each particular item in the schedule is provisional and is subject to measurement on completion and final payment shall be made in accordance with such

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



measurement. The rates shall include for the provision of all measures for safety as specified in ASC 20 and ASC6.5.

Bulk excavation quantities will be measured net in place before excavation, excluding the topsoil, which is provided for in Item A2, down to the prescribed trench floor levels. Details of payment lines for excavating the trench are included on Drawing 17 (ASC6).

Joint, lifting band and stiffener holes excavation quantities (ASC7) will be measured net in place to the dimensions shown on the drawings.

Additional excavation quantities (ASC8) will be measured net to the excavation lines shown on drawings or as instructed by the Engineer.

Excavation is divided into "soft material" and "rock" (ASC4) and will be classified by the Engineer on site before the excavation is covered and before any payment is made for the excavation under examination. The Engineer's classification shall be final and binding, and any objections to the classification shall be made before the excavation has been covered. The quantities listed in the re purely provisional and payment will be made on the actual volume of each class of material as determined after the trench has been opened.

Measurement of excavation quantities will be in cubic metres.

ITEMS A6 (a) & A6 (b): PROVIDE SELECTED FILL (ASC 12.1; ASC 12.2; ASC 12.3)

Item A6 (a) is for Class I fill material and Item A6 (b) is for Class II fill material. Selected material shall be in accordance with ASC 12.1, ASC 12.2 and ASC 12.3. Where selected material is available from the spoil deposited alongside the trench during the excavations under the contract, payment will be made under items A6 (a) i) and A6 (b) i). Payment under items A6 (a) ii) and A6 (b) ii) will be for importing selected material. Items A6 (a) iii) and item A6 (b) iii) are extra over items A6 (a) i), A6 (a) ii), A6 (b) i) and A6 (b) ii) to sieve material. Items A6 (a) iv) and A6 (b) iv) shall include for locating, negotiating with the owner and establishing a borrow pit for the material. All rates for importing selected material, whether it be from a borrow pit or from the trench excavation, shall include for loading, transporting the material for a free haul of 200 m and delivery to the trench side.

The cost of obtaining, placing and compacting selected material for refilling over-excavation and overbreak shall be included in the rates for items A8(a), A8(b) and A8(c).

Measurement will be the net volume in cubic metres, of fill placed in the trench having the dimensions shown on the drawing and measured over the length instructed by the Engineer. The displaced volume of the pipe will not be taken into account for measuring purposes.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ITEMS A6(c) & (e): PROVIDE 38 mm STONE & CRUSHER RUN FILL (ASC 12.4; ASC 12.6)

38 mm stone shall be in accordance with ASC 12.4 and crusher run fill shall be in accordance with ASC 12.6. The rate for providing 38 mm stone and crusher run fill shall include all costs in obtaining a suitable material and for loading, transporting and delivering the material from any source to the trench side.

Measurement will be the net volume in cubic metres, of fill placed in the trench having dimensions shown on the drawings and measured over the length instructed by the Engineer.

ITEM A6 (d): PROVIDE SELECTED MATERIAL FOR SOIL CEMENT FILL (ASC 12.5)

The rate shall cover the supply at the trench side of selected material in accordance with ASC 12.5.1 from any source and shall include all costs relating to the locating, loading, transporting and unloading of the material at the trench side.

ITEM A7: OVERHAUL

Haulage of material (Classes I and II) transported from a borrow pit negotiated by the Contractor or from stockpiled material along the route of the pipeline, and over a distance exceeding 200 m, will be paid for under Item A7. Measurement will be of the material in place as filling to the length and levels instructed by the Engineer, and of the actual distances exceeding 200 m covered according to the Engineer's instructions regarding the source of the material.

ITEMS A8 (a), A8 (b) AND A8(c): PREPARING THE TRENCH FLOOR (ASC 13)

The rates for preparing the trench floor whether it be in material of adequate bearing capacity (Item A8 (a)), in soil of inadequate bearing capacity (Item A8 (b)), or in unsuitable material (Item A8(c)) and shall include for:

- ASC 13.2 - Removing, clearing and disposing of rubble, debris, mud and water.
- ASC 13.1 - Supplying, placing and compacting fill to rebuild the overbreak and over-excavation and to restore the trench floor to the levels and grades stated on the longitudinal section drawings and/or prescribed by the Engineer.
- ASC 13.6 - Trimming of the trench floor to the correct levels and grades,

Measurement of preparation of the trench floor shall be in square metres calculated on the normal trench widths specified on the drawings and on the lengths for the various categories as instructed by the Engineer. No direct payment will be made for removing and disposing of material from the overbreak and/or over-excavation or for the supply of the fill for rebuilding overbreak and/or over-excavation.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ITEM A9 (a) AND (b): FILLING IN SPECIFIED OVER-EXCAVATION (ASC 13.3)

ITEM A9 (a): Supply and place U44 Kaymat geofabric (ASC 13.3.1).

The rate shall include for the removing, clearing and disposal of rubble, debris, mud and water (ASC 13.2), the supply, cutting, placing and securing of the U44 Kaymat geofabric on the floor of the cleaned trench and on top of the 38 mm stone. Measurement will be in square meters over the nett area as installed allowing for an overlap of 300 mm at joints.

ITEM A9 (b): Place and compact 38 mm stone (ASC 13.3.1)

The rates for this work shall include:

- ASC 13.2 Removing, cleaning and disposal of rubble, debris, mud and water.
- ASC 13.3 Carry out all the necessary work for placing 38 mm stone and compacting in 200 mm finished thickness layers to the compaction specified.

The supply of the fill material is measured under Item A6(c).

Measurement will be in cubic metres to the dimensions shown on the drawings, or instructed by the Engineer, and measured over the length instructed by the Engineer.

ITEM A10: CONSTRUCT THE PIPE BED FOUNDATION (ASC 14.1)

The rates for this work shall include:

- ASC 13.2 - Removing and cleaning and disposal of rubble, debris, mud and water.
- ASC 14.1 - Carry out all the necessary work for mixing, watering, placing, and compacting in a 150 mm finished thickness layer to the degree of compaction specified.

The supply of the fill to the trench side is measured under Items A6 (a) and A6 (b).

Measurement of pipe bed foundation will be in cubic metres of the material in place to the length and levels instructed by the Engineer.

ITEM A11: FORM THE PIPE BED (ASC 14.2)

The rates for this work shall include:

- ASC 13.2 - Removing and cleaning and disposal of rubble, debris, mud and water.
- ASC 14.2.1 to ASC 14.2.5 - Form the pipe bed to the required degree of compaction and the plane surface to the tolerances.

There will be no direct payment for the supply of any additional fill required.

Measurement of pipe bed will be square metres based upon the widths of trenches shown on the drawings and the full length of the pipeline.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ITEM A12: BACKFILL (ASC 23)

The rates for backfilling shall cover the cost of placing the filling and compacting it in the trench and excavations and shall include:

- ASC 23.1, ASC 23.2 - Measure the pipe internally
- ASC 23.1 and ASC 23.2 - Filling the trench in two stages, using Class 1 selected material in Stage I (OR at the Engineer's instruction using Class II material in Stage II) and Class II selected material in Stage II in accordance with the drawings.
- ASC 23.1 - Returning to site of valve chambers and sleeves/culverts for final filling and reinstatement and remaining props on completion of surface reinstatement.

The supply of the fill is measured under Item A6.

Measurement of backfill will be in cubic metres. The quantity backfilled shall be taken as being equal to the total net volume (excluding topsoil) excavated down to the pipe bed level shown on the section drawings plus excavation for joint holes, slots and additional excavation less the volume displaced by the pipe and other installations such as valve chambers, anchor blocks, etc.; stone and crusher run material placed; and the topsoil layers where applicable. No allowance shall be made for increased bulk due to excavation.

ITEM A13: ADDITIONAL DEGREE OF COMPACTION (ASC 23.4.1)

The additional degree of compaction shall be applied as and where directed by the Engineer. Payment will be "extra-over" item A12 for the volume of filling which has attained the additional compaction.

ITEM A14: BACKFILL WITH SOIL CEMENT FILL (ASC 12.5)

The rate shall be for the supply of cement. mixing, placing and compacting the material provided under Item A6 (d).

Measurement will be in cubic metres to the length and levels instructed by the Engineer or as detailed on the drawings.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ITEM A15: BACKFILL THE TRENCH AND OTHER EXCAVATIONS WITH CRUSHER RUN MATERIAL (ASC 12.6).

The rate shall include for placing and compacting material provided at the trench side under item A6(e) and at major roads for providing and mixing in of cement for the 300 mm deep upper road layer and all maintenance and repair until the road wearing surface has been reinstated.

Measurement will be in cubic metres to the dimensions shown on the drawing and to the length and levels instructed by the Engineer.

ITEM A16: DISPOSAL OF SURPLUS SPOIL AND UNDESIRABLE MATERIAL AND REINSTATE THE WORKING AREA (ASC 28: ASC 29; ITEM A16 (a), (b), (c) AND (d))

The rates for disposal shall include for loading, as the excavation proceeds, transporting, dumping and levelling on sites to be negotiated by the Contractor (ASC 28) and for reinstatement of the working area in accordance with ASC 29.

Measurement of surplus spoil considered to be removed from the site shall be taken as the unbulked volume of material displaced by the pipe, soil imported from external borrow pits for the soil cement fill and/or backfill, crusher-run material placed and structures with allowances made for the volume spread over the trench (Item A17) and undesirable materials disposed of in terms of ASC 11.4 and ASC 28.3.

Measurement of undesirable materials disposed of shall be based on the volume of rubble, unsuitable soft material and rock measured at the portion of the trench during the classification of the material.

Measurement of quantities disposed of will be in cubic metres.

ITEM A17: SPREAD SURPLUS SPOIL (ASC 28.5; ASC 29.7)

Measurement will be in cubic metres of the volume in final position to the lines and thickness as directed by the Engineer and shall include for the treatment described in ASC 29.7.

ITEMS A18, A19 AND A20: CROSSING ROADS AND RAILWAYS (ASC 15 & ASC 16)

The rate for crossing roads shall be extra-over the cost of excavation under Item A3, and shall include the following.

ASC 15: Giving notice to the controlling authority and closing the road to traffic or constructing the deviation and generally complying with conditions and ensuring safety and minimum disruption.

The rate for the crossing of roads shall include for the supply, placing and compacting of the crusher-run or road gravel material which may be required for the deviation. There shall be no direct payment for crossing a track.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ITEM A20: RAIL CROSSING DETAILS (ASC 16.3) (Not Applicable)

The rate shall be extra-over the cost of excavation under A3 and shall include taking occupation, strapping the rails preserving and repacking the ballast.

Measurement will be in number of crossings.

ITEM A21: CROSSING STREAMS, WATER COURSES AND FURROWS (ASC 17)

The lump sum rate shall include for all plant, equipment and labour movement to suit the sequence of pipe laying operations. The rate shall include for notifying the owners, designing, providing and maintaining a suitable diversion channel or overpass, maintaining dewatering equipment with 24 hour surveillance and, on completion of the crossing, refilling and channel or water course, removing embankments and cleaning up and reinstating the working area. Payment will be made pro rata to the length of the completed trench.

ITEMS A22 (a), A22 (b) and A22 (c): CROSSING SERVICES (SCC 13, SCC 14, & SCC15)

The lump sum rate shall include for all plant, equipment and labour movement to suit the sequence of pipe laying operations. The rate for crossing pipelines, power lines, cables, sewers, drains, pipes, telephone equipment shall include for locating the services and notifying owners that crossing is to take place. Payment will be made pro rata to the length of trench completed.

ITEM A23: CROSSING FENCES AND WALLS (SCC 16, ASC 19.3 AND ASC 19.4)

The rate shall include for giving notice to the property owner, the temporary staying of the fence at the edges of the working strip, the careful dismantling and storing of the fence until completion of construction operations, the erecting and maintaining for a temporary fence to close the opening across the working strip at the crossing point, and upon completion of construction operations, the reinstatement of the dismantled permanent fence. Measurement for the above works described will be per crossing.

ITEMS A24 AND A25: FENCES (ASC19.1 AND ASC 19.2)

The rates shall include the cost of supplying the wire, standards, droppers, posts and stays and the costs of clearing surface vegetation, other than trees, over a width sufficient for the erection of the fencing, the excavation and the entire cost of erecting the fencing. The rate for a permanent fence shall include for supplying and placing concrete in the post and strut bases.

Fencing will be measured in linear metres as the actual length of fencing erected as shown on the drawings or as directed by the Engineer.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ITEM A27: PUBLIC SAFETY (REFER TO PSA 8.3.3 (b))

The lump sum rate shall include all measures necessary to protect the work area and trenches during construction, including temporary fences, bridges, railings, barriers etc., in compliance with the Occupational Health and Safety Specification of the Client. Payment will be made pro rata to the length of the completed trench.

ITEM A28: FIREBREAKS (ASC 25)

Measurement will be in square metres over the area instructed by the Engineer.

ITEM A29: TREES (ASC 18) (NOT APPLICABLE)

The cost of removing and disposing of trees, coppices, forests or plantations over the width of the working strip is to be included as a lump sum and whilst clearing of veld bush and scrub is to be included in item A1 (b). Payment will be made pro rata to the length of completed trench.

ITEM A30: DISCONTINUE OPERATIONS AND TRANSFER PLANT, EQUIPMENT AND LABOUR (SCC 14)

The rate for unexpected discontinuity in operations along the route of the pipeline and transfer, plant, equipment and labour shall include everything necessary to close down in sequence the various operations in the construction train and transfer them to the new working point.

The price schedule includes items for one transfer over a plant and equipment route distance of up to 2 km and one transfer over a route distance exceeding 2 km. For purposes of classification the distance shall be measured along the shortest practical route along which the plant and equipment can be transported.

ITEM A31: PROTECT BITUMINOUS ROAD SURFACES (ASC 15.4.3 AND ASC 15.4.5)

The rate shall include for selecting, transporting and spreading suitable material in the 300 mm thick protective layer and maintaining it while the excavation of the trench, installation of the pipe and backfilling operations are in progress. The rate shall also include the collection into piles, loading the material and the final cleaning of the road surfaces. The cost for eventual disposal shall be included in Items A16 and A17. Measurement shall be in square metres of road surface protected.

ITEM A32 (a) & (b): FORM AND MAINTAIN ACCESS TRACKS (ASC 3.4 AND ASC 3.5)

The rate shall include for the preparation and maintenance of all access tracks as formed on the express instruction of the Engineer. The rate shall also include for (where applicable) the obtaining,

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



transporting, dumping, levelling and compacting of suitable material from the excavation to form the track. Forming of the working strip shall not be defined as making an access trench.

The rates shall include all work necessary to construct the access track in accordance with ASC 3.4 and to maintain it for the duration of the contract including complying with ASC 3.5.

ITEM A33: STANDING TIME COSTS

The rate shall include for overheads, plant charges, wages and all other costs incurred when the Contractor is unable to carry out the work under Schedule A of the contract, for reasons beyond his control.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PRICE SCHEDULE B – MANUFACTURE, SUPPLY, UNLOADING, LAYING, JOINTING ETC OF STEEL PIPES

The rate for each item shall include the cost of all labour, material and the provision, operation and maintenance of the necessary plant and equipment.

Measurement for supply and transporting of pipes (Item B1) unloading pipes (Item B2), examining coatings (Item B3) and placing, installing and lining up pipes (Item B4) shall be the total length along the pegged survey line, with reference pegs offset from the centre line of the pipeline in the manner depicted on the Drawings. No deductions will be made for the length of tapers, isolating valves, sets, bends, joint gaps or the length installed in culvert crossing.

ITEM B1: SUPPLY OF PIPES (PSZ)

The rate shall include for fabrication, protective coatings and linings, testing, storage and delivery to the place of installation along the pipe trench of steel pipes as specified in the specification PSZ.

Measurement and payment will be per meter length installed (net).

ITEM B2: UNLOAD AND TRANSPORT PIPES (BSC 3; BSC 4)

The rate for unloading shall include for stringing along the trench, stacking on storage areas within 300m from the trench and transporting to the trenches as necessary.

ITEM B3: EXAMINE COATINGS (BSC 5)

The rate shall include for inspecting and repair of damaged coatings.

ITEM B4: PLACE PIPES, INSTALL AND LINE UP (BSC 4, BSC 5, BSC 6, BSC 13)

The rate shall include for trench safety measures, dewatering and checking trenches and cleaning joint surfaces and the interior of the pipeline and preventing unauthorized ingress. Allowance shall be made for a reduced rate of advance in soils which have low shear strength, at crossings of power lines, pipelines, sewers and the services covered in BSC 8.

ITEMS B5 AND B6: MAKE JOINTS AND COMPLETE COATINGS (BSC 5, BSC 7, and BSC 11)

The rate shall include the protection of the invert of the pipe, meeting tolerances, repair of defects and providing pipe-end mitres up to 2° deflection angle.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Measurement for completing coatings shall include for all joints including the socket and spigot joints or plain ended joints and each wrapper plate joint.

ITEM B7: SETS AND BENDS (BSC 6, BSC 7, BSC 9)

The rate shall include for the supply, transporting and taking delivery of coated steel pipe at the trench side or at the specials fabrication workshop, marking, cutting, assembly and welding, coating, transport to the trench side, unloading and installation in the pipeline. The rate shall cover the supply, manufacture and installation of two wrapper plates per set or bend.

ITEM B8 AND B9: CUT STEEL PIPE

The rate shall include for marking, cutting and preparing the ends of the pipe and coatings for field welding.

ITEM B10: SPECIAL PIPE SECTIONS (BSC 6, BSC 7): VALVE CHAMBERS

The rate shall include for the supply of piping, flanges, gussets, crotch plates, bolts and gasket material, all fitting, drilling and welding and protective coatings.

ITEMS B11.1: SUPPLY AND INSTALL VALVES, METERS AND PLUG COCKS (BSC 11) (NEW VALVES AND METERS)

The rate shall include the supply, delivery, unloading, handling, transport on site from storage to the works, fitting, installation and testing of valves and meters as shown.

ITEM B 12.1: SPECIAL PIPE SECTIONS (BSC6, BSC7): NEW SPECIALS

The rate shall include for the supply of piping, flanges, gussets, crotch plates, bolts and gasket material, all fitting, drilling and welding and protective coatings.

ITEM B13: DISCONTINUE OPERATIONS AND TRANSFER PLANT, EQUIPMENT AND LABOUR (SCC 14)

The rate to discontinue operations at a point along the route of the pipeline and transfer plant, equipment and labour shall include everything necessary to close down in sequence the various operations in the construction train and transfer them in sequence to the new working plant.

The price schedule includes items for one transfer over a plant and equipment route distance of up to 2 km.

ITEM B14 (a): RADIOGRAPHIC EXAMINATION OF BUTT WELDS (BSC 6.4)

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



The price shall cover the full length of all circumferential butt welds done on site or in the factory with an allowance for re-examination of repaired welds. Measurement will be in number of full circumferential welds. 100% of butt welds shall be tested.

ITEM B14 (b): MAGNETIC PARTICLE TESTING OF FILLET WELDS (BSC 6.3)

The price shall cover the full length of 10 % of all circumferential fillet welds with an allowance for re-examination of repaired welds; Measurement will be in number of full circumferential welds.

ITEM B15: ACCEPTANCE TEST (BSC 13, BSC 15)

The amount for testing shall include for everything necessary, to conduct the test, locate and repair leakage and repeating the testing until the test is found to be satisfactory.

ITEM B16: ROAD CROSSING BY PIPE JACKING (BSC 8)

- (a) Supply and install 1050 mm diameter reinforced concrete pipes SC type class 100D manufactured to SABS 677 (SABS 1200 LG – 8.2.1, 8.2.2, 8.2.6, Item 16a). The operations shall be measured in accordance with the specifications of SABS 1200 LG. The rates shall include for the excavation of thrust and reception pits, removal and disposal of surplus material within a distance of 5,0 km as well as the full reinstatement of the site on completion of the works. The quantities shall be measured in meters length completed.
- (b) Extra-over item 16a for excavation in rock (SABS 1200 LG-8.2.8).
Excavation shall be undertaken by using pneumatic tools and will be measured in m³ of excavated rock material.
- (c) Extra over item B4 for installation of a 508 mm OD steel pipe within the concrete sleeve (BSC8, Item 16c).
The rates shall provide for all additional costs (in excess of normal installation measured in Item B4) for pulling the 508 mm OD steel pipe through the concrete sleeve, for positioning, stabilising and connecting the steel pipe, etc.
- (d) Grouting of annulus between the steel pipe and the concrete sleeve (BSC 8.5, Item 16d)
The rate shall include the cost of material, grout, equipment, sealing, etc. and will be measured in m³ of annulus.
- (e) Standing time (SABS 1200 LG 8.2.10, Item B16 e)
Provisional item for standing time, beyond the control of the contractor. Payment will only be made on approval by the Engineer.

ITEM B18: STANDING TIME COSTS

The rate shall include overheads, plant charges, wages and all other costs incurred when the Contractor is unable to carry out the work under Schedule B of the contract, for reasons beyond his control. The amount will be paid only on approval by the Engineer.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ITEMS B19, B20, B21, B22 AND B23: PROVISIONAL SUMS FOR PAYMENT TO OTHER SERVICE PROVIDERS

The provisional sums allowed will be at the disposal of the Engineer for payment for services provided by other service providers. The specified amounts will not be paid to the Contractor.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PRICE SCHEDULE C - CONSTRUCTION OF VALVE CHAMBERS, STRUCTURES, ETC (CSC)

ITEM C1 TO C3: GENERAL NOTES FOR CONSTRUCTION OF BRICK AND REINFORCED CONCRETE CHAMBERS

CSC 1. THE UNIT OF MEASUREMENT SHALL BE THE NUMBER OF EACH TYPE OF VALVE CHAMBER CONSTRUCTED COMPLETE, AS SHOWN ON THE DRAWINGS OR AS INSTRUCTED BY THE ENGINEER.

CSC 2. THE TENDERED RATES SHALL INCLUDE FULL COMPENSATION FOR ALL LABOUR, CONSTRUCTION PLANT, AND MATERIALS REQUIRED FOR THE CONSTRUCTION OF THE CHAMBERS, INCLUDING COMPACTION AND PREPARATION OF FOUNDATIONS, BINDING SEALANTS, CONCRETE SLABS, REINFORCEMENT, BRICKWORK, BRICKFORCE, STEP IRONS, VENTS, CAST IN-SITU CONCRETE AND CASTING OF ROOF SLABS, COVERS AND FRAMES.

CSC 3. THE INSTALLATION OF VALVES AND THE SUPPLY AND INSTALLATION OF SPECIALS, INCLUDING WELDING AND PROTECTION OF JOINTS IS COVERED IN PRICE SCHEDULE B.

ITEM C4: SUPPLY AND INSTALLATION OF MANHOLE COVERS

THE RATES SHALL INCLUDE FULL COMPENSATION SUPPLY AND INSTALLATION OF THE FRAMES AND COVERS IN ACCORDANCE WITH THE DRAWINGS.

ITEM C5: SUM ALLOWED FOR PAYMENT TO RAND WATER FOR THE SUPPLY OF MANHOLE COVERS

SUM ALLOWED FOR PAYMENT TO RAND WATER FOR THE SUPPLY OF SECURITY COVERS AND FRAMES. THE SUM IS PROVISIONAL AND IS ALLOWED FOR PAYMENT TO RAND WATER. THIS AMOUNT WILL NOT BE PAID TO THE CONTRACTOR.

The following for the construction of the Chamber for the PRV station

- Excavation and backfill covered in Schedule A
- Piping, specials and valves covered in Schedule B

ITEM C6: CONSTRUCTION OF FLOOR SLAB (not applicable)

The rate shall include the whole cost for preparation of the excavation surface, supply and construction of 50mm thick layer of concrete blinding, additional compaction of the foundation if instructed, supply and placing of concrete for a 200mm thick floor slab, including the installation of reinforcement mesh, final finishes etc.

The rate shall also provide for all shattering and concrete curing. The rate shall include the construction of a 300mm x 300mm x 400mm deep sump as shown.

All works to be done in accordance with specifications and as shown in the drawings.

Measurement will be square meters of complete 200mm thick slab as shown on the drawings.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



ITEM C7: CONSTRUCTION OF MASONARY WALLS

The Rate shall include all works necessary to complete the 440mm thick brick walls in accordance with the specification and as shown on the drawing. The rate shall include all necessary operations, the supply and installation of bricks, brick force, air-bricks, parting strips, flexijoints, PVC mesh, step irons, etc. to achieve a complete finish as specified.

Measurement shall be per square meter of complete wall as shown on the drawings, measured on the external perimeter.

ITEM C8: CONSTRUCTION OF ROOF SLAB

The rate shall include the whole cost for the construction of the 250mm thick roof slab in accordance with the specifications and as shown on the drawings.

The rate shall include the cost for shuttering and removal thereof, cost of concrete, curing, supporting, construction of movable access slabs and manholes, the cost for placing of reinforcement, cantering, etc., all complete.

Measurement will be in square meters of complete slab as shown on the drawings.

ITEM C9: SUPPLY OF REINFORCEMENT

The rate shall include all costs for the supply, delivery and handling of reinforcement as specified.

The installation of the reinforcement is included in items C6, C8 and C10.

Measurement shall be per ton of reinforcement supplied.

ITEM C10: CONSTRUCTION OF THRUSTBLOCKS

The rate shall include all costs for the work, supply of material and finishing of concrete thrust blocks as specified.

This shall include the preparation of trench surface and foundation, additional compaction as instructed, installation of reinforcement, concrete, shuttering, curing, etc. in order to achieve complete and finished thrust blocks.

Measurement shall be cubic meters of thrust block as shown on the drawings, complete.

ITEM C11: SUPPLY AND INSTALLATION OF HOLDING DOWN BOLTS AND STRAPS

A provisional sum is allowed for this. The sum shall be at the disposal of the Engineer.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



SECTION B: UNLOADING, LAYING, JOINTING ETC OF STEEL PIPES, SUPPLY AND INSTALLATION OF SPECIALS AND INSTALLATION OF VALVES.

BSC 1. GENERAL REQUIREMENTS

Under this Section of the contract the Contractor shall

- Arrange for the unloading of pipes alongside the pipeline trench.
- Install the pipes in the trenches and make the necessary joints including the flanged joints at isolating valves.
- Fabricate and install bends and form horizontal and vertical sets where shown on the drawings using steel pipe supplied.
- Supply and install the special pipe sections scheduled.
- Provide equipment and material and carry out radiographic and magnetic particles examinations of welded joints.
- Supply and install all isolating, scour and air valves.
- Make good the external coating at joints
- Make good the internal lining
- Provide equipment, make connections and carry out water tightness and structural tests of the pipeline.
- Rectify defects in the pipeline during construction and for a period of 12 months after the final date of the acceptance of the contract.
- Manufacture and supply of pipes (Refer to Section PSC for specifications).

BSC 2. PIPE DIMENSIONS

BSC 2.1 The following dimensions are provided for tendering purposes. The Tenderer should check dimensions and mass of the pipes to be laid and ensure the lifting equipment is adequate:

Outside Diameter	Wall Thickness	Length per pipe
mm	mm	m
1 118	12.0	12.192
1 016	12.0	12.192
406	6	12.192

BSC 2.2 Pipes with 400 mm ND and larger shall have external Rigid Polyurethane Coating and internal Solvent Free Epoxy Lining. Cut backs on the coating shall be as shown on the drawings. The 406 mm ND pipes shall be flanged, all other pipes plain ended for butt-welding.

BSC 3. TRANSPORTING AND UNLOADING OF PIPES

BSC 3.1 The pipes will be transported to site by the pipe supplier.

BSC 3.2 Delivery of steel pipes to the site will be co-ordinated by the Contractor. The pipes shall be delivered along and as near as possible to the trench for the pipeline.

BSC 3.3 The Contractor shall unload the pipes from the road vehicles and string them along the trench until required. Some pipes may have to be unloaded or stacked on storage areas some distance from the trench and later carried to the sections of the trench, where they are to be laid.

BSC 3.4 The pipes at all stages, shall be protected against damage, and shall be lifted by means of approved broad-band slings.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



BSC 3.5 The use of chains, wire ropes, etc, will not be permitted and the pipes shall be supported on pipe storage mounds provided by the Contractor while in the storage areas or when placed alongside the trench. (Sawdust filled bags shall not be used).

BSC 3.6 The Contractor shall fully inspect the pipes prior to unloading and all defects shall immediately be reported to the Engineer. The Contractor shall make arrangements for the defects to be repaired.

BSC 4. HANDLING OF PIPES

BSC 4.1 The Tenderer shall state in Schedule of Quantities the plant he proposes to use for unloading and placing the pipes in the trench. All plant shall be subject to the approval of the Engineer. The plant shall be designed so as not to damage the pipes, the lining and sheeting or disturb existing pipelines.

BSC 4.2 Before placing the pipes in the trench the measures taken to ensure the safety of the operations, the material and compaction of the trench floor and the finished line and grade of the pipe bed shall be carefully checked between survey pegs by the Contractor. The joint holes for each pipe length shall be checked by the Contractor and permission to lay obtained from the Engineer's Representative. The pipes shall then be placed in the trench, installed and jointed in accordance with the specification.

BSC 4.3 The Contractor shall keep the pipe trench and excavations free from water at all times during the pipelaying operations.

BSC 5. INSTALLING STEEL PIPES

BSC 5.1 Preparation :

BSC 5.1.1 Before a pipe or special pipe section is placed in the trench the internal and external protective coatings shall be examined visually and by means of a Holiday detector of the correct type and rating for the particular coating system. No pipe shall be laid without the permission of the Engineer's Representative. The Tenderer shall state in the Schedule of Quantities details of the equipment that will be provided to carry out Holiday detection on the site.

BSC 5.1.2 Any manufacturing defects located in the coatings shall be reported immediately to the Engineer and will be repaired by the Contractor.

BSC 5.1.3 Any damage to the sheathing caused during unloading or while the pipes are stored on the site shall be made good by the Contractor.

BSC 5.2 Cleaning of joints :

Just prior to the installation of any section of pipe, all foreign matter of every nature and all protective material shall be removed from the surfaces that are to be in contact at joints, so as to leave thoroughly clean surfaces for metal-to-metal contact in the field joints.

BSC 5.3 Laying pipe :

BSC 5.3.1 Each pipe shall be accurately laid on the prepared bed to the required line and grade. In placing pipe in the trench, the pipe shall be held by an approved sling, at least 0,4 m wide, and the pipe shall not be dragged on the bottom of the trench but shall be supported by the sling while being fitted to the adjacent pipe section.

BSC 5.3.2 After each pipe has been set into position it shall be attached to the adjoining pipe by means of an arc-welded joint. The use of dogs, clips, lugs or equivalent devices welded to the pipe for the purpose of forcing it into position will not be permitted.

BSC 5.3.3 Any dents which appear in the wall of the pipe shall be removed by the Contractor after the cause or the object causing the dent has been located and removed. The cost of removing the dent and making good the lining, wrapping and backfilling shall be borne by the Contractor.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



BSC 5.3.4 Any damage to the pipe during or after laying shall be made good and for this purpose the Engineer may require the pipe or section thereof to be removed from the trench and replaced with pipe which is free from defects.

BSC 5.4 Completing coatings at joints :

As soon as the field joints have been welded the coating at such field joints shall be completed in accordance with the following procedures:

BSC 5.4.1 External coating

After welding and the necessary examination have been carried out, the surface of the pipe to be made good shall be wire brushed, using mechanically operated tools, to remove loose rust and slag from the weld. The surface shall then be treated with Denso primer "D" and when this has dried sufficiently two successive layers of 300 mm wide Densotherm tape shall be applied in accordance with the manufacturer's specification to a finished thickness of not less than 5 mm on the external surface. All air bubbles shall be excluded. No other product shall be used unless the Contractor has obtained the written permission of the Engineer. Appropriate and approved shrink sleeves may be considered as a substitute for the above specification for repair of external coatings. The final external coating specification will be supplied to the successful contractor.

All flanges shall be wrapped with two successive layers of 300 mm wide Densotherm tape in accordance with the manufacturer's specification to a finished thickness of not less than 5 mm on the external surface. All air bubbles shall be excluded.

BSC 5.4.2 Internal coating

For plain ended pipes: (600mm ND and larger)

After welding of joints, a person will enter the pipe and the internal surfaces of the pipe shall be wire brushed to remove loose rust and debris. The completion of the internal cement mortar lining after welding on site shall be as shown on the drawings. The cement mortar shall comprise ordinary portland cement (CEM II 42.5) or rapid hardening cement (CEM I 42.5R), well graded sand, water and, if required, a styrene-butadiene copolymer latex (SBR) as admixture. The cement mortar shall be well mixed and of proper consistency to obtain a dense, homogeneous lining that will adhere to the pipe joint. The minimum cement water ratio shall be 2.8 by mass. The maximum sand to cement ratio shall be 1.0 by mass.

BSC 6. WELDED JOINTS

BSC 6.1 Welding :

BSC 6.1.1 Jointing by butt and/or fillet welding shall be made in accordance with approved welding techniques and to the standard specified in BSC 6.2 and BSC 6.3. All welding shall be electric fusion welding and be acceptable to the Engineer.

BSC 6.2 Butt welding shall comply with the following requirements :

BSC 6.2.1 Aligning : The edges to be joined shall be aligned so that overlap in abutting edges shall not exceed 1,5-mm.

BSC 6.2.2 Uniformity of appearance : All welds shall be substantially uniform in appearance and shall show full fusion and penetration throughout their lengths.

BSC 6.2.3 Undercut : Welds shall be substantially free from undercut and, if present,

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



- (i) the depth of the undercut shall not exceed 12,5 per cent of the nominal wall thickness or 1 mm, whichever is the lesser in depth and,
- (ii) the aggregate length of undercut in any 1 m length of welding shall not exceed 50-mm.

BSC 6.2.4 Weld bead tolerances : The outer weld bead shall not exceed a height of 3 mm. The inner weld bead shall not project. More than 1 mm and all excess weld metal shall be removed to the satisfaction of the Engineer.

In butt welds made from one side only a root groove may be present provided that it has a rounded outline and does not penetrate below the level of the adjacent surfaces of the parent plate.

BSC 6.2.5 Freedom from defects : The weld, heat affected zone and surrounding parent metal shall be free from cracks, porosity cavities and trapped slag.

BSC 6.2.6 Transverse tensile strength of welded joint : The welded joint shall have an ultimate tensile strength at least equal to 95 per cent of the minimum tensile strength of the parent plate.

BSC 6.3 Fillet welding shall comply with the following requirements :

BSC 6.3.1 A visual inspection shall be carried out after cleaning the slag off every fillet weld before completion of the external coatings on all field welded joints.

BSC 6.3.2 Welds shall not have a concave surface. There shall be no undercutting of adjacent plate. Welds shall be free from cracks, slag intrusions and porosity.

BSC 6.3.3 10 % of all fillet welds shall be subjected to magnetic particle testing.

BSC 6.4 Welding tests on butt welds only :

BSC 6.4.1 The Contractor shall supply on the site all equipment, materials and personnel to carry out radiographic examination of the full length of all (100 %) the circumferential welds made during installation of the pipeline. All (100%) of the circumferential butt welds done at the factory shall also be subjected to radiographic tests.

BSC 6.4.2 Cracks, lack of complete penetration, or lack of complete fusion shall be considered injurious defects. The standard for acceptance of minor imperfections such as slag inclusions or gas pockets shall be that laid down in clauses 6.5 and 6.6 of American Petroleum Institute Standard 1104.

BSC 6.4.3 Any weld rejected as a result of radiographic examination may be repaired at the option of the Contractor and such repair shall be carried out in accordance with BSC6.5. The repaired weld shall be re-examined radiographically and re-examination shall extend for the full length of the weld in which the repair has been carried out.

BSC 6.5 Repairs :

BSC 6.5.1 Repairs of welded joints shall be permitted. Where repairs are required the defective weld metal shall be cut out and the parent metal prepared by grinding before being re-welded to the satisfaction of the Engineer.

BSC 6.5.2 The repairs procedure, performance, and welders employed on repairs shall be qualified in accordance with Appendix B of American Petroleum Institute Standard 5L. Each repair weld shall be marked with the welder's identifying stamp.

BSC 6.5.3 On discovery of reject welds the Engineer may, at his discretion, call for additional radiographic examination at the Contractor's cost until it is shown that the necessary standard is being maintained.

BSC 7. SPECIALS

BSC 7.1 The following special pipe sections are required to be supplied :

- (a) 200 mm diameter scour pipes

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



(b) Tees, bends, reducers, flanged and plain ended pieces, etc. varying in size.

BSC 7.1.1 All piping for the fabrication of specials shall be:

(i) API 5L X52 steel with a wall thickness of 12 mm, unless otherwise specified.

Steel for flanges shall be in accordance with SABS 1123 to Table to suite

BSC 7.1.2 The steel plate and/or coil shall be free from seams, cracks, laminations and other injurious defects. The external diameter shall conform to the relevant dimensions given in the schedules and the outside diameter and circumference of specials with a diameter exceeding 400 mm shall be subject to tolerances of + 3 mm and ± 6 mm respectively.

BSC 7.1.3 Ends of specials shall be cleanly cut and be free from burrs. The ends shall not deviate more than 3 mm at any point from a true plane at right angles to the axis of the pipe.

BSC 7.1.4 Where pipes are to be jointed by butt welding the ends shall be bevelled to an angle of 30 ± 5 degrees measured from a plane perpendicular to the axis of the pipe, and shall include a root face of $2 \text{ mm} \pm 1 \text{ mm}$.

BSC 7.2 Welding :

BSC 7.2.1 Welding shall be in accordance with BSC 6.

BSC 7.3 Welding tests :

BSC 7.3.1 The Contractor shall supply all equipment and carry out radiographic examination of the full length of all butt welds made on site. The standard of acceptances shall be that specified in BSC 6.4.

BSC 7.4 Test of material used to manufacture specials :

BSC 7.4.1 All piping used for the fabrication of specials shall be subject to an approved hydrostatic test to a pressure that will result in a stress of 85 per cent of the guaranteed minimum yield strength for the steel plate.

BSC 7.5 Repairs :

BSC 7.5.1 Repairs of welded joints shall be permitted. The procedure and standard of acceptance shall be in accordance with BSC6.5.

BSC 7.6 Cleaning :

BSC 7.6.1 Each steel special shall be thoroughly cleaned and freed from all mill scale, foreign matter or rust especially along the weld and shall be approved by the Inspector immediately before coating. The exterior and interior of the special shall be cleaned by steel shot blasting and will not be accepted unless the operation provides a roughened surface equivalent to SA 2½ of Swedish Specification SIS 055900-1967.

BSC 7.6.2 Note: This applies to small bore piping from 100 mm NB upwards. Smaller bore piping not suitable to sand blasting, shall be cleaned by pickling.

BSC 7.7 Coatings :

BSC 7.7.1 After cleaning and inspection the external surface shall be coated with the 3LPE system. The exact coating specifications will be supplied to the successful Contractor.

BSC 7.7.2 After cleaning and inspection the internal surfaces shall be lined as follows:

(ii) Solvent Free Epoxy with a target thickness of 600 microns (Minimum 500 microns and maximum 800 microns).

BSC 8. JACKED PIPES AND CULVERTS

BSC 8.1 The road crossings shall be constructed by installing the 1 100 mm ND and the 1 000 mm ND steel pipes in a 1 650 mm concrete pipe sleeve. The Contractor shall execute all operations necessary for this installation.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



BSC 8.2 The concrete pipe sleeve shall be installed by jacking in accordance with the specifications of SABS 1200 LG. The Contractor will be allowed to use the services of a specialised pipe jacking sub-contractor, to be approved by the Engineer.

BSC 8.3 Pipes for jacking shall be reinforced concrete pipes SC type, class 100D manufactured to SABS 677 (latest edition). The sleeve formed of these pipes shall span across the entire road servitude. The pipes shall be laid at levels indicated on the drawings.

BSC 8.4 The steel pipe joints shall be welded on site and the completed pipe pulled through the sleeve, using appropriate guides approved by the Engineer. All precaution for not damaging the coatings shall be taken.

BSC 8.5 After securing the steel pipe in position the annulus between the pipe and the sleeve shall be grouted. The grout shall be a sand/cement (CEM II 42.5) mix with a minimum of 375 kg/m³ cement content.

BSC 9. CHANGE OF DIRECTION

BSC 9.1 Every change of direction shall be made by a set comprising a single segmental cut or a bend. A set with a deflection angle up to and including 2 degrees may be made by mitring the pipe ends at the nearest joint. Above 2 degrees deflection angle the change of direction shall be made at the chainage depicted on the section drawing. Fabrication of a set or a bend may be carried out at a workshop and delivered to the route of the pipeline for subsequent installation or fabrication may be carried out on site.

BSC 9.2 In the case of site fabrication, sets shall be made by cutting and welding the pipe while the bends shall be fabricated using steel pipe supplied for the pipeline.

BSC 9.3 In every case fabrication, testing and coating shall be carried out in accordance with BSC6 and BSC7 of the Specification and the standard of acceptance and procedure for repair shall be those stated therein.

BSC 9.4 No payment will be made for accommodating deflections up to and including 2 degrees. Items have been included in the Price Schedules for providing and installing sets and bends with deflections exceeding 2 degrees. The price for a set shall include for all cutting, preparing the cut ends, supplying both wrapper plates and welding. Where a set occurs at a joint between pipes, the cost of jointing shall be taken to be included in the item covering the set. The price shall include for the supply, cutting, preparing and welding at all segmental cuts and installing the bend. Separate items have been included in the Price Schedule for making good the coatings at sets and at all segmental cuts on bends.

BSC 10. SUPPLY OF VALVES

BSC 10.1 The valves shall be manufactured strictly in accordance with the relevant document referred to under B11.1. The aforementioned document shall be obtained by the Contractor from the Johannesburg Water or from the Engineer.

BSC 10.2 The valves shall be supplied complete with bolts, nuts and washers needed to install them in the pipeline. Compressed Asbestos Fibre (CAF) insertion gaskets approved by the Engineer shall be supplied by the Contractor.

BSC 10.3 The valves shall be flanged and shall comply with Johannesburg Water flange requirements detailed on Drawings.

BSC 10.4 All complete valves shall be subjected to the following open-end tests:

(c) at pressures of 1.5 times the Working Pressure for material strength and soundness.

(d) at pressures of 1.0 times the Working Pressure for drop tightness.

BSC 10.5 The Contractor shall submit general arrangement drawings showing the leading dimensions and a sectional drawing to illustrate components and materials of construction. In addition, the successful Contractor shall submit detailed working drawings of each valve type for the Engineer's approval prior to placing orders. In addition the Contractor shall submit a quality

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



control plan to indicate holding points and shall provide full access for inspection by the Engineer.

BSC 11. INSTALLATION OF VALVES

BSC 11.1 Each valve shall be installed in the pipeline in accordance with the details on the Drawings.

BSC 11.2 Isolating valves :

All gate valves shall be flanged isolation valves to SABS 664, Class 40 or class 16 as specified, anti-clockwise closing. All valves 400 mm and bigger are to be supplied with an approved open gear box assembly as follows:

BSC 11.2.1 For the 200, 300 mm, 400 mm, 500mm and 900 mm Valves:

Wedge type gate valves, Pressure Rating as specified in the BoQ. Multi-Stage Spur gearing with 6:1 minimum ratio, having operating spindles on the input spindle and at a stage where the valve can be stroked without exceeding the maximum input torque of 275Nm if no differential pressure is applied to the valve. The 900 mm valve to be supplied with a 100 mm bypass valve.

BSC 11.2.2 For the 50mm and 100 mm Valves:

Resilient seal gate valve PN 40. Valves must be provided with gland seals that consist of at least two O-rings and dirt intrusion into seals and bearings must be suitably prevented..

The gears shall be robust and machine cut and their mounting shall be of substantial design.

Each pinion gear spindle shall be supported between two bearings or alternatively one bearing of sufficient depth to prevent misalignment of the opinion gear and spindle. The bearings shall be fitted with bronze bushes and shall be provided with grease nipple lubricating points and shall be lubricated prior to delivery. All points to be lubricated shall be fitted with 1/8 inch BSP straight nipples for grease-gun lubrication. Adequate lubrication shall be provided for all gear and indicator bushes.

All valves shall open by anti-clockwise rotation of the main spindle and gearboxes shall be fitted with an intermediate idler where necessary.

In the case of Type A and Type B gearing a shear pin or other safety device shall be incorporated between the high and low gears to prevent damage to the valve if excessive force is applied. Two spare pins shall be attached to each valve.

Shear pins shall be easily replaced in the field. Hard-driven pins will not be accepted as shear pins.

BSC 11.3 Air valves:

Air valves must be double acting air valves of compact single chamber design with both small and large air release orifices inside the chamber. The valve must also act as a vacuum breaker, with intake capacities of 60 % of discharge rates given.

The unit measurement for valves shall be number of each described assembly

The rate shall include supply installation and testing including for all corrosion protection, bolts, gaskets, and any other contingency work.

BSC 11.4 Water Meters:

Both 500 mm flow meters are to be electromagnetic flow meters, to be supplied, delivered, installed and commissioned.

The meter will consist of a primary head, which is to be installed in a water pipeline and a remote wall-mounted signal converter.

The principle of operation is in accordance with Faraday's Law of Induction, whereby field coils in the primary head are energized through a pulsed direct current from the signal converter.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



The flow meter shall be of the electromagnetic type, utilising pulsed DC excitation and shall be microprocessor based. It shall be capable of measuring flow rate and flow total in both directions, with two independent totalisers to give flow for network management purposes.

There shall be separate isolated analogue (4 to 20 mA) and pulse outputs (volts free) for forward and reverse flow. These outputs shall be fully user configurable.

The accuracy shall be better than 0,15% of the reading or +/- 1 mm/s whichever is the greater, in both forward and reverse directions. The working flow range shall be 10 mm/s to 15 m/s (i.e. 1500:1).

The repeatability shall be 0,05% of the reading or better. This performance is required for water management and/or billing purposes.

The meter shall offer lifetime stable zero so that routine zeroing is not required. The meter shall automatically indicate zero flow under empty pipe sensor conditions.

The meter performance shall have been verified on a test facility that is internationally acceptable (such as NAMAS, NIST, or equivalent), such that fully traceability is assured. Laboratory traceability packs shall be available on request.

It shall be possible to verify the calibration of the complete flow system (sensor and transmitter) in-situ, without removal of, or access to the sensor. A calibration certificate shall be provided. Condition monitoring of the sensor, transmitter and interconnection cable shall be available to provide verification of long-term satisfaction field system operation. This shall be traceable and shall conform to ISO 9000 series quality standards.

The meter shall be designed and manufactured under the ISO 9000 series quality standards. The meter shall have lay lengths to current ISO standards for magnetic meters to facilitate interchangeableness of products.

The wetted materials shall be compatible with, and suitable for, the appropriate application. An internationally recognized body such as WRC, AWWA, or equal shall certify the liner. Acceptable electrodes are stainless steel, Hastelloy C, Tantalum, or Titanium.

The power supply shall be 85 - 265 v AC, 40 - 400 Hz for mains powered devices, or 24 v for DC powered devices without the need for link setting or voltage selection to allow for dips and surges without disruption.

The impedance shall be 10 to the power 15 ohms or greater so that electrode fouling does not affect signal integrity.

The meter shall be furnished with built-in grounding electrodes of the same material as the sense electrodes.

The flow sensor shall be rated IP68, and be suitable for indefinite submergence to a depth of 10 m.

Multiple diagnostic and self-monitoring functions such as empty pipe detection, low/high flow, reverse flow, flow over-range, etc. shall be standard features. Integral and dual output alarms shall be provided. Serial communication shall be provided as standard. It shall be possible to pre-commission the system using a configurator and verify all display and outputs.

Dual or triple line alphanumeric backlit display shall indicate user defined flow rate and flow total units and all menu selection shall be possible from outside the electronic housing.

Data shall be stored in non-volatile memory with a retention capacity of 10 years.

The meter software shall incorporate dual password features, to prevent inadvertent or fraudulent program or unit changes.

The electronic housing may be integral or remote and may be safety certified to FM, CENELEC, CSA.SAA, or Gost standards for international usage without the need for air purging. It shall be NEMA 4X/IP65 or better with separate electronics and termination areas

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



for enhanced protection. The system shall conform to EMC Directive 89/336/EEC to 10 V/m, for electromagnetic radiation susceptibility standards.

The tube must be lined with an approved potable water liner - neoprene or hard rubber, which will stand up to the duty and conditions specified. Vacuum conditions must be considered.

All end connections shall be flanged, drilled to SABS 1123, as specified.

A set of earth rings and copper connecting wire must be supplied with each primary head.

Electrical protection must be class IP68.

The signal converter must be of the wall-mounted type.

It must be possible to use a signal converter with any other primary head of the same make, with reasonable accuracy.

The maximum cable run between a signal converter and its primary head will be 50 m.

Power supply will be 24 V direct current with battery backup.

Easily accessible, numbered, screwed – clamp terminal blocks must be provided in the terminal boxes.

Prices for additional cable must be quoted in the Bill of Quantities.

The signal cable must have double shielding and consist of 1,5 mm² stranded drain wire, 2 x 0,5 mm² stranded insulated wire leads, first-metal foil shield, insulation, 0,5 mm² stranded drain wire, second-metal foil shield and outer sheath.

Battery powered units must have provision for intermittent energizing of the sensor field winding and a minimum battery life of two (2) years.

Output signals shall be suitable for data loggers.

The meters must be connected to the Johannesburg Water Telemetry system via the PRV Building. For this purpose, 76m of power cable must be supplied, as well as 76 m of data cable.

The unit must be free from interference voltages. The Contractor must submit details of the protection that will be provided against stray currents, ground currents and lightning. (SABS 1529- 9)

Analogue and frequency outputs must include the following features:

- Selectable as 0-20 mA or 4-20 mA
- Adjustable to 22 mA maximum
- Current output connections to suit the above
- Current output galvanically isolated
- Flow indication in either direction
- Automatic range change and selectability
- Low flow cut-off on analogue outputs
- Adjustable damping outputs
- 24 V(5 V selectable) for electronic counter (1 Ohm resistance) on frequency outputs.
- 24 V output for Electro-mechanical counter with selectable pulse width.

Frequency shall be adjustable, so that 10 to 36 x 10⁶ pulse/hour can be made to coincide with the selected maximum flow range.

Display to be through LCDs and must indicate totalised flow and instantaneous flow rate in selectable unit.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



Totalised flow (forward and reverse) and flow rate can either appear simultaneously or flash alternatively.

Selectable status indication must be provided for:

- Errors
- Range change
- Flow direction
- Analogue and frequency output exceeded

A zero check facility must be provided.

Meters are to be installed with comprehensive flange insulation kits.

BSC 11.5

Pressure reducing valves:

The pressure will be reduced in two steps. During the first step (or upstream PRVs) pressure will be reduced from 130 m to 65 m. The second step (or downstream PRVs) will reduce the pressure from 65 m to 25 m. Upstream PRVs will be rated PN 40 and downstream PRVs will be rated PN 16. Upstream PRVs will be of the proportional type and downstream PRVs will be of the modulated type. Upstream PRVs will be flanged to SABS 1123 table 4 000 / 3 and downstream PRVs will be flanged to SABS 1123 table 1 600 / 3. Upstream PRVs are also to be fitted with pressure transducers to be connected to Johannesburg Water telemetry. An additional 100 m of power cable and 100 m of data cable must be supplied for this purpose. The pilot stems shall be guided by a Delrin busing in the spring casing above the diaphragm and totally removed from the flow of water in the main pilot chamber. The pilots shall be self-cleaning and self-flushing by locating the outlet in the bottom of the pilot ninety degrees to the inlet.

Valves shall be hydraulically operated globe valves. The inner valve assembly shall be top and bottom guided by means of bearing bushings. The inner valve assembly shall be the only moving part and shall be securely mounted on an AISI 316 Stainless Steel stem. Lower grades of Stainless Steel shall not be acceptable. The Stainless Steel stem shall be provided with wrench flats for ease of assembly and maintenance. Wrench flats will be fully accessible when inner valve is assembled. All pressure containing components shall be constructed of ASTM A536-65 / 45 / 12 ductile iron.

Valves shall be provided with smooth frictionless motion and maximum low flow stability with actuation being achieved by the use of Rolling Diaphragm technology.

Valves shall have a protective fusion bonded epoxy coating internally and externally to a minimum of 250 microns. The protective fusion bonded epoxy coating shall conform to the ANSI / AWWA C116 / A21.16 (current version) specification. No machining of any external parts after final coating will be acceptable to ensure a continuous coating surface throughout the entire valve.

The valve cover shall have a separate stem cap giving access to the stem for alignment check, spring installation and ease of assembly.

Valve bonnets shall be accurately located to bodies utilizing locating pins. Locating pins shall eliminate corrosion resulting from the use of uncoated ductile iron to ductile iron surfaces. Valves with lipped spigot covers shall not be acceptable due to risk of rust and difficulty in assembly.

Valves shall have the AISI 316 Stainless Steel seat and shall incorporate a two-piece seat and bottom guide design.

The valves shall form a drip-tight seal between the stationary stainless steel seat ring and the resilient disc, which has a rectangular cross-section and is retained by clamping on three and one half sides. The resilient disc shall be constructed of EPDM for normal service conditions.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



All external fasteners shall be AISI 18-8 Stainless Steel with AISI 18-8 Stainless Steel washers. Mild steel studs or bolts will not be acceptable.

All repairs and maintenance shall be possible without removing the valve from the line. To facilitate easy removal and replacement of the inner valve assembly and to reduce unnecessary wear on the guide, the stem shall be vertical when the valve is mounted in a horizontal line.

Each valve shall be air tested prior to shipment. The standard test shall include leakage test, seat leakage test, and stroke test.

The valves shall be covered by a minimum three year (3) warranty against defects in materials and workmanship. The stainless steel seat shall be covered by a lifetime replacement warranty.

The auxiliary control system shall be fitted with a large filter assembly, to prevent fouling of the control system. This filter shall be fitted with a transparent drain cap, which allows maintenance personnel to inspect the strainer, without the need to shut of the system, or remove the strainer from service.

The main valve body shall be fitted with a visual position indicator, to offer the maintenance personnel visual indication of the valve position, as well as opening and closing speed controls. The strainer shall have an integral blowdown valve and discharge tube for facilitate the ease of maintenance.

BSC 11.6

Level Control valves:

The 400 mm ND and 300 mm ND Level Control Valves shall have a float control pilot and have a pressure rating of Class 16, flanges shall conform to SABS 1123 table 1 600 / 3. The valve must be able to function as a two position control valve, either fully open or fully closed. The valve must allow normal forward flow to fill the reservoir to the maximum level and then close drip-tight at the set-point. It must open to refill the tank once the level drops a fixed distance below the high water level. The pilot valve shall have an integral delayed opening feature, which allows the reservoir to drain by 0.3 m, before fully opening. This delayed opening feature ensures that the valve does not immediately open and subsequently close on a lowering reservoir top water level (TWL). The altitude pilot system shall fully exhaust to atmosphere ensuring the valve opens fully, no modulating control shall be accepted. The pilot control shall be supplied complete with an adjustment range of between 3 m and 18 m.

Valves shall be hydraulically operated globe valves. The inner valve assembly shall be top and bottom guided by means of bearing bushings. The inner valve assembly shall be the only moving part and shall be securely mounted on an AISI 316 Stainless Steel stem. Lower grades of Stainless Steel shall not be acceptable. The Stainless Steel stem shall be provided with wrench flats for ease of assembly and maintenance. Wrench flats will be fully accessible when inner valve is assembled. All pressure containing components shall be constructed of ASTM A536-65 / 45 / 12 ductile iron.

Valves shall be provided with smooth frictionless motion and maximum low flow stability with actuation being achieved by the use of Rolling Diaphragm technology.

Valves shall have a protective fusion bonded epoxy coating internally and externally to a minimum of 250 microns. The protective fusion bonded epoxy coating shall conform to the ANSI / AWWA C116 / A21.16 (current version) specification. No machining of any external parts after final coating will be acceptable to ensure a continuous coating surface throughout the entire valve.

The valve cover shall have a separate stem cap giving access to the stem for alignment check, spring installation and ease of assembly.

Valve bonnets shall be accurately located to bodies utilizing locating pins. Locating pins shall eliminate corrosion resulting from the use of uncoated ductile iron to ductile iron surfaces. Valves with lipped spigot covers shall not be acceptable due to risk of rust and difficulty in assembly.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



Valves shall have the AISI 316 Stainless Steel seat and shall incorporate a two-piece seat and bottom guide design.

The valves shall form a drip-tight seal between the stationary stainless steel seat ring and the resilient disc, which has a rectangular cross-section and is retained by clamping on three and one half sides. The resilient disc shall be constructed of EPDM for normal service conditions.

All external fasteners shall be AISI 18-8 Stainless Steel with AISI 18-8 Stainless Steel washers. Mild steel studs or bolts will not be acceptable.

All repairs and maintenance shall be possible without removing the valve from the line. To facilitate easy removal and replacement of the inner valve assembly and to reduce unnecessary wear on the guide, the stem shall be vertical when the valve is mounted in a horizontal line.

Each valve shall be air tested prior to shipment. The standard test shall include leakage test, seat leakage test, and stroke test.

The valves shall be covered by a minimum three year (3) warranty against defects in materials and workmanship. The stainless steel seat shall be covered by a lifetime replacement warranty.

The auxiliary control system shall be fitted with a large filter assembly, to prevent fouling of the control system. This filter shall be fitted with a transparent drain cap, which allows maintenance personnel to inspect the strainer, without the need to shut of the system, or remove the strainer from service.

The main valve body shall be fitted with a visual position indicator, to offer the maintenance personnel visual indication of the valve position, as well as opening and closing speed controls. The strainer shall have an integral blowdown valve and discharge tube for facilitate the ease of maintenance.

BSC 11.7 General :

BSC 11.7.1 Flanges shall be set up and installed in the pipeline with the meeting faces plumb or level according to their position in the pipeline and with the bolt holes off centres.

BSC 11.7.2 A CAF insertion gasket shall be supplied and fitted by the Contractor between each pair of joint flanges.

BSC 11.7.3 Flange bolts shall be taken up evenly all round in sequence and then shall be set using spanner approved by the Engineer. After 24 hours, the bolts shall be reset to assure that they are tight.

BSC 12. CLEANING

BSC 12.1 The interior of the pipes shall be kept free from contamination at all times.

BSC 12.2 After working hours ingress of debris shall be prevented by the fitting of approved end plates. Branches and tees shall be sealed off immediately after installation.

BSC 13. CHARGING OF PIPELINE

BSC 13.1 On completion of the pipeline, the Contractor will arrange to fill it with water for testing in accordance with BSC 15.

BSC 13.2 Pipes laid under streams and canals shall be encased in concrete. Thereafter backfilling shall be completed and the stream restored.

BSC 13.3 As each section of the pipeline is completed, domes shall be welded to the pipeline before it will be filled with water. Before the domes are removed and end connections completed the pipeline shall be tested as specified in BSC 15.

BSC 13.4 The connection of the new pipeline to the existing pipeline shall be made with special joint sections. The Contractor shall however supply all specials and valves required, and shall provide all necessary assistance with the installation. The cutting of the existing pipelines

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2				
Part	T1	T2	C1	C2	C3	C4



and the welding of the special joint sections shall be carried out by the Contractor at his cost under the supervision of the Engineer.

BSC 14. MAINTENANCE

BSC 14.1 The Contractor shall be responsible for all defects in the pipeline during the construction and maintenance periods and shall immediately make good any defects that arise.

BSC 14.2 Attention is directed to the danger of the pipeline lifting if the trench becomes waterlogged while the pipe is empty.

BSC 15. ACCEPTANCE TEST OF COMPLETED PIPELINE

BSC 15.1 On completion of the laying and associated structures for a pipeline section the Contractor shall supply and install suitable blank flanges, make the necessary preparations, provide the testing equipment and carry out watertightness and structural-strength tests of the pipeline system. The length of each section to be individually tested will be defined by the Engineer.

BSC 15.2 After filling the section to be tested, the section shall be allowed to stand for a minimum of 24 hours. The Contractor shall then place the pipeline under a test pressure corresponding to the relevant design head to be advised by the Engineer.

BSC 15.3 Water shall be fed into the system through a calibrated meter and the pressure in the system measured by a calibrated gauge. The Contractor shall provide the necessary pumping system, connection, meter gauges and labour. Each test shall continue for at least three days. Any decrease in pressure shall be made up every hour and the quantity of make up water measured. The pipeline will not be considered satisfactory until the average leakage is less than 0.1 litres/mm diameter/kilometre/24 hours/30 m head.

BSC 15.4 Any visible leak in the pipeline shall be made good by the Contractor. If any valve leaks it will be made tight by the supplier of the valve.

BSC 15.5 If the average leakage per 24 hours from each individually tested section of the pipeline is greater than that specified, the Contractor shall take immediate steps to reduce the leakage and shall at his own expense do any excavating necessary to locate and repair leaks or other defects which may develop under test, including removal of backfill already placed; shall make all repairs necessary to secure the necessary water tightness; shall replace such excavated materials, after which the test shall be repeated until the pipe under test is found satisfactory.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



SECTION X: SOLVENT FREE LIQUID EPOXY INTERNAL LINING ON STEEL PIPELINES

Solvent Free Liquid Epoxy Internal Lining on Steel Pipelines

SCOPE

This specification covers the material and manufacturing requirements for electric welded low carbon steel pipes in sizes 100mm to 1 000mm nominal diameter to be buried in soil and to be used for the conveyance of potable water. The requirements of SANS 1217 "Guidelines for internal and external organic coating protection for buried pipelines" shall apply to all coating and lining activities. Where there is conflict between and documents or standards, the Corrosion Engineer or his nominated representative must be consulted and the findings reduced to writing. All discrepancies / amendments should be raised in the pre-conference meeting and resolved before the commencement of the project. Where fruitless inspections or calls occur and costs are incurred, these costs will be back charged to the Contractor and or the material supplier should the product supplier be at fault.

Advance notice of a minimum of 24 hours shall be given by the Contractor to the appointed inspectorate body when requesting inspection of any portion of the goods for acceptance, and a minimum of 3 working days before the commencement of the contract.

The Contractor's quality control records shall be available for inspection at all times. Certified copies of these records shall be made available on request.

Notwithstanding any observation carried out by the Corrosion Engineer or his appointed representative, the Contractor shall retain full responsibility for the quality of the goods supplied under the contract.

All pipes shall be inspected on delivery to the nominated site/s and all defects shall be made good by the Contractor at his expense.

MEASUREMENT AND PAYMENT

No payment shall be made until satisfactory test certificates have been provided. Such certificates shall be posted under separate cover and not dispatched with the deliveries of pipes.

APPROVED INTERNAL LINING SYSTEMS

Specification Details for Internal Lining

The epoxy lining shall be a solvent free liquid epoxy, like TIB, 32-99, or a similar approved liquid epoxy lining. The approved supplier shall be S.A.N.S.9001 certified. **See document requirements for acceptance and approval, inspection control and sampling regimen.*

The brand type or grade, and the supplier of the solvent free liquid epoxy to be used shall be approved in writing by the Corrosion Engineer. To obtain approval, the supplier shall:

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Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



- i) Provide independent test results in writing that demonstrate that the proposed lining material is capable of meeting the requirements specified in Table PLS1.1
- ii) Provide an Infrared Scan fingerprint for the material to be retained as a standard for comparison for all subsequent batches supplied to the Corrosion Engineer or his nominated representative. All random testing taken by the appointed agent / engineer and sent to a third party for testing and verification will be done for the account of the coating and lining supplier, these tests will be done at the discretion of the appointed party. It is recommended that the batches are controlled to a minimum, as the sample take may be required on each different batch.

Approval of Batches

To maintain their approved status must comply with the original specification sheet supplied at the onset of the tender.

Each batch of epoxy paint to be used by the applicator shall be approved by the Corrosion Engineer or his nominated representative before use. No change in formulation of the liquid epoxy is permitted without prior approval. Such approval shall not exonerate the contractor from the due performance of the paint systems in terms of this specification.

The manufacturer shall supply Quality Control Certificates and Infrared Scan fingerprints for each batch of material supplied. The Quality Control Certificate shall include results of tests carried out in accordance with the manufacturer's approved procedures the material will not deviate from the original specification submitted under the "specification commissioner of oath" the number of paint batches shall be kept to a minimum so as to avoid excessive costs being incurred with the Quality Control testing required prior to application of the products.

Pipes lined with epoxy paint products that have not been approved will be rejected.

Preparation and Cleaning of Pipe

- i) Degreasing
- ii) Pipes shall be degreased internally (and externally) by the use of an approved water rinse-able solvent degreaser or by passing the pipes over gas burners to carbonise contaminants.
 - a) The degreaser can be of an acidic base or alkaline base, with the pH being at least 4 points from neutral. The product to be used must be submitted for acceptance prior to use on the project.
 - b) Abrasives used for blast cleaning shall be free from oil or grease, as shall be the compressed air used in air blast cleaning. Under no circumstances will the abrasive material be acceptable for use if it has been used to blast line pipe, specials, internal or external without the steel surfaces prior to this project when the wash / degrease / oil removal process has been missed out.
 - c) Shot blast media must not have been used on cleaning of old line pipe, which has been in operation within a chemical plant, or previously buried underground. In such cases the blast material must be removed and clean un-contaminated blast material replaced and used.

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Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



- d) Process: (i) grind and remove all spikes, obtrusions and high spots and welding splatter. (ii) wash and degrease ; (iii) check for further high spots which will require grinding; (iv) shot blast to SA3 white metal, 75 micron / 100 micron profile.

iii) Blast Cleaning

The interior surface of the pipe shall be blast cleaned by centrifugal or air blast cleaning methods, then vacuum cleaned or blown off to achieve the following standards:

- Cleanliness shall be equal to Sa3 of ISO8501-1 when tested in accordance with S.A.N.S.
- The profile produced by blast cleaning shall be angular and shall have an average peak to valley height of 50 to 100 micrometers (or as recommended by the approved supplier), when tested in accordance with either S.A.N.S. 5772 or Testex Replica Tape. Spikes shall be removed with coarse abrasive paper.
- Residual dust and debris shall not exceed 0,2% when tested in accordance with S.A.N.S. 5769.
- Water soluble salts shall not exceed 100mg/ m² at any point when tested with the Weber-Reilly Reagent.
- Any laminations revealed by blast cleaning shall be ground out and re-blasted / cleaned to meet the requirements given in (a) to (d) above. If grinding penetrates the steel to a depth greater than 8% of the nominal wall thickness, the pipe shall be rejected.

iv) Handling of Cleaned Pipe

After cleaning, the pipe surface shall not be contaminated in any way. Operators shall wear clean gloves and all surfaces in contact with the pipe surface shall be clean and free from oil, grease, grit, dirt and other contamination.

v) Cut Back of Lining

The blast cleaned surface shall be stopped off or cut back by suitable masking which shall not contaminate the cleaned surface, to 100mm from both ends of the pipe.

- vi) Protection of Uncoated Pipe Ends must be coated with a holding coat, such as an epoxy weld able material. The coating thickness will be a maximum of 25 micron, weathering / exposure time of 3-4 months.
- Option B: Pipe ends left uncoated due to cut back of the solvent free liquid epoxy lining shall be painted with an approved weld able epoxy primer like ea9 to a dry film thickness of 15 to 25 microns. This Lining shall overlap the approved weld able primer by 20mm.

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Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Application of Linings

- i) Method of Application General.
- ii) Use of a 2 part plural spray unit capable of applying **100% solid epoxy lining** material.
 - a) The two components shall be thoroughly and completely mixed in the proportions specified by the manufacturer.
 - b) Application shall be by dual feed hot airless equipment or by single component airless equipment recommended and in consultation by the material manufacturer.
 - c) The lining shall be applied in a uniform manner and, when cured, shall comply with all the appropriate requirements of the specifications.
 - d) The specified thickness shall be achieved in one application for solvent free epoxies. In the event of the thickness being less than the minimum specified, the lining shall be removed and the pipe length shall be re-blasted and relined to comply with the specification.
 - e) Thickness minimum 500 micron, **Target 600 microns**, maximum 800 microns.
 - f) The surface is required to be smooth and without patches or repairs. No runs, sagging/wrinkling allowed of solvent borne or 100% solid material.
 - g) The specified thickness must be achieved in multi-coat applications for **solvent borne epoxies**. When more than one coat is applied, the time interval between coats shall be not less than the minimum nor greater than the maximum specified by the manufacturer and appropriate to the pipe surface temperature.
 - h) **100% Solid** materials must be applied in one single application.
 - i) Applicators are recommended to measure wet film thickness at the time of application to avoid rejection or recoating when the dry film thickness is outside the specified limits of the specification.
 - j) The solvent based material should be applied with two different colours, this allows for a procedure of the multi-layer coating. Correct hold points and thickness testing will apply.
 - k) Thickness of Lining - 100% Solid material will have a minimum of 500 microns, **target lining 600 microns** as the designated coating finished DFT. A maximum of 800 microns will be allowed for the total system. Note the manufacturer's specifications must always be cross referenced to ensure the total system is achievable whilst remaining within the listed tolerances for the system.
- iii) Cut Back of Lining

The lining shall be cut back as specified .The lining will have a minimum cut back to the factory coating / lining of 100mm and a maximum of 120mm. (Default is 100mm cut back.)

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Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



iv) Repairs

- Repairs of holiday test defects may be carried out provided that the number of repairs necessary does not exceed 4 per 12 metre length of pipe.
- A cluster of pinholes within a radius of 25mm shall be regarded as one defect. This will constitute a hold point for in-depth inspection.
- Any pipe needing repairs in excess of the number given above or where the lining shows any sign of flaking or loss of adhesion shall not be repaired. The lining shall be removed and the pipe length shall be re-blasted, cleaned and recoated to comply with the requirements of the specification.

v) Method of Repair

When repairs are permissible, the following method shall be used.

- Abrade an area at least 25mm diameter around and beyond the defective area. The abrasive paper shall not be coarser than 220 mesh but preferably 400 mesh. It shall preferably be used wet to avoid excessive removal of coating. The repair area shall be abraded to a matt finish, free from deep scratches and excessive removal of coating. After abrasion, the area shall be wiped clean with M.E.K. or other suitable clean solvent and allowed to dry.
- Repair material shall be solvent free epoxy repair material from the supplier of the line pipe. The colour may differ from the colour of the epoxy lining. It shall be thoroughly mixed in the correct proportions as recommended by the supplier. The materials shall be sufficiently thixotropic that 600 microns dry film thickness can be achieved in one application without sagging. If this requirement is not achieved, the material shall be rejected.
- Repair material shall be mixed in the proportions supplied by the manufacturer. No splitting of packs shall be permitted unless the material is supplied in self-metering packs. The mixed repair material shall be applied to the clean, dry, abraded repair area so as to cover the defect and extend to within 1mm or 2mm of the edge of the abraded area. A "halo" of abraded area shall be visible around the repair material.
- After curing, the repair and at least 250mm surrounding area shall be tested by holiday test method. The resultant will be that there will be no defects.

Performance Criteria

The applied solvent free lining shall comply with all the requirements given in **TABLE PLS1.1**

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Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Frequency of Testing

Tests 1 to 3 of TABLE PLS1.1 shall be applied to each and every pipe.

Tests 4, 5(a) and 6 shall be applied to at least one pipe selected at random from the first day's production or from each batch of liquid epoxy whichever is more frequent.

Tests 5(b) shall be applied to at least one pipe or sample panel from each lining application run.

TABLE PLS1.1: REQUIREMENTS OF CURED SOLVENT FREE EPOXY LINING

PROPERTY	REQUIREMENT	TEST METHOD
1. Visual	Smooth glossy or semi glossy finish, free from excessive runs, sags, orange peel, occlusions or other visible defects	Use an experienced observer. NO runs to be visible on the coating .
2. Coating Thickness	Min. 500 Target 600 microns. Maximum 800 microns. Thickness readings outside this range will be assessed in terms of S.A.N.S. 1217 using a $\pm 20\%$ criteria.	S.A.N.S. Method 141. Take a minimum of 2 readings per m ² of surface up to 300mm nominal dia. , or 1 reading per m ² over 300mm.
3. Electrical Insulation Defects	Lining: Nil defects at 90 Volts, 2 MegaOhm	S.A.N.S. 1217 Section 8.12.1
4. Impact Resistance	No defect at 1 Joule	S.A.N.S. 1217 Section 8.7 but modified as given in Note 1 below
5. Degree of Cure: a) Static Test b) Dynamic Test	No softening or discolouration when fully cured No softening or discolouration when fully cured	S.A.N.S 1217 Section 8.9. Cure time shall be in accordance with the manufacturer's data. 50 double rub with cotton wool swab soaked in MEK. Cure time shall be in accordance with the manufacturer's data. See Note 2 below.
6. Adhesion (Hot water soak)	Dis-bonded length not to exceed 15mm from point of V-cut	Immerse in water at 75°C for 48 hr. Remove and make V-cut at 30 degree angle. Test adhesion when cooled to 25°C. See Note 3 below.

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Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Application Procedures

Two-Component Solvent-Free Epoxy Coating

Surface Preparation

Steel surfaces should be abrasive blasted to NACE No. 2/SSPCSP10, ISO 8501:1, Grade SA3. The blast profile is generally specified by the client; a typical profile is 75-100 microns. Where blast cleaning cannot be carried out, the surface should be mechanically scraped to remove all loose scale and produce a surface which is clean, dry and free from rust or dust.

Concrete Surfaces

Concrete surfaces should be lightly abrasive blasted or mechanically scarified, taking care not to expose the aggregate.

Application

Do not apply Solvent-Free Epoxy Coating when the relative humidity exceeds 90% or when the surface to be coated is less than 3°C above the dew point. The minimum temperature for application is 5°C.

The intended for application is by plural feed airless spray. Application temp should be attained by heating the Base and Activator components.

Storage

Use within 5 years of purchase or as Manufacture's specifications. Store in original sealed containers at temperatures between 5°C and 30°C. Manufacturing date to be not older than 60/80 days from manufacturing date.

Potable Water Specification (Typical properties and values)

Data Sheet and Application Guide for potable water, carrying NSF, WRAS, AFNOR, ANSI / NSF61 FACTORY CERTIFICATION.		Properties	Value
Product Description		Colour	Grey or Water Industry Blue
Solvent-Free Epoxy Coating specifically developed as a solvent-free lining for the internals of pipes, tanks, vessels and other equipment in contact with potable water.		Ratio	2:1 By volume 2:1 By weight
		Drying & Cure times at 20°C (68°F)	
Product Features		Touch Dry	4 hours
		Hard Dry	6 hours
		Full Cure	7 days
The epoxy must combine good application characteristics with excellent corrosion protection and chemical resistance. Designed for application in a single high build coat		Volume Solids	100%

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Witness:		Witness:	

Volume	1	2	3	
Part	T1	T2	C1	C2



by plural feed hot airless spray. International approvals for contact with potable water are required. Must be suitable for both steel and concrete surfaces. • Adhesion-Excellent to both blast cleaned and mechanically scraped surfaces. • Corrosion Resistance-Excellent even under aggressive immersion conditions. • Temperature Resistance-Suitable for use up to 80°C in immersion service conditions and up to 120°C in dry service conditions. General Application Steps 1. Remove oil, grease and loosely adhering deposits. 2. Abrasive blast clean steel surfaces to NACE No. 2/SSPC SP10 ISO 8501:1, Grade SA3 blast cleaning to white metal. 3. Apply linings at the specified thickness. 4. Allow to cure. 5. Visually or electrically inspect the coating for defects. 6. Repair all defects.	Shelf Life	Use within 5 years of purchase. Store in original sealed containers at temperatures between 5°C (40°F) and 30°C (86°F).
	Specific Gravity	1.48
	(Average Mixed) V.O.C.	Nil
	Film Thickness (Typical)	Wet/Dry: 600 microns.
		Note: The actual thickness to be applied should be agreed between the specifier and the manufacturer dependant on operational performance criteria and may be higher or lower than the quoted typical value. NOTE: For NSF certified applications the maximum approved thickness is 1mm (40mil)
	Theoretical Coverage Rate	2 sq meters per litre at 500 microns dft.
	Potable Water Approvals	
	UK	Regulations 31(4)a, WRAS
	France	AFNOR XP P 41-256
	USA	ANSI/NSF 61
	Canada	BNQ
	Australia	AS/NZS 4020
	Spain	OTEC
	Italy	ARPAL

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Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



NOTE 1

Impact resistance shall be carried out on a sample of production pipe firmly clamped and chocked (to be rebound free) to a rigid base. No electrical insulation defects shall be detected at the point of impact when tested at 1 Joule.

NOTE 2

The Degree of Cure-Dynamic Test is required to confirm that the lining applied to the pipe has the correct ration of base to curing agent as determined by the settings on the twin feed airless spraying equipment. An >off-ratio mix produces a defective lining. To enable this test to be carried out timeously, sample panels with a maximum coating thickness of 250 micron may be force cured at 60°C for 4 hours, allowed to cool to ambient temperature, and then tested.

NOTE 3

Tests to be carried out **on a coupon cut from the pipe** with the same lining application run as the pipe. Additional tests may be required at the discretion of the engineer.

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Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



SECTION C: CONSTRUCTION OF VALVE CHAMBERS, STRUCTURES, ETC.

CSC 1. GENERAL REQUIREMENTS

- CSC 1.1 Under this Section of the contract the Contractor shall construct brick and reinforced concrete structures to house the isolating valves, scour valves and air valves, concrete thrust anchor blocks, and pipe support plinths along the whole of the pipeline, brick up the ends of reinforced concrete sleeves/culverts and miscellaneous general building work reinstating structures damaged during the construction of the pipeline all in accordance with the Schedule of Quantities.
- CSC 1.2 The Contractor shall prevent the entry of water from any source into the excavation within which he is constructing a valve chamber or structure and keep the excavation free from water until the valve chamber and/or structure has been completed and accepted by the Engineer.

CSC 2. MATERIAL REQUIREMENTS

- CSC 2.1 Cement shall be Ordinary Port Cement (CEM II 42.5) complying with SABS "ENV 197-1".
- CSC 2.2 Cement shall be delivered to the site in a dry condition undamaged by exposure to the weather and shall be stored on the site in weather-proof conditions.
- CSC 2.3 Sand for concrete shall be clean, sharp river sand in accordance with SABS 1083 (latest edition). It shall be free from clay, loam, lime, mica or other deleterious minerals, vegetable or organic matter and shall be approved by the Engineer before use.
- CSC 2.4 Stone for concrete shall be clean, non-friable quartzite or dolomite, free from dust, excessive flat or elongated particles, dirt, clay or other impurities.
- CSC 2.5 Water for concrete and mortar shall be free from injurious amounts of dissolved mineral salts, organic matter or other substances which may impair the strength or durability of concrete or mortar.
- CSC 2.6 Bricks for the chambers shall be hard burnt engineering grade facing bricks e g "Maize Satin" ex Corobrik and shall conform in all respects with SABS 227 - 1986.
- CSC 2.7 The Contractor shall furnish the Engineer with a sample of the bricks to be used on this contract for approval, and once approved no brick not corresponding with the sample shall be used, unless otherwise permitted.

CSC 3. CONCRETE MIX PROPORTIONS

- CSC 3.1 Concrete cast shall be to the following strengths:

Class	Position
1 (minimum 28 day works cube compressive strength - 15 MPa)	Site concrete Saddles Thrust/anchor blocks Pipe surround
2 (minimum 28 day works cube compressive strength - 25 MPa)	Reinforced sections and other structural sections

- CSC 3.2 Prior to commencement of the construction of the valve chambers and structures, the Contractor shall lodge with the Engineer a mix design for both Class 1 and Class 2 concrete. These designs shall be verified by casting 6, 150 mm concrete cubes for each mix design. 3 cubes of each mix shall be crushed after seven days and the other 3 after 28 days. The seven day compressive strength shall not be less than 60 per cent of the required 28 day strengths.
- CSC 3.3 During the course of the contract 6 cubes shall be made by the Contractor for each concrete pour, 3 of which shall be crushed after seven days and the other 3 after 28 days. No work

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



containing concrete with a compressive strength less than the required 28 day compressive strength, shall be accepted by the Engineer.

CSC 3.4 The transportation, curing and crushing of the concrete cubes shall be carried out by an approved laboratory appointed by the Contractor at his own expense. Accurate records of these results shall be submitted to the Engineer as soon as they are available.

CSC 4. MORTAR

CSC 4.1 No mortar other than cement mortar shall be used unless particularly specified or allowed by the Engineer.

CSC 4.2 Mortar for brickwork shall be composed of four parts by volume of dry sand to one part of volume of cement. The sand for mortar shall comply in all respects with SABS 1090 Latest edition.

CSC 4.3 Ingredients shall be mixed dry on a non-absorbent close-jointed timber or sheet-iron covered platform until the mixture is of uniform colour. Clean water is then to be added gradually through a fine rose and the mixture turned over until the ingredients are thoroughly incorporated.

CSC 4.4 Mixing platforms shall be well cleaned and old mortar removed before any new batch is mixed.

CSC 4.5 Mortar shall be mixed in small quantities and used immediately. No mortar that has once commenced to set will be allowed to be used.

CSC 4.6 Horizontal joints shall be 10 mm nominal and the brickwork shall rise four courses to 340 mm.

CSC 5. BRICKWORK

CSC 5.1 All walls shall be carried up regularly so that no part stands more than 2 courses higher than adjoining walls.

CSC 5.2 Brickwork shall be built in a pattern comprising two stretchers and one header course. Internal faces and exposed external faces on the chambers shall be finished off smooth and fair. Joints on exposed faces shall be pointed. Brickforce shall be provided every third course between stretcher courses.

CSC 5.3 Selected bricks of uniform size shall be used for fair faces finish above ground level.

CSC 5.4 Where the pipeline passes through the brick end walls the opening shall be trimmed with a full circular arch of header bricks built with a 20-mm thick "Flexijoint" similar approved joint sealer between the pipeline and the brickwork. The bricks abutting this circular arch shall be neatly cut with a comb hammer or brick-cutter to the appropriate shape before laying.

CSC 5.5 Access into air valve chambers and culverts shall be by means of 20-mm diameter hot dipped galvanized mild steel rungs which shall be supplied and built in each fourth course of the brickwork as the work proceeds. The rungs shall be well set, and any rung showing movement shall be cut out and replaced.

CSC 5.6 Faces of bricks in contact shall be fully mortared so that vertical joints are completely filled.

CSC 5.7 Chambers shall be built up to provide a minimum clearance of 450-mm between the top of the air valve and the underside of the roof slab.

CSC 5.8 Three ventilation gaps, each 50-mm wide, shall be provided in each wall on the second course below the roof slab. The Contractor shall build into the wall at each of these gaps, at 150-mm section of Netlon expanded PVC mesh to prevent the ingress of vermin and other objectionable matter.

CSC 5.9 One layer of damp-proof sheeting shall be laid on top of the brickwork to form a parting layer under the roof slab.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



CSC 6. FLOORS, WALLS AND ROOF SLAB

- CSC 6.1 The valve chamber floor shall be founded on a 50 mm thick layer of concrete blinding (where directed by the Engineer) and may be cast without shuttering. An item for blinding is included in the price schedule.
- CSC 6.2 Where chamber foundations are found to be soft they shall be compacted before any concrete is placed. Foundations in rock shall be cleared of all loose and soft material and washed down before any concrete is placed.
- CSC 6.3 A continuous strip of 6 mm thick hardboard shall be laid around the perimeter of the joint between the removable roof panel and the roof slab.
- CSC 6.4 In no case shall any concrete be placed until the Engineer has inspected the exposed surfaces and given the order to proceed with the concreting, which shall be commenced without delay.
- CSC 6.5 Properly supported shuttering shall be erected for the walls and roof slab and particular care is to be taken that no movement of the shuttering takes place while the concrete is being placed in position.
- CSC 6.6 Shuttering shall be of good material, of uniform thickness and width and the edges shall be held in place so that no distortion can occur. Shuttering to exposed concrete work shall be fair face.
- CSC 6.7 Shuttering shall be removed carefully so as not to damage the concrete and shuttering for the roof slab shall not be stripped until 7 days after concreting has taken place. No "cement bagging" of finished concrete surfaces will be accepted.
- CSC 6.8 Reinforcing mesh for the floor and roof slabs of air valve chambers shall be Fabric Ref 500. The mesh shall be fixed on supporting stools to maintain the cover of concrete shown on the drawings.
- CSC 6.9 The Contractor shall cast in the roof slab a fabricated steel manhole frame and cover accordance with the drawings.
- CSC 6.10 Brass latches to covers, where required, will be supplied and fitted by the Contractor at his own cost.
- CSC 6.11 Concrete shall be conveyed from the mixer to the point of deposition in grout tight barrows in such a way as to avoid segregation or change in water content of any part of the batch.
- CSC 6.12 The concrete shall be thoroughly compacted using approved vibrators and all concrete shall be placed in position before any initial set has taken place.
- CSC 6.13 All concrete shall be cured in a manner approved by the Engineer for a minimum period of 7 days.
- CSC 6.14 All concrete surfaces shall be clean, hard and non-porous and entirely free from honeycombing. The surfaces of the floor and roof slabs are to be puddled until the fines rise to the surface and finished off with a straight edge followed by a wood trowel. A 25 mm chamfer is to be provided on the upper and lower edges of the roof slabs and any exposed corners and the cost thereof is to be included in the rate for the shuttering.
- CSC 6.15 Except in roadways, the roof shall have a 50 mm fall to the sides, measured from the centre-line along the length of the pipe.

CSC 7. THRUST/ANCHOR BLOCKS, PIPE SUPPORTS AND ENCASING OF PIPES

- CSC 7.1 Thrust/anchor blocks, concrete encasing of pipes and pipe supports, at bends or adjacent to isolating valve chambers shall be constructed in the position and to the dimensions to be decided by the Engineer after inspecting each bend or isolating valve chamber site.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



CSC 7.2 Excavations for thrust/anchor blocks shall be trimmed neatly and shall be cleaned of loose and soft material and rock faces shall be washed down before any concrete is placed. In no case shall any concrete be placed until the Engineer has inspected the exposed surfaces.

CSC 7.3 Shuttering shall be provided to retain the concrete, while it is hardening, between the pipe and walls of the trench excavations.

CSC 7.4 The size and shape of anchor blocks at bends will be provided by the Engineer after inspecting the site.

CSC 8. STEEL REINFORCEMENT

CSC 8.1 The reinforcing bars shall comply with the requirements of SABS 920-1985. Welded mesh fabric shall comply with the requirements of SABS 1024 - 1991.

CSC 8.2 Welded joints in tensile reinforcing bars will not be permitted.

CSC 8.3 The size, length and bending of the reinforcing bars shall be strictly in accordance with the bending schedules and drawings.

CSC 8.4 All bending shall be done cold and in accordance with SABS 82 - 1976.

CSC 8.5 All reinforcement shall be clean and free from scale, loose rust, grease and oil.

CSC 9. PLACING REINFORCEMENT

CSC 9.1 The reinforcing bars shall be placed accurately in the positions and shall have the minimum cover shown on the detailed drawings. The bars shall be wired together with 1,6-mm diameter wire at every second point of intersection and shall be fixed so as to prevent any displacement during concreting. Wire tie ends shall point away from the nearest formwork face.

CSC 9.2 The Contractor shall supply all binding wire, supporting stools and spacer blocks necessary to maintain the cover of concrete shown on the drawings and shall cover the cost of same in his price for placing the reinforcement.

CSC 9.3 All placing of reinforcement shall be done well in advance of the concrete and no concrete shall be placed until the reinforcement in position has been inspected and passed by the Engineer.

CSC 9.4 Bending aside of reinforcement to facilitate placing of concrete shall be kept to a minimum and will be permitted only at certain points approved by the Engineer; such reinforcement shall be accurately rebent to its correct shape and position before the concrete is placed round it.

CSC 9.5 Unless shown on the bending schedule, reinforcing bars shall not be cut to accommodate holes for pipes or bolts, etc. Where reinforcement interferes with a hole of pipe the bars shall be moved to position indicated by the Engineer.

CSC 9.6 Where reinforcing bars project beyond sections of concrete which are about to be cast, such projecting bars shall be firmly supported and held in position to obviate possible damage to the newly cast concrete.

CSC 9.7 Concrete spacer blocks shall be of cement sand mortar mixed in proportions by mass to be approved by the Engineer, compacted by vibration to a density equal to that of the surrounding concrete and cured as specified.

CSC 10. ACCESS RUNGS

CSC 10.1 Hot dip galvanised mild steel access rungs shall be provided in scour valve chambers and isolating valve chambers in accordance with the details on the drawings.

CSC 10.2 Galvanising shall be in accordance with the requirements of SABS 763 - 1988.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



CSC 11. PRECAST CONCRETE

CSC 11.1 Precast concrete elements shall be supplied and built into the works in accordance with Section GE of SABS 1200: Standardised Specifications for Civil Engineering Construction.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



PARTICULAR PROJECT SPECIFICATION Y: SPECIFICATION FOR RIGID POLYURETHANE COATING AND SOLVENT FREE LIQUID EPOXY LINING ON API 5L STEEL PIPE

Scope

This Specification defines the minimum technical requirements for Liquid Applied Coating and lining for factory coated pipe and specials. The external coating system shall comprise a layer of rigid polyurethane applied in a single coating operation to a thickness of 1.7mm. The internal lining system shall comprise plural component hot applied solvent free epoxy to a thickness of 600µm

The contractor's scope shall include, but not necessarily be limited to the following:-

- Pre cleaning
- Surface preparation
- Application
- Testing of applied coating

The pipeline will be buried and will be protected against external corrosion by external coating and cathodic protection systems.

The external coating shall be suitable for the operating conditions applying to this pipeline and shall have proven good resistance to cathodic disbondment and cathodic over potential. This document supplements the requirements of other project Specifications and Standards for the performance of the work.

Note: The connotation of the following words will be:

- **Shall** – denotes that the requirement is mandatory.
- **Should** – denotes that the requirement is highly recommended but not mandatory.
- **Approved or Approval** – denotes approval in writing by the Corrosion and Coating Engineer of Johannesburg Water (CCE) or his nominated representative/s.

Contractor's Responsibilities

The Contractor shall obtain the CCE's Approval for any deviation from this Specification or referenced code, standard or project document, in writing at time of tendering. Changes requested later are likely to be rejected.

In the event of any conflict between this Specification, any referenced documents and the Project Data Sheet; the Contractor shall request written clarification of the requirements from the CCE.

Only subcontractor's approved by the CCE shall be employed.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Standards and Codes

Coatings shall be applied in accordance with the requirements of this Specification and the Manufacturers' Specifications.

The order of precedence between this Specification and industry documents is:

- Project Specifications
- Project Datasheet
- Manufacturer's Specifications
- Standards and Drawings
- Industry Codes and Standards

Quality System

The coating operation shall be governed by a documented Quality System, which ensures that the requirements of this Specification are met in every respect.

The Quality System shall be based upon recognized quality standards, of which ISO 9001 is a suitable example. Quality Assurance systems to other equivalent standards may be used if approved by the CCE.

The Contractor Quality Assurance Group shall have been established, which shall be responsible for reviewing the Quality System and ensuring that it is implemented.

Application and test procedures, which comprise the Quality System and the Inspection & Test Plan, shall be submitted to the CCE for Approval.

The Quality System shall include control of material and equipment suppliers and subcontractors and shall ensure that the requirements of this Specification are satisfied by the suppliers and subcontractors operating quality systems in their own organizations. A Quality Plan and Inspection & Test Plan for the activities necessary to satisfy the requirements of the Specification shall be prepared and issued to the CCE for Approval before commencement of work.

The Quality Plan and Inspection & Test Plan shall include any sub-contracted work and the sub-contractor's Quality Plans shall be submitted to the CCE for Approval.

The Quality Plan shall be sufficiently detailed to indicate sequentially, and for each discipline, the requisite quality control, inspection, testing, and certification activities with reference to the relevant procedures and the acceptance standards.

The Quality System and associated procedures may, with due notice, be subject to formal audits by the CCE.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



The application of quality control will be monitored by the CCE's inspectors, who will witness and accept on behalf of the CCE the inspection, testing, and associated work required by the Specification. The provision of inspection services reporting directly to the CCE shall in no way relieve the Contractor of the responsibility to ensure that the full scope of work is carried out entirely in accordance with the Specification, the agreed Quality Plan and Inspection & Test Plan.

Functional Requirements

The coating shall be applied to provide corrosion protection to the pipeline and specials over the design lifetime.

Contractor shall demonstrate that the coating system will fulfil the requirements before production starts.

This shall be demonstrated by complying with the coating qualification procedures herein. Contractor shall demonstrate that the coating, as applied during normal production, fulfils the requirements by effective quality control procedures in accordance with this specification.

Preference will be given to materials that do not require post application heating to facilitate cure.

The coating shall be suitable for use with cathodic protection and at ambient temperatures.

Technical Requirements

Application shall be by an approved, qualified, and experienced specialist coating contractor. The specialist contractor shall submit a full and comprehensive documentation package demonstrating a long term track record of successful completion of identical scopes of work on projects of the same scale.

Materials

The required external coating shall be a two component liquid applied rigid polyurethane. The required internal coating shall be a two component liquid applied solvent free epoxy. A valid potable water certificate must accompany the data sheet of the material to be used. The minimum documentation to be provided is detailed at Table 2.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Coating Material Requirements

The two coating components shall have different colours allowing the verification of the correct mixing and checking of the uniformity of the colour of the mixed product.

The external coating is considered cured when it has attained the hardness recommended by the product manufacturer and has passed an adhesion test in accordance with Table 3

The coating materials shall be handled, stored, applied, and cured in accordance with the recommendation of the material manufacturers.

Contractor shall submit, with the quotation, certified test reports and data as listed in BS EN 10290, Table 1 and SANS 1217 Tables 1 and 3 as applicable. Requirements additional to those of BS EN 10290, Table 1 are detailed in Table 2 of this specification

Surface Preparation

All inspection and testing associated with surface preparation shall be based on BS EN 10290, Section 8 and, where necessary, modified as shown in Table 4 of this specification. Prior to blast cleaning, all surfaces shall be inspected and any oil or grease shall be removed by means of solvent cleaning in accordance with SSPC SP1 using water dispersible cleaners. The solvent shall leave no residue.

Surfaces that have been exposed to a marine or polluted atmosphere shall be fresh water or chemically cleaned to remove any chlorides or other salts to comply with requirements of ISO 8502-6 of less than 20 mg/m² equivalent NaCl.

At the start of each shift, after the compressor has reached operating temperature, the compressed air shall be checked for oil and water contamination in accordance with ASTM D4285

Using dry blasting techniques, the surfaces to be coated shall be abrasive blast cleaned to remove all mill scale and other impurities from the steel surface.

Blast cleaning abrasive shall be of the expendable type approved by CCE. Compressed blasting air shall be clean, dry and free from oil.

The air temperature, humidity, and pipe temperature shall be measured and recorded.

The surface of the pipe shall be blast cleaned as per ISO 8501-1 to Grade Sa 3 surface preparation quality at the time of coating.

The abrasive material shall be selected to achieve a surface profile of a minimum of 50 µm and a maximum of 100 µm, and as qualified during PQT. Hardness of the abrasive material must be Rockwell C 54 or greater.

The abrasive material shall be dry, clean, and free from contamination.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Salt contamination tests shall be regularly performed on abrasive to verify that total salt level in the soluble contaminants is less than 25ppm.

The method of measurement shall be by an electronic stylus rugosity-type device during qualification to assess profile height and profile density and correlate this with Testex replica tape.

The agreed standard of surface cleanliness and profile height and density achieved during qualification shall be set as the standard for all coating work.

Spot checks using the electronic stylus rugosity device shall be carried out during production as directed by the CCE.

Measurements shall be made with Testex replica tape in accordance with NACE RP0287.

Any loose dust or contamination from the blasting process shall be removed by use of dry clean compressed air, brush, or vacuum cleaner.

The surface of the joint area shall be checked for dust contamination in accordance with ISO 8502-3. The joint surface shall have a dust rating of ≤ 2

Visual Inspection of Cleaned Surfaces

The CCE shall have final approval on the disposition of pipes, bends, specials and fittings whether or not to release those items for coating, to return for re-cleaning, or to reject the item(s) for excessive surface defects.

Surface Defects

After blast cleaning, the items shall be thoroughly inspected for surface defects such as raised slivers, laminations, or hackles of steel visible on the surface.

The defects shall be removed in accordance with the project requirements.

Items formed from pipe with surface defects, which are considered to require extensive grinding, shall be removed from the production process for further investigation.

Extensive grinding shall not be performed without Engineer approval. Anchor pattern shall be restored on all ground surfaces.

Wall Thickness

After extensive grinding, which must be approved, the remaining wall thickness shall be measured by ultrasonic inspection and shall not be less than the specified minimum wall thickness.

Items formed from pipe with thickness less than the specified minimum wall thickness shall be rejected.

Ground areas shall merge smoothly with the surrounding pipe surface.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Elapsed Time until Coating

The total allowable elapsed time between completion of the blast cleaning operation and commencement of the coating operation shall be kept to a minimum such that the surface cleanliness is Sa 3 at the time of coating.

Delay shall not exceed the times provided in Table 1 below.

Table 1

Time-Humidity Table for Blasting – Coating delay

% RELATIVE HUMIDITY	ELAPSED TIME (HOURS)
85	0.5
80	1.0
70	1.5
60	1.75
50	2.0

Relative humidity and dew point temperature shall be determined using a sling psychrometer or digital hygrometer in the immediate vicinity of the abrasive blast cleaning equipment.

No surface preparation by abrasive blast cleaning or coating application is to be performed unless the RH < 85% and surface temperature is more than 3°C above the Dew Point.

Coating Application

All coating activities shall be performed in accordance with the approved procedures.

The surface shall be heated using an induction heating coil, radiant heaters or hot air to a temperature as recommended by the coating material manufacturer and in accordance with this specification

The use of propane torches or gas burners for pre-heating and post-heating is expressly prohibited. Infrared heaters may be used for post-heating.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



The temperature of the bare steel shall be monitored using temperature-indicating crayons. The amount of crayon used shall be the minimum amount required for accurate measurement. Crayon markings shall be removed with a wire brush.

Care shall be taken to ensure a uniform heating pattern.

Liquid Coating Application

A layer of liquid coating shall be applied to the blast cleaned surfaces using the method and equipment recommended by the product manufacturer. 100% Solid material should have a dry film thickness (DFT) of 600µm and shall be a minimum of 500µm. A maximum of 800µm will be allowed for the total system.

Note the manufacturer's specifications must always be cross referenced to ensure the total system is achievable whilst remaining within the listed tolerances for the system.

The required minimum dry film thickness in terms of SSPC PA2 is 1.7mm for the external coating.

100% Solid materials must be applied in one single application. The specified thickness shall be achieved in one application for solvent free epoxies. In the event of the thickness being less than the minimum specified, the lining shall be removed and the pipe length shall be re-blasted and relined to comply with the specification. For factory-coated pipe, bends and specials the cut back shall be 150 ±20mm. The edge of the cut-back shall be feathered at 30 – 45°.

The coating shall be uniform, free of defects and shall not show a tendency to laminate, to sag or to curtain.

If post-heating of the coating after application is required, this shall also be carried out in accordance with the product manufacturer's procedure, and as qualified during Quality Control Planning phase.

The wet film thickness shall be measured in accordance with ISO 2808.

Particular attention shall be paid to the recommended dry film thickness which shall be measured in accordance with SSPC PA 2.

No spot measurement may be less than 1.5mm for the polyurethane and 500µm for the epoxy.

No thinner shall be used unless recommended by the product manufacturer.

Tools and equipment shall be cleaned using only such solvents as are recommended by the product manufacturer.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Particular care shall be taken in the handling of the coated items before the coating has reached the minimum value of hardness recommended by the manufacturer and qualified during the rock impact test.

All pipes and other components shall be high spark holiday tested in accordance with NACE RP0274 at the test voltage recommended by the coating manufacturer.

Repairs

Repairs shall be carried out with repair grade materials of the same grade as the spray-applied, and tested in accordance with approved procedures.

Data and Quality Requirements

Table 2:

Data Requirements for System Pre-Qualification Additional to BS EN 10290, Section 3, Table 1

PROPERTY	TEST METHOD	ACCEPTANCE CRITERIA
Hardness Shore "D"	ASTM D2240	≥75
Composition	FTIR Fingerprint	
Contractor shall submit data regarding specific curing times to touch dry, dry to handle and full cure for steel temperatures of 10, 20, 30, 40 & 50°C		

(Note: The coating is equivalent to type 1 thickness class B of BS EN 10290 clause 1)

Table 3:

Requirements for Procedure Qualification Additional to BS EN 10290, Section 7, Table 4

PROPERTY	TEST METHOD	ACCEPTANCE CRITERIA
Cathodic disbondment, 66 ± 3°C, 24 hrs, 3.5V	NACE RP 0394	<6mm
Adhesion to steel after hot water soak, 70 ± 3°C, 30 days and 60 days	ISO 4624	≥7MPa
Impact resistance	ASTM G14, 23°C	3J/mm
Interface porosity	NACE RP 0394	1-2
Cross section porosity	NACE RP 0394	1-2

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Table 4:
Requirements for Quality Control Testing From BS EN 10290, Section 8, Table 5 and or this Specification

Properties
Surface condition before blast cleaning
Dimension, shape and properties of blast cleaning products and checking of the blast cleaning process
Abrasive salt levels
Roughness of the blast cleaned surface
Visual condition of the blast cleaned surface
Temperature of pre-heating, before coating, if necessary
Temperature of post-heating, after coating, if necessary
Temperature and humidity
Wet thickness of the coating system
Dry thickness of the coating system
Appearance and continuity
Holiday detection
Hardness Shore "D"
Infrared scan, check against manufacturer's data
Adhesion test - Pull off method (1)
Cut back (factory-coated items)

Note 1: Field pull-off adhesion testing shall be carried out on an offline spool or adjacent to the cut-back on production pipe, every shift.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Publications

The following publications form part of this specification. Unless otherwise specified herein, the latest edition as at the date of this specification shall apply.

ASTM–American Society for Testing and Materials

ASTM D2240	Standard Test Method for Rubber Property (Durometer Hardness)
ASTM D4541	Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM G14	Standard test method for impact resistance of pipeline coatings (Falling Weight Test)
ASTM D4285	Standard Test Method for Indicating Oil or Water in Compressed Air

BS EN–British Standard European Norm

BS EN 10290	Steel tubes and fittings for onshore and offshore pipelines – External liquid applied polyurethane and polyurethane-modified coatings

ISO–International Organization for Standardization

ISO 1514	Paints and varnishes -- Standard panels for testing
ISO 2808	Paints and varnishes – Determination of film thickness
ISO 4624	Paints and varnishes – Pull off test for adhesion
ISO 8501-1	Preparation of Steel Substrates Before Application of Paints and Related Products - Visual Assessment of Surface Cleanliness - Part 1: Rust Grades and Preparation Grades of Uncoated Steel Substrates and of Steel Substrates After Overall Removal of Previous Coatings
ISO 8502	Preparation of steel substrates before application of paints and related products - Tests for the assessment of surface cleanliness
ISO 8503	Preparation of Steel Substrates Before Application of Paints and Related Products – Surface Roughness Characteristics of Blast-Cleaned Steel Substrates Part 1: Specifications and definitions for ISO surface profile comparators for the assessment of abrasive blast-cleaned surfaces. Part 2: Method of grading of surface profile of abrasive blast-cleaned steel-comparator procedure. Part 4: Method for the calibration of ISO surface profile comparators and for the determination of surface profile - Stylus instrument procedure. Part 5: Replica tape method for the determination of surface profile.
ISO 8504-2	Preparation of Steel Substrates Before Application of Paints and Related Products - Surface Preparation Methods - Part 2: Abrasive Blast Cleaning

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4



Scope of Work

ISO 11124-1	Preparation of Steel Substrates Before Application of Paints and Related Products - Specifications for Metallic Blast Cleaning Abrasives- Part 1: General introduction and classification Part 2: Chilled iron grit Part 3: High-carbon cast-steel shot and grit Part 4: Low-carbon cast-steel shot

NACE - National Association of Corrosion Engineers

ASTM D 4285	Method for indicating Oil or Water in Compressed Air
NACE RP0274	High-Voltage Electrical Inspection of Pipeline Coatings Prior to Installation
NACE RP0287	Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using a Replica Tape
NACE SP0394	Application, Performance, and Quality Control of. Plant-Applied, Fusion-Bonded Epoxy External Pipe

SSPC–Steel Structures Painting Council

SSPC SP11	Power Tool Cleaning to Bare Metal
SSPC PA 2	Measurement of Dry Coating Thickness with Magnetic Gauges (Steel Structures Painting Manual, Ch 5 - Paint Application Specs.)
SSPC SP1	Solvent Cleaning

South African Bureau of Standards

SANS 1217	Internal and External Organic Coating Protection for Buried Steel Pipelines
SANS 241	Drinking water

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

Johannesburg Water (SOC) Ltd



VOLUME 1

PART 4: SITE INFORMATION



Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

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Linbro Water Upgrade
CIDB Grade 7CE or Higher

Site Information

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Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

Site Information

C4 SITE INFORMATION

C4.1 GENERAL

This section describes the site at the time of tender to enable the tenderer to price his tender and to decide upon his method of working and programming and risks.

C4.2 SITE LOCATION

The site is situated in Linbro Park, Johannesburg.

C4.3 ACCESS TO SITE AND RESTRICTIONS

Any permission as may become necessary shall be the responsibility of the Contractor to obtain.

Having been granted access to works areas by the Employer, other service authorities and private owners, the Contractor shall adhere to any agreed conditions of access and ensure the works area is left in a condition similar to when it was first accessed. It must be kept in mind that part of the site is located within a private business development and care must be taken not to compromise the safety / security of the workers or property of the development or those of adjacent developments / properties.

C4.4 EXISTING SERVICES, SERVITUDES AND WAYLEAVES

For detailed specification the Contractor shall refer to clauses PS1.5 (Temporary Works), PS4.5 (Existing services), and PS4.8 (Permits and wayleaves). Wayleaves obtained to date are attached at the end of Section C4 : Annexure To Specifications

C4.5 SECURITY

The Contractor shall be responsible for the security of his personnel, materials, equipment and construction plant on and around the site of the Works and for the security of his camp (if applicable). The Employer in this regard will consider no claims.

Refer to clause PS6.1 (Security)

C4.6 NATURE OF GROUND AND SUBSOIL CONDITIONS

It shall be the Contractor's responsibility to acquaint himself with the conditions of the site. A geotechnical study has been done and is attached.

Employer:		Contractor	
Witness:		Witness:	

Volume	1	2	3			
Part	T1	T2	C1	C2	C3	C4

Contract JW14301 Page (2)

Linbro Water Upgrade
CIDB Grade 7CE or Higher

Site Information

C4.7 GEOTECHNICAL REPORT AND BOREHOLE CORES

A geotechnical report is available on request. It shall be the Contractor's responsibility to acquaint himself with the conditions of the site when submitting his or her rates.

C4.8 HYDROLOGICAL REPORT AND FLOODLINES

There are no supporting documents available with regard hydrological and floodline aspects.

Employer:		Contractor	
Witness:		Witness:	



ENVIRONMENTAL MANAGEMENT PLAN

Johannesburg Water SOC Ltd



Environmental Management Plan

Prepared By:
OHSE&DM
Environmental Section
PO Box 61542
Marshalltown

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DISCLAIMER

1. Should there be any other Environmental related activities issued as non-compliance during construction, the contractor is liable to comply with those requirements
2. Should the contractor deviate from the conditions and requirements of the EMP and/or Environmental Authorisation(if applicable), the contractor is liable for non-compliances, rectification and associated fines thereof
3. This EMP does not exempt the Contractor from complying with other relevant legislations related to the construction activities.



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LIST OF ACRONYMS

Acronym Description

BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EO	Environmental Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GDARD	Gauteng Department of Agriculture and Rural Development
GN	Government Notice
I&AP	Interested and Affected Party
JW	Johannesburg Water
km	Kilometre
m	meter
MSDS	Material Safety Data Sheets
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)

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ENVIRONMENTAL MANAGEMENT PLAN

NWA	National Water Act, 1998 (Act No. 36 of 1998)
PHRAG	Provincial Heritage Resources Authority for Gauteng
RE	Resident Engineer
WUL	Water Use License
WULA	Water Use License Application
WWTW	Wastewater Treatment Works

DEFINITIONS

Environment

The surroundings in which humans exist and which comprise of:

- Land, water and atmosphere of the earth.
- Micro-organisms, plant and animal life.
- Any part or combination of a) and b) and the interrelationships among and between them.
- The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that can influence human health and well-being.

Environmental Aspect

Those components of the company's activities, products and services that is likely to interact with the environment.

Environmental Authorisation

The written statement from the relevant environmental authority in terms of the National Environmental Management Act (Act 107 of 1998), with or without conditions, that records its approval of a planned activity and the implementation thereof and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

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ENVIRONMENTAL MANAGEMENT PLAN

Environmental Impact Assessment (EIA)

The decision making process of examining the environmental impacts of a development in terms of the NEMA (107 of 1998) and the EIA Regulations (Government Notice No.R982, R983, R984, R985 and R986).

Environmental Management Programme (EMPR)

An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.

Environmental Management System (EMS)

A set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. The EMS provides a framework that helps a company achieve its environmental goals through consistent control of its operations.

Auditing

A systematic and objective assessment of an organization's activities and services conducted and documented on a periodic basis internally and externally

Environmental Objective

An overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and which is quantified where practicable.

Environmental Target

A detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.

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ENVIRONMENTAL MANAGEMENT PLAN

Floodplain

A flat expanse of land bordering a river channel, formed through sediment deposition and other alluvial processes, and often characterized by frequent flooding as a result of bank overspill from the river channel.

Groundwater

Sub-surface water in the zone in which permeable rocks, and often the overlying soil, are saturated.

Hazardous waste

Waste that are proven to be toxic, corrosive, explosive, flammable, carcinogenic, radioactive, poisonous or classified as such in legal terms.

Heritage Resource

Any place or object of cultural significance including buildings, structures, landscapes, graves and geological, archaeological and paleontological sites.

Landscape

Land modified for human use and occupation, embracing both the natural (wilderness) environment and the urban.

Management actions

Practical actions aimed at achieving management objectives and targets.

Management objectives

Desired outcome of management measures for mitigating negative impacts and enhancing the positive impacts related to project activities and aspects (i.e. risk sources).

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Monitoring

A systematic and objective observation of an organization's activities and services conducted and reported on regularly.

Natural Vegetation

All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on the site.

Pollution

Any change in the environment caused by substances, radioactive or other waves, or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

Furthermore pollution can also be regarded as an undesirable state of the natural environment being contaminated with harmful substances as a consequence of human activities.

Protected Plants

Plant species officially listed on the Protected Plants List (each province has one), and which may not be removed or transported without a permit to do so from the relevant provincial authority.

Reinstatement

Reinstatement is defined as the return of a disturbed area to a state, which approximates the state (where possible), which it was before disruption.

Riparian Habitat

The physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient

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to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

Runoff

The total water yield from a catchment including surface and subsurface flow.

Sensitive environmental features

Environmental features protected by legislation (e.g. heritage resources), or identified during the EIA as sensitive through specialists' findings and input received from Interested and Affected Parties.

Subsoil

The soil horizons between the topsoil horizon and the underlying parent rock.

Topsoil

Topsoil can be regarded as the fertile upper part or surface of the soil.

Transplanting

The removal of plant material and replanting the same plants in another designated position.

Veld

Unimproved areas of natural vegetation.

Wastewater

Means water contaminated by the project activities.

Watercourse

A geomorphological feature characterized by the presence of a stream flow channel, a floodplain and a transitional upland fringe seasonally or permanently conveying surface water.

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Waterlogged

Soil or land saturated with water long enough for anaerobic conditions to develop.

Weeds and Invader Plants

Weeds and invader plants are defined as undesirable plant growth that shall include, but not be limited to all declared category 1, 2 and 3 listed invader species as set out in the Conservation of Agricultural Resources Act (No 43 of 1983) regulations. Other vegetation deemed to be invasive should be those plant species that show the potential to occupy in number, any area within the defined construction area.

Wetland

Land where a surplus of water (i.e. waterlogging) is the key factor determining the nature of the soil development as well as the types of plants and animals living at the soil surface.

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1. BACKGROUND

The purpose of this document is to provide management measures that will ensure that potential negative impacts associated with the activity are minimized whilst positive impacts are optimised, provided that the EMP is implemented by a suitably qualified Environmental Officer (EO). The proponent developer, the main contractor and the sub- contractor are responsible for the implementation of the EMP throughout the stages. Therefore it is imperative that the EMP is circulated to site managers, contractors and Depots who will perform any work on site which has the potential to cause environmental damage. Any parties responsible for transgression of the underlying management measures outlined in this document will be held liable for non- compliances.

The following is a generic EMP to mitigate against “generally occurring impacts” associated with the construction phase of Johannesburg Water’s activities. "Generally occurring impacts" refers to potential impacts typical of Johannesburg Water’s activities, and are not restricted to a single or specific site. The findings of this EMP will be implemented at all sites.

This section forms an integral part of the **Contract Specification** and, in particular, shall be a part of the **ENVIRONMENTAL MANAGEMENT PLAN FOR CONSTRUCTION AND OPERATIONAL ACTIVITIES**.

PURPOSE

The purpose of this EMP is to ensure that Johannesburg Water conducts all its activities related to the construction and maintenance in accordance with the provisions of NEMA, and other applicable legislations. This EMP has taken into account the provisions of the Constitution and the principles of Integrated Environmental Management.

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2. APPLICABLE LEGISLATIONS

Several laws and regulations apply to the protection of the environment and contain environmental principles and standards that need to be applied and permits and licences that need to be obtained. This EMP will be subject to regulatory control under a range of State, Provincial and Local regulations. Such legislation largely embraces pollution prevention, resource use and conservation, and socio cultural (heritage) protection. This chapter reviews legislation pertaining to this generic EMP.

According to Section 2 (1, 2 & 3) of the National Environmental Management Act No. 107 of 1998 (NEMA), all organs of state have to apply certain principles set out in NEMA when taking decisions that may significantly affect the environment. The key principles of this Act include that all “actions” that they approve must be economically, socially and environmentally sustainable. It further states that “people and their needs” must be at the forefront of “its concern” and their interests must be served equitably.

These legislative requirements include, but are not limited to, the provisions of the legislation represented is described below:

The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)

Section 24 of the Constitution of South Africa (Act 108 of 1996) states that “Everyone has the right (a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other”

Measures that:

- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.
- Section 152 of the Constitution states that the objectives of local government are to:
- Ensure that services are provided to communities in a sustainable manner;

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- Promote social and economic development; and
- Promote a safe and healthy environment.

National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended)

The National Environmental Management Act 107 of 1998 (NEMA) requires that an environmental authorization is obtained before activities, which have been listed in terms of NEMA, are commenced with. The failure to obtain such an environmental authorization, before commencing with listed activities, could result in administrative sanctions, including compliance notices or directives ordering the cessation of the operations until authorized; and fines of up to ZAR10 million for each such contravention.

The Environmental Impact Assessment Regulations (EIA Regulations) set out the process to be followed in applying for an environmental authorization, while the listing notices; list the activities that require authorization (the Listing Notices). National Environmental Management Act (NEMA) 107 of 1998 amended in 07 of April 2017. The following are the listed activities:

- EIA Regulations GNR 326
- Listing Notice 1; Government Notice Number (GNR) 327 (Basic Assessment).
- Listing Notice 2; Government Notice Number (GNR) 325 (Full EIA/ Scoping & Environmental Impact Report)
- Listing Notice 3 ;GNR 324 (It applies on both Basic Assessment and full EIA)

National Environmental Management: Biodiversity Act 2004 (Act 10 of 2004)

Provides management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act 107 of 1998; the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.

The National Environmental Management Waste Act 2008 (Act 59 of 2008)

The National Environmental Management Waste Act (NEMWA) reforms the law regulating waste management in order to protect health and the environment providing reasonable measures for the prevention of pollution

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and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

The Occupational Health and Safety Act 1993 (No 85 of 1993)

The Occupational Health and Safety Act make provision in regulation

- Section 8 for the general duties of employers to their employees.
- Section 9 of the Regulations makes provision for general duties of employers and self-employed persons to persons other than their employees.

National Heritage Resources Act (NHRA) 1999, (Act 25 of 1999)

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act. The South African National Heritage Resources Agency (SAHRA) is the responsible authority for implementing the National Heritage Resources Act (NHRA) 1999, (Act 25 of 1999).

Section 38(1) of the NHRA lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include the following:

- (c) Any development or other activity which will change the character of a site:*
 - (i) Exceeding 5 000 m2 in extent; and*
 - (ii) The rezoning of a site exceeding 10 000 m2 in extent.*

Water Services Act 1997, (Act 108 of 1997)

This Act provides for the rights of people to amongst others, basic sanitation. It acknowledges that that there is a duty on all spheres of government to ensure that sanitation services are provided in a manner which is efficient, equitable and sustainable and that it should be sufficient for subsistence and sustainable economic activity. The

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provision of sanitation services must be undertaken in a manner consistent with the broader goals of water resource management. This project is in line with the Act as it aims to provide sufficient sanitation services to the region in a sustainable manner.

Conservation of Agricultural Resources (CARA) 1983 (Act 43 of 1983)

The CARA aims to ensure the protection of agricultural resources such as land with agricultural potential and water and makes provision for the eradication of alien and invasive species.

NEMA Air Quality Act (AQA) 2004, (Act 39 of 2004)

The aim of this law is to regulate air quality and protect the environment in South Africa through reasonable measures to prevent pollution and ecological degradation, while securing sustainable development. The Act also provides national norms and standards for air quality management, monitoring and control.

The objectives of NEM: AQA are to protect the environment by providing reasonable measures to protect air quality, prevent air pollution and to give effect to Section 24(b) of the Constitution. NEM: AQA must be read in conjunction with NEMA, which provides framework legislation and establishes an integrated environmental management system for South Africa.

Within NEM: AQA, the control and management of emissions relates to the listing of activities which requires the issuing of emission licenses. In terms of Section 22, No person may conduct an activity listed on the national list (or provincial list) without an atmospheric emission license.

Government Gazette 32434 of 24 July 2009 listed activities, which require an atmospheric emission license before it commences. Air quality limits and thresholds are fundamental to effective air quality management, providing the indicators to safe exposure levels for the majority of the population.

Listed activities and associated minimum emission standards identified in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) e.g. category 8 relevant to JW activities.

National Water Act (NWA) 1998, (Act 36 of 1998)

Water use is controlled by the National Water Act (NWA) 1998, (Act 36 of 1998) . The NWA recognises that water is a scarce resource in South Africa and its provisions are aimed at achieving sustainable use of water to the

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benefit of all users. The provisions of the Act are thus aimed at discouraging pollution and waste of water resources. According to Section 21 of the NWA the following activities require a water use licence (WUL) prior construction:

- “21.(a) taking water from a water resource;
- 21.(b) storing water;
- 21.(c) impeding or diverting the flow of water in a watercourse;
- 21.(d) engaging in a stream flow reduction activity contemplated in section 36;
- 21.(e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- 21.(f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- 21.(g) disposing of waste in a manner which may detrimentally impact on a water resource;
- 21.(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- 21.(i) altering the bed, banks, course or characteristics of a watercourse;
- 21.(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- 21.(k) using water for recreational purposes.”

3. OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

The purpose of this EMP is to provide an easily interpreted reference document that ensures that the project environmental commitments, safeguards and mitigation measures from the environmental planning documents, project approvals, and Scope of Works are implemented.

The objectives for the EMP are:

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- To develop, implement and maintain effective management systems for the environmental aspects ;
- To document details of environmental protection infrastructure and controls so that they are able to provide long term protection for the natural environment;
- To ensure compliance with relevant legislation (National, Provincial and Local), regulatory requirements and environmental documents;
- To maximise the value and outcomes of environmental monitoring activities so that the information can be applied to the planning and implementation of future projects;
- To ensure that all Environmental Management considerations are implemented during the operational and maintenance phases of the project.

All the Environmental specifications and the procedures discussed in this document were also developed in accordance with the relevant legislation applicable to the development.

3.1 Phases of the Project

The EMP deals with the following phases as detailed below:

3.1.1 The Planning and Design Phase

Overall Goal for Planning and Design: Undertake the planning and design phase of the development in a way that:

- Ensures that the design of the proposed developments responds to the identified environmental constraints and opportunities.
- Ensures that the best environmental options are selected for all components of the project.
- **Ensure that there is sufficient financial provision for environmental assessment, monitoring and rehabilitation.**

The EMP offers an ideal opportunity to incorporate pro-active environmental management measures with the goal of attaining sustainable development.

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Pro-active environmental measures minimize the chance of impacts taking place during the construction and operational phase. There is still the chance of accidental impacts taking place; however, through the incorporation of contingency plans (e.g. this EMP) during the planning phase, the necessary corrective action can be taken to further limit potential impacts. In order to meet this goal, actions plans for the planning and design phase have been identified together with monitoring requirements.

3.1.2 The Construction Phase

The bulk of the impacts during this phase will have immediate effect (e.g. noise-, dust- and water pollution etc.) If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts will then be mitigated through the contingency plans identified in the planning phase, together with a commitment to sound environmental management from Johannesburg Water.

3.1.3 Rehabilitation / Reinstatement Phase

This phase will involve restoring the land impacted during the construction phase back to its original state. This process will mainly on rectifying the negative impacts that have been caused during construction by the removing pollution or contaminants and other dangerous substances from groundwater, sediment, or surface water and improvement of the soil.

3.1.4 The Operational Phase

By taking pro-active measures during the planning and construction phases, potential environmental impacts emanating during the operational phase will be minimised. This, in turn, will minimise the risk and reduce the monitoring effort, but it does not make monitoring obsolete.

4. ROLES AND RESPONSIBILITY

The implementation of this EMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction and operational phases. The stakeholders are discussed below.

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4.1 Johannesburg Water

Shall:

- Ensure that the EMP is kept on JW's depots and construction sites.
- Remain ultimately responsible for ensuring that the development is implemented according to the requirements of the EMP.
- **Ensure that the Environmental section attends all project related tender briefing sessions.**
- Although Johannesburg Water appoints specific role players to perform functions on his/her behalf, this responsibility is delegated.
- Be liable for restoring the environment in the event of negligence leading to damage to the environment.
- **Ensure that the EMP is included in the tender documentation so that the contractor who is appointed is bound to the conditions of the EMP, and there's sufficient budget for Environmental assessments during the planning, design, construction, decommissioning (rehabilitation) phases of the project.**
- Ensure that the contractor appointed understands and acknowledges the content of this EMP.
- **Ensure that the compliance with the conditions of the environmental authorisation and the EMP is audited.**
- Ensure that the Environmental section signs all close out reports to confirm rehabilitation.

4.2 The Contractor

Shall:

- Be bound to the EMP conditions through his/her contract with Johannesburg Water, and is responsible for ensuring that he adheres to all the conditions of the EMP.
- Thoroughly familiarise him/herself with the EMP requirements before construction begins and must request clarification on any aspect of these documents, should they be unclear.
- Ensure adherence to the environmental management specifications.
- Ensure that any instructions (whether verbal or written) issued by the site Manager, project manager, site engineer or EO, in terms of the EMP is adhered to.
- Ensure that a report is tabled at each site meeting, which will document all incidents report that has occurred during the period before the site meeting.

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- Ensure that incidents register is kept in the site office.
- Ensure that a register of all public complaints is maintained.
- Ensure that all employees, including those of sub-contractors receive Environmental Induction before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMP (i.e. ensure their staff are appropriately trained as to the environmental obligations).
- Appoint an Environmental Liaison Officer (ELO) prior Construction for Environmental Authorised Projects.
- Appoint SHE Officer prior Construction for unauthorized projects i.e the SHE Officer with Environmental Management experience or be trained on Environmental legislation.

4.3 Environmental Liaison Officer (ELO)/ SHE Officer:

Shall:

- Ensure that the project team is involved in all aspects of project planning that can influence environmental conditions on the site.
- Be permanently on site during the construction phase to oversee the Contractor's internal compliance with the EMP requirements and ensuring that the environmental specifications are adhered to.
- Assist with day-to-day monitoring of the construction activities.
- Ensure that any issues raised by the EO will be routed to the SHE Officer for the contractors' attention.
- The ELO/ SHE Officer shall be permanently on site during the construction phase to oversee the Contractor's internal compliance with the EMP requirements and ensuring that the environmental specifications are adhered to.
- Be responsible for keeping detailed records of all site activities that may pertain to the environment and include all these aspects in an environmental register.
- The ELO/SHE Officer must keep a register of complaints from any community members on environmental issues.
- The ELO /SHE Officer will be required to keep a record of all on-site environmentally related incidents and how these incidents were dealt with.

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- Ensure proper rehabilitation is undertaken before site closure.

4.3.1 Requirements of the Environmental Liaison Officer (ELO) / SHE Officer:

- ELO/SHE must have a Diploma in Safety Management or equivalent
- Must have or be able to obtain ISO 14001: 2015 and Environmental Law formal training.
- Must have at least one (1) year proven relevant experience in both SHE related matters.

OR

- ELO/SHE must hold a National Diploma or Degree in Environmental Management.
- Must have at least one (1) year relevant experience in Environmental related issues.

4.4 Resident Engineer (RE)/ Site Agent

Shall:

- Liaise with the Contractor and Environmental Officer (EO) on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences.
- Oversee the general compliance of the Contractor with the EMP and other pertinent site specifications.
- Familiarise him/herself with the EMP specifications and further monitor the Contractor's compliance with the Environmental Specifications on a daily basis, through the Site Diary, and enforce compliance.
- Ensure that Monthly Audits reach the contractor before Monthly Progress Meeting.
- Ensure proper rehabilitation is undertaken before site closure.

4.5 Project Engineer /Inspectors (PE/PI)

Shall:

- Ensure that there is a sufficient budget for complying with all EMP conditions at the tender stage.
- Ensure sufficient budget is provided for rehabilitation/ Reinstatement.
- Ensure proper rehabilitation is undertaken before site closure.
- Ensure of all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- Ensure that Contractor(s) are made aware of all stipulations within the EMP.
- Ensure that the EMP is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.

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- Be fully conversant with the EIA for the project, the EMP, the conditions of the Environmental Authorisation (if applicable), and all relevant environmental legislation.
- Ensure compliance monitoring of contractors on a day to day basis.
- Ensure adherence and implementation of the tender requirements.
- Ensure reference of specific non-compliance/non-conformance issues to the responsible units and/or contractors.

4.6 Environmental Officers

Shall:

- Be responsible for informing the contractors of any decisions that are taken concerning environmental management during the project phase. This would also include informing the contractors of the necessary corrective actions to be taken
- Liaise with environmental authorities where necessary.
- Review all the environmental documents from the Contractor, including sign off.
- Conduct environmental monthly audits of all contractors' work on site where necessary
- Maintain site documentation of related to environmental management (EMP, Method statements, audit reports, monitoring results, receipts of waste removal etc.). Documents to be maintained on the relevant site Documents Control Systems.
- Inspect and report on environmental incidents and check corrective actions.
- Conduct environmental incidents enquiries.
- Review and sign off method statements prepared by Contractors.
- Ensure that an environmental compliance monitoring strategy/framework is implemented.

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5. CONTENTS FOR CONTRACTOR'S ENVIRONMENTAL FILE

The following documents must be submitted by the contractor in the Environmental file before Construction commences on site. The file must be submitted to the Environmental Section prior construction for approval. The Contractor should achieve a minimum score of 80% for the file to be approved.

- JW Declaration letter of understanding with EA/GA/WUL/EMP and other associated permits for the project
- SHE/ELO appointment letter
- Contractor Environmental induction and attendance register
- Environmental Toolbox talk and attendance register
- Site Camp layout (All open spaces belong to City Parks, thus proper permission must be obtained and acknowledgment in writing from City Parks must be submitted, prior to site establishment. This process is independent to councilors giving permission to contractors. The land should be assessed regardless. failure to do so will result in City parks fining the contractor)
- Environmental Policy
- Legal Register
- Environmental Aspect and Impact Register
- Objective and Targets & Management Plan
- MS/ Storm water management plan and Erosion & Sediment control
- Alien invasive and weeds control plan
- Hazardous Material Management (handling of hazardous substances/ procedure for refuelling/ appointment letter for store man)
- Environmental Method Statements for the activities are to be undertaken (e.g. MS for excavation or installation of a pipe, the MS must cover also environmental aspect and impacts and how the impacts will be mitigated)
- Method statement register and permit register
- Waste management plan or Method statement for waste management
- Waste register for the waste that has been disposed off

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- Complaints register
- Incident report (Flash report/ investigation report)
- Incident register
- Hazardous chemical or substances register
- Emergency Response Plan (Include environmental emergencies e.g. snake sighting, biting and handling including hydrocarbon spill)
- Training Matrix
- Dust Management Plan
- Daily environmental checklist/ weekly checklist/ Spill kit checklist
- SHE monthly report and audit report
- Rehabilitation plan

6. ENVIRONMENTAL SPECIFICATIONS

6.1 Site Establishment

- The intended actions and programme for site establishment shall be submitted to Client including a plan showing the layout of the construction camp, including the positions of all buildings, stockpile and laydown areas, vehicle wash and service areas, fuel storage areas and other infrastructure.
- The construction camp shall occupy as small an area as possible, and no site establishment shall be allowed within 100 m of any watercourse or water body unless otherwise approved by Client. The site layout shall be planned to facilitate ready access for deliveries, facilitate future works and to curtail any disturbance or security implications for neighbours. The final site layout shall be subject to the Environmental section approval.
- All open spaces belong to city parks. Proper consultation and approval to be obtained by the contractor from city parks prior to construction should there be a need to establish a construction site in the open space.
- All site structures shall be of a temporary nature and shall be removed at the end of the contract. All site establishment components (as well as equipment) shall be located within previously disturbed areas

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where possible, and shall be positioned to limit visual intrusion on neighbours and the size of area disturbed.

- All “No-Go” areas shall be clearly identified prior to the commencement of construction. No clearing of 300 square metres of indigenous vegetation will be allowed.

6.2 Development footprint

- The development footprints and disturbed areas surrounding the proposed project infrastructure should be kept as small as possible and the areas cleared of natural vegetation and topsoil must be kept to a minimum;
- The extent of all development footprint areas and permanent/ temporary structures must be limited to what is essential;
- As far as possible, existing roads are to be utilised, to limit cumulative impacts from roads and traffic;
- The height of any temporary structures such as topsoil stockpiles should be kept as low as possible.

6.3 Infrastructure placement

- Infrastructure should not be placed on ridgelines or other locations where they would be silhouetted against the sky;
- Any stockpiles generated during the construction phase must be shaped and rounded to blend in with the surrounding undulating landscape and to minimize visual contrast. Such stockpiles, if vegetated and shaped appropriately, may be positioned in such a manner as to screen the construction activities from view;
- Where infrastructure is sited within view of visually sensitive areas, it must be placed as far away as possible or within lower-lying areas where it may be screened by topography. Where full screening of infrastructure components is not possible, siting should take advantage of partial screening opportunities;
- As far as possible, surface infrastructure should be placed in areas that have already been disturbed;

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- New roads are to follow the contours of the landforms in order to make it less visually prominent and to reduce the need for cut and fill activities. Siting of roads should avoid steep side slopes which may contribute towards erosion.
- Infrastructure appearance
- It is recommended that any stockpiles be vegetated with indigenous grasses in order to blend more easily and for screening purpose.

6.4 Eating Areas

- Designated eating areas shall be provided on site.
- These eating areas shall be clearly demarcated and shall be provided with bins with lids.
- Staff will be prohibited from consuming meals anywhere other than at these eating areas and that noise is limited.
- All eating areas shall include provision for a smoking area.

6.5 Soil

- The contractor should remove 150mm of topsoil and stockpile at a height of not more than 1m. Topsoil to be maintained throughout construction period and should not be disturbed.
- Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky material, when areas are cleared. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost.
- Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed.
- Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season. The need for such measures will be indicated in the site-specific report.
- Topsoil stripped from different sites must be stockpiled separately and clearly identified as such.
- Topsoil obtained from sites with different soil types must not be mixed.
- Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and micro-organisms in the soil.

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- Soil must not be stockpiled on drainage lines or near watercourses without prior consent from the Project Manager.
- Soil should be exposed for the minimum time possible once cleared of invasive vegetation, that is the timing of clearing and grubbing should be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion.
- Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds.
- Limited vehicular access is allowed across rocky outcrops and ridges.
- All cut and fill surfaces need to be stabilized with appropriate material or measures when major civil works are complete.
- Erosion and donga crossings must be dealt with as river crossings. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and destabilized.
- All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.
- Soil contaminated with oil must be appropriately treated and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods.
- Runoff must be reduced by channelling water into existing surface drainage system.

6.6 Water

- Adequate sedimentation control measures must be instituted at any river crossings when excavations or disturbance of a riverbanks or riverbeds takes place.
- Adequate sedimentation control measures must be implemented where excavations or disturbance of drainage lines of a wetland may take place.
- All fuel, chemical, oil, etc. spills must be confined to areas where the drainage of water can be controlled. Use appropriate structures and methods to confine spillages such as the construction of berms and pans, or through the application of surface treatments that neutralise the toxic effects prior to the entry into a water course.

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- Oil absorbent fibres must be used to contain oil spilt in water.
- During construction through a wetland, the majority of the flow of the wetland should be allowed to pass downstream.
- Vehicular traffic across wetland areas must be avoided.
- No dumping of foreign material in streams, rivers and/or wetland areas is allowed.
- The wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from the DWS. The necessary licenses must be obtained in terms of Section 21 and 22 of the National Water Act, 36 of 1998 from DWS.
- No fires or open flames are allowed in the vicinity of the wetland, especially during the dry season.
- No swimming, washing (including vehicles and equipment), fishing or related activity is permitted in a wetland or river.
- Disturbances to nesting, breeding and roaming sites of animals in or adjacent to wetland areas must be minimized.

6.7 Air

- Speed limits must be implemented in all areas, including public roads and private property to limit the levels of dust pollution.
- Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that must not result in the generation of run-off.
- Where possible the use of potable water should be minimised for dust suppression purposes, preferably recycled or reused water.
- The site-specific investigation will quantify the impact of dust on nearby wetlands, rivers and dams in terms of sedimentation. Mitigation measures identified during the site specific study must be implemented.
- The Contractor must notify the Principal of all schools within 50m of the site of proposed activities. The Principal must in turn ensure that children with allergies and respiratory ailments take the necessary

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precautionary measures during the construction period. The Contractor must ensure that construction activities do not disturb school activities e.g. dust clouds may reduce visibility affecting sports activities.

- Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours.
- Noise control measures must be implemented. All noise levels must be controlled at the source. All employees must be given the necessary ear protection gear. IAP's must be informed of the excessive noise factors.
- The Contractor must inform all adjacent landowners of any after-hour construction activities and any other activity that could cause a nuisance e.g. the application of chemicals to the work surface. Normal working hours must be clearly indicated to adjacent land owners.
- No loud music is allowed on site and in construction camps.
- No fires are allowed if smoke from such fires will cause a nuisance to IAPs.

6.8 Social and Cultural

- Access by non-construction people onto any construction sites must be restricted. The Contractors activities and movement of staff must be restricted to designated construction areas only.
- The Contractors crew must be easily identifiable due to clothing, identification cards or other methods.
- Rapid migration of job seekers could lead to squatting and social conflict with resident communities and increase in social pathologies if not properly addressed. The Contractor must ensure that signs indicating the availability of jobs are installed.
- Criteria for selection and appointment (by the Contractor) of construction labour must be established to allow for preferential employment of local communities. The Local Authority must be actively involved in the process of appointing temporary labourers.
- Sub-Contractors and their employees must comply with all the requirements of this document and supporting documents e.g. the Contract document that applies to the Contractor. Absence of specific reference to the sub-contractor in any specification does not imply that the sub-contractor is not bound by this document.

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- No member of the construction workforce is allowed to wander around private property, except within the immediate surroundings of the site.
- The Contractor must provide suitable sanitation facilities for site staff. Sanitation provided during the construction phase should be managed so that it does not cause environmental health problems. The use of the surrounding veld for toilet purposes is not permitted under any circumstance.
- The Contractor must arrange for all his employees and those of his sub-contractors to be informed of the findings of the environmental report before the commencement of construction to ensure:
 - A basic understanding of the key environmental features of the work site and environments, and
 - Familiarity with the requirements of this document and the site specific report.
- Supervisory staff of the Contractor or his sub-contractors must not direct any person to undertake any activities which would place such person in contravention of the specifications of this document endanger his/her life or cause him/her to damage the environment.
- The demand for construction materials and supplies will have an effect on the local economy. This impact can be optimised by sourcing and purchasing materials locally and regionally wherever possible, insofar as the material complies with the design specification.
- The Contractor must maintain a detailed complaints register. This must be forwarded, together with solutions, to the authorities when requested.

6.9 Aesthetics

- Scenic Quality
- Damage to the natural environment must be minimized.
- The contractor may not remove any trees. If trees are in the way of the pipe route or with the development sites, the contractor must inform the environmental section who will then liaise with city parks for permission or recommendation.
- Trees and tall woody shrubs must be protected from damage to provide a natural visual shield. Excavated material must not be placed on such plants and movement across them must not be allowed, as far as practical.

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- The clearing of all sites must be kept to a minimum and surrounding vegetation must, as far as possible, be left intact as a natural shield.
- No painting or marking of natural features must be allowed.
- Above-ground Structures (reservoirs, water hammer tanks, valve chambers, pump stations etc.)
- All above ground structures should be located in areas where the visual impact from roads, houses etc. is minimised.
- All above ground structures could be treated or painted to blend in with the natural environment.
- Cut and fill areas, river and stream crossings and other soil stabilisation works must be constructed to blend in with the natural environment.
- Natural outcrops, rocky ridges and other natural linear features must not be bisected. Vegetation on such features must, as far as possible, not be cut unless absolutely necessary for construction.
- Excavated material must be flattened (not compacted) or removed from site. No heaps of spoil material must be left on site once the Contractor has moved to a new construction site.
- Any complaints from interest groups regarding the appearance of the construction site must be recorded and addressed promptly by the Contractor.

6.10 Archaeology and Cultural Sites

- All finds of archaeological finding must be reported to the nearest police station.
- Archaeological finding from the graves of victims of conflict, or any burial ground or part thereof which contains such graves and any other graves that are deemed to be of cultural significance may not be destroyed, damaged, altered, exhumed or removed from their original positions without a permit from the South African Heritage and Resource Agency (SAHRA).
- Work in areas where artefacts are found must cease immediately.
- Under no circumstances must the Contractor, his/her employees, his/her sub-contractors or his/her sub-contractors' employees remove, destroy or interfere with archaeological artefacts. Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act, 25 of 1999.
- A fence at least 2m outside the extremities of the site must be erected to protect archaeological sites.

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- All known and identified archaeological and historical sites must be left untouched.
- Work in the area can only be resumed once the site has been completely investigated. The Project Manager will inform the Contractor when work can resume.
- Environmentalist must arrange for examinations of findings with an Archaeologist.

6.11 Flora

- All suitable and rare flora and seeds must be rescued and removed from the site. They must be suitably stored, for future use in rehabilitation.
- The felling and/or cutting of trees and clearing of bush must be minimised.
- Bush must only be cleared to provide essential access for construction purposes.
- The spread of alien vegetation must be minimized.
- Any incident of unauthorised removal of plant material, as well as accidental damage to priority plants, must be documented by the Contractor.
- Woody vegetative matter stripped during construction must either be spread randomly throughout the surrounding veld so as to provide biomass for other micro-organisms and habitats for small mammals and birds, or it may be stockpiled for later redistribution over the reinstated top soiled surface. No vegetative matter must be burnt or removed for firewood other than those removed during the grubbing and clearing phase. Such vegetation can be made available to the local inhabitants to be used as firewood.
- No tree outside the footprint of the Works area must be damaged.

6.12 Fauna

- No species of animal may be poached, snared, hunted, captured or wilfully damaged or destroyed.
- Snakes and other reptiles that may be encountered on the construction site must not be killed unless the animal endangers the life of an employee.
- Anthills and/or termite nests that occur must not be disturbed unless it is unavoidable for construction purposes.
- Disturbances to nesting sites of birds must be minimized.

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- The Contractor must ensure that the work site is kept clean and free from rubbish, which could attract pests.

6.13 Infrastructure

- The relevant authorities must be notified of any interruptions of services, especially the Local Municipality, National Road Agency, Transnet, TELKOM and ESKOM. In addition, care must be taken to avoid damaging major and minor pipelines and other services.
- The integrity of property fences must be maintained.
- No telephone lines must be dropped during the construction operations, except where prior agreement by relevant parties is obtained. All crossings must be protected, raised or relocated as necessary.
- All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented.
- Storage Facilities
- Proper storage facilities should be provided for the storage of oils, grease, fuels, chemicals and hazardous materials.
- The Contractor must ensure that accidental spillage does not pollute soil and water resources.
- Fuel stock reconciliation must be done on all underground tanks to ensure no loss of oil, which could pollute groundwater resources.
- Cement must be stored and mixed on an impermeable substratum.
- The Contractor shall ensure that existing services (e.g. roads, pipelines, and powerlines and telephone services) are not damaged or disrupted unless required by the contract and with the permission of the RE.
- The Contractor shall be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted.
- A time limit for the repairs may be stipulated by the RE in consultation with the Contractor.

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6.14 Traffic Control

- All reasonable precautions must be taken during construction to avoid severely interrupting the traffic flow on existing roads, especially during peak periods.
- Before any work can start the Local Traffic Department must be consulted about measures to be taken regarding pedestrian and vehicular traffic control.

6.15 Access Roads

- The Contractor and the affected landowner must collaborate on the planning and construction of new access routes and the repair or upgrading of existing routes.
- Access to the site must be controlled such that only vehicles and persons directly associated with the work gains access to the site.
- Temporary access roads must not be opened until required and must be restored to its former state as soon as the road is no longer needed.

6.16 Batching Plants

- Concrete must be mixed only in an area demarcated for this purpose, ideally on an impervious surface (e.g. cement mixing pit)..
- Batching operations to take place in a designated area, which will be kept clean at all times.
- All concrete spilled outside this area, must be promptly removed by the Contractor and taken to a permitted waste disposal site.
- After all concrete mixing is complete; all waste concrete must be removed from the batching area and disposed of at an approved dumpsite.
- Ensure separation of clean and dirty water from batching plant.
- Storm water must not be allowed to flow through the batching area. Water laden with cement must be collected in a retention area for evaporation and not allowed to escape the batching area.
- Operators must wear suitable safety clothing.
- Wastewater from batching operations to be suitably disposed of.

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- Waste concrete and cement sludge to be removed on a regular basis (to prevent overflowing) and to be disposed of at a suitable facility.
- Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement.
- Used cement bags will be stored so as to prevent windblown dust and potential water contamination. Used bags will be disposed of adequately at a licenced waste disposal facility.
- Limit concrete batching to single sites where possible.
- Concrete transportation will not result in spillage.
- Cleaning of equipment and flushing of mixers will not result in pollution, with all contaminated wash water entering the waste water collection system.
- To prevent spillage onto roads, ready mix trucks will rinse off the delivery shoot into a suitable sump prior to leaving the site. The Contractor shall ensure such designated concrete wash bay area's/ sumps are created and that all concrete trucks delivering concrete to site first empty and clean their shoots at this point before leaving the site. The dried waste product shall be handled as construction rubble.
- Suitable screening and containment will be in place to prevent windblown contamination from cement storage, mixing, loading and batching operations.
- All contaminated water and fines from exposed aggregate finishes will be collected and stored in sumps and will be adequately disposed of.
- All visible remains of excess concrete will be physically removed on completion of the plastering or concrete pouring and disposed of in an acceptable manner.
- Any spilled concrete to be cleaned up immediately.
- In practice all wastes arising from construction activities are to be handled; transported and disposed of in accordance with the relevant regulations. All efforts should be made to minimise, reclaim or recycle waste, and failing that, dispose of it in a manner licensed by the government for that purpose.

6.17 Ablution Facilities

- Chemical toilet facilities should be managed and serviced by a qualified company. No disposal or leakage of sewerage should occur on or near the site.

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6.18 Blasting

- Blasting must not endanger public or private property.
- Noise mufflers and/or soft explosives must be used to minimize the impact on animals.
- All the provisions of the Explosives Act, 26 of 1956 and the Minerals Act, 50 of 1991 must be complied with.
- The Contractor must take measures to limit fly rock.

6.19 Electrical

- Measures must be taken to prevent any interference that could result in flashover of power lines due to breaching of clearances or the collapse of power lines due to collisions by vehicles and equipment.
- Measures must be taken during thunderstorms to protect workers and equipment from lightning strikes.
- All tall structures must be properly earthed and protected against lightning strikes.

6.20 Fire prevention

- The Contractor must take all the necessary precautions to protect the materials on site and to avoid veld fires.
- No fires or open flames are allowed on site unless directly used for construction purposes, e.g. acetylene blowtorch.
- Review all SABS standards relating to fire precautions and fire control namely, SABS 0131-3 Section 8 and SABS 089-1 or as amended.
- The Contractor must have fire-fighting equipment and a first aid box available on site and on all vehicles working on site.
- All waste bins must be kept away from fuel tank installations.
- All fuel tanks must be installed above ground, depending on the volume of stored fuel, for easy detection of fuel leaks.

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- Any welding or other sources of heating of materials must be done in a controlled environment, wherever possible and under appropriate supervision, in such a manner as to minimise the risk of veld fires and/or injury to staff.
- Fires lit for comfort (warmth) must be actively discouraged by the Contractor, due to the risk of veld fires and the risk to adjacent properties. Also, no waste material must be burnt.

6.21 Excavation

- The process of excavation and back filling must be carried out as a sequential process following one another as quickly as possible.
- Excavations must only remain open for a minimum period of time and during this time they must be clearly demarcated. If excavations place the public at risk these sites must be fenced.
- The residents directly affected by open trenches must be notified of the dangers. This will be done during the site-specific phase.
- Danger tape shall not be utilised to prevent personnel from open excavations. Construction vehicles should avoid creating new roads, use existing roads.
- Topsoil must be cleared and retained as it contains most inorganic matter and nutrients.
- Harvested grass should be retained and used as a mulch to combat erosion.
- Soil should be exposed for the minimum time possible once cleared of invasive vegetation.
- Avoid prolonged exposure of soils to wind and water erosion when clearing and grubbing.
- Stockpiled topsoil must be covered with suitable fabric to prevent erosion and weed invasion.
- Stockpiled topsoil must be covered with suitable fabric to prevent erosion and weed invasion.
- No vehicles are allowed to access onto the stockpiles after they have been placed.
- Topsoil and subsoil must be kept separate throughout construction and rehabilitation.
- A marsh wire or snow netting shall be erected around the exposed excavations to warn the public.
- The contractor must rip and re-vegetate temporal roads after project completion.

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6.22 Workshops, storage areas and materials handling

- These areas shall be chosen so as to cause the least impact on the biophysical and social elements of the area.
- The siting of workshops, maintenance and refuelling sites and materials storage areas shall not be in the vicinity of sensitive sites e.g. wetlands, cultivated fields or drainage lines, or where local land owners can be disturbed.
- Storm water shall be diverted around the storage area. Storm water falling on the storage area shall be discharged if it meets the required water quality standards.
- Proper storage facilities, placed on an impermeable surface, shall be provided for the storage of oils, grease, fuels, chemicals and other hazardous materials to be used during the construction phase of the project. If fuel is required on site it shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. Leakage of fuel shall be avoided.
- An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any spillage or overflow from these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil.
- In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or container and Material Safety Data Sheets (MSDS's) will be made available for all hazardous chemicals. Before containers or storage facilities are erected, emergency procedures in the event of misuse or spillage that may negatively affect an individual or the environment will be in place.
- The storage facilities (including any tanks) shall be surrounded by a bund wall, in order to ensure that accidental spillage does not pollute local soil or water resources.
- The storage areas shall not be utilised for accommodation purposes and shall be access controlled.
- The storage area shall be kept tidy and the area shall be rehabilitated after use.
- An inventory of any hazardous chemicals/substances (including that within equipment) kept on site, along with a description of possible ill effects and treatment of health-related afflictions resulting from accidents, shall be kept in the storage area as well as by the appropriate manager. These areas shall be securely fenced.

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- Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area.
- A notice board with the contact details of the responsible party shall be displayed at the gate to the storage area.
- The contractor shall ensure that any delivery drivers are informed of all procedures and restrictions required to comply with the EMP. Someone with an adequate understanding of the CEMP shall supervise drivers during delivery and off-loading.
- All vehicles and machinery will be inspected for any leaks or malfunctions regularly. Vehicle servicing or repairs is prohibited from site, unless in an emergency.
- Drip trays shall be inspected and emptied daily and serviced when necessary. In particular drip trays shall be closely monitored during rain events to ensure that they do not overflow. The contents must be disposed of at a recognised site.
- All repairs done on machinery using hydrocarbons as fuels or lubricants shall have a drip tray placed strategically to avoid incidental spillage.
- Workers shall be made aware of the health risks associated with any hazardous substances used (e.g. smoking near refuelling depots), and shall be provided with appropriate protective clothing / equipment in case of spillages or accidents.
- Cement and other potential environmental pollutants shall be stored and mixed on plastic sheeting or ready mix trucks shall be used. There shall be no opportunity for environmental contamination.
- Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediate to the satisfaction of the EO.
- The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site.

6.23 Method Statement

The objective is to ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk.

The environmental specifications are required to be underpinned by a series of Method

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Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to Johannesburg Water Environmental Section and ECO.

A Method Statement is defined as “a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager and Environmental Officers are able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications”. The Method Statement must cover applicable details with regard to:

- Construction procedures
- Materials and equipment to be used
- Getting the equipment to and from site
- How the equipment/material will be moved while on-site
- How and where material will be stored
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur
- Timing and location of activities
- Compliance/non-compliance with the Specifications, and
- Any other information deemed necessary by the Johannesburg Water.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

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Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved. The EO and ECO should monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement.

6.24 Re-vegetation and Rehabilitation or Reinstatement

Objective

To ensure re-vegetation and rehabilitation of disturbed areas is undertaken

Legislation and Standards

- Conservation of Agricultural Resources Act 43 of 1983
- Environment Conservation Act 73 of 1989
- National Forestry Act 84 of 1998
- National Environmental Management Act 107 of 1998
- Gauteng Nature Conservation Bill, 2014

Mitigation measures

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

- Disturbed areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix. Re-use native/indigenous plant species removed from disturbance areas in the rehabilitation phase as per the re-vegetation and rehabilitation management plan.
- Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.
- On-going alien plant monitoring and removal within the disturbed project footprint (where the initial clearing for construction took place) must be undertaken on all areas of natural vegetation on an annual basis.
- All temporary facilities, equipment and waste materials must be removed from site and appropriately disposed of.
- All temporary access road must be rehabilitated to their original condition

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- Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.
- On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented.
- On-going alien plant monitoring and removal should be undertaken as per the approved Rehabilitation/Re-vegetation plan.

6.25 Flora Search, Rescue and Relocation

Objective

To identify, remove, and where possible, relocate red data and conservation worthy flora species from proposed area.

Legal requirements

- National Environmental Management Act: Biodiversity Act (Act 10 of 2004) including Threatened or Protected Species Regulations;
- National Environmental Management Act (Act 107 of 1998);
- Gauteng Nature Conservation Bill, 2014/Transvaal Nature Conservation Ordinance 12 of 1983; and
- National Forests Act (Act 30 of 1998).

Management and Mitigation Requirement

- Conduct a detailed search of at the area. As a minimum, this should take place during the spring and summer months prior to impoundment so positive identification of flowering plants can be made. This should be done taking due cognisance of specialist studies already undertaken as part of the EIA process;
- Allow time for additional searches if these are deemed necessary, based on progress and diversity of plant species found;
- Identify and physically mark all conservation worthy plants found on the ground; and
- Capture markers and reference in a retrievable system, so that these can be located again for transplanting (e.g. using a combination of aerial photography, GPS and GIS, as appropriate).

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Plant search and rescue plan

- From information gathered during the plant marking exercise, establish the size.
- Requirements for the plant rescue team workforce, and the methodology to be employed during the rescue to maximise the likelihood of success; Document and motivate which species found on site are considered to be conservation worthy.
- Follow a multi-pronged approach to maximise the likelihood of success wherever feasible. In addition to transplanting of whole plants, seed can be collected and sown *in situ* in suitable habitats and/or in an off-site nursery.
- Any plants not suitable for transplantation must be considered for transplanting to existing conservation areas nearby. This could involve growing these plants on in an off-site nursery for a period of time.
- Depending on the conservation worthy species found, the location of suitable existing conservation areas nearby and the location of the off-site nursery, the most appropriate plant rescue options must be detailed in the search and rescue plan, and could be a combination of the following options:
- All required permits must be obtained from the appropriate authority covering plants to be affected by the plant rescue operation prior to the removal of the plants.

Aftercare and monitoring

- Record numbers and diversity of propagated plants and the health of the same, until they can be planted out;
- Aftercare of transplanted plants to be done in accordance with the plant search and rescue plan by an appropriate agent (e.g. staff from the commercial nursery or an appropriately trained onsite Contractor), including watering and alien plant control requirements. If done correctly, the frequency of input will decrease with time;
- Record numbers and diversity of transplanted plants and the health of the same;
- Monitoring must be undertaken as per requirements of the plant search and rescue plan approved by GDARD, including monitoring of alien plants and maintenance of a photographic record; and

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- Provide a detailed record (including photographic record) that indicates the success of the plant rescue operation. Records of corrective action taken to improve management of transplanted plants, where relevant, must also be completed.

6.26 STORM WATER MANAGEMENT

Objective

- To minimise erosion of soil from site during construction.
- To minimise deposition of soil into drainage.
- Minimise loss of vegetation cover due to construction related activities.

Mitigation Measures

- Identify and demarcate construction areas for general construction work and restrict construction activity to these areas. Prevent unnecessary destructive activity within construction areas (prevent over-excavations)
- Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. All stockpiles must be positioned at least 50 m away from drainage lines and wetlands.
- Erosion control measures: Run-off control and attenuation on slopes (sand bags, logs), silt fences, storm water channels and catch-pits, shade nets, soil binding, geofabrics, hydro seeding or mulching over cleared areas.
- Control depth of excavations and stability of cut faces/sidewalls.
- Compile a comprehensive storm water management plan as part of the final design of the project and implement during construction and operation.

Monitoring

- Regular inspections of the site by EO/SHE.
- Immediate reporting of ineffective sediment control systems.
- Public complaints register must be developed and maintained on site.

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6.27 Monitoring Program

OBJECTIVE: Monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the environmental authorisation (once issued). Where this is not clearly dictated, Johannesburg Water will determine and stipulate the frequency of monitoring required in consultation with the relevant authority. The contractor project manager will work with the site manager of the contractor to ensure that monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to routinely monitor the implementation of the specified environmental specifications, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications.
- Ensure adequate and appropriate interventions to address non-compliance.
- Ensure adequate and appropriate interventions to address environmental degradation.
- Provide a mechanism for the lodging and resolution of public complaints.
- Ensure appropriate and adequate record keeping related to environmental compliance.
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site.
- Aid communication and feedback to authorities and stakeholders.

Method of Monitoring

The Environmental Officer will ensure compliance with the EMP, and will conduct monitoring activities. The EO will undertake site inspections on a monthly basis or as specified in the environmental authorisation once issued.

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Monitoring Reports

Environmental Monthly reports will be compiled by the EO on a monthly basis and must be submitted to Environmental Specialist. The report should include details of the activities undertaken in the reporting period, any non-conformances or incidences recorded, corrective action required and details of these non-conformances or incidents which have been closed out.

A document handling system must be established to ensure accurate updating of EMP documents, and availability of all documents required for the effective functioning of the EMP. Supplementary EMP documentation could include:

- Method Statements;
- Environmental Action Plan
- Environmental File
- Site instructions;
- Emergency preparedness and response procedures;
- Record of environmental incidents;
- Non-conformance register
- Training records;
- Site inspection reports;
- Waste Register
- Water Usage Register
- Fauna and Flora Register
- Hazardous chemical Inventory list
- Monitoring reports;
- Auditing reports; and
- Public complaints register (single register for maintained for overall site).

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Table 1: Monitoring Programme

ISSUE	FREQUENCIES OF MONITORING	RESPONSIBLE PERSON
WATER		
Prevention of water pollution	Weekly in rainy season	Contractor’s Representative (CR)
Prevention of stagnant water on site.	Weekly in rainy season	
Proper functioning of sanitation facilities	Weekly	
SOIL		
Surface or gully erosion on site	Weekly in rainy season	CR
Soil contamination with oils	Monthly	CR
If small, clean up. If large, appoint a suitable contractor for clean-up.	Immediately	CR
Air		
Control domestic fires.	Weekly	CR
Heavy vehicle emission control.	Monthly	CR
Dust control of access roads. Wetting when required.	Weekly inspection	CR
WASTE		
Efficiency of domestic waste collection.	Bi Weekly	CR
Prevention of burning of solid/liquid wastes on site.	Weekly	CR
Proper collection and containment of liquid wastes (petroleum, oils, paints, resins & cooking oils)	Monthly	CR
The recycling and/or disposal thereof.		
The collection and disposal of construction waste (concrete, wood, steel)	Bi Weekly	CR
	Monthly	CR

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ISSUE	FREQUENCIES OF MONITORING	RESPONSIBLE PERSON
Collection of hazardous waste.	Bi Weekly	CR
WILDLIFE		
Weed Control	Weekly	CR
Control of illegal hunting or snaring of game, birds or other wild animals.	Weekly	CR
SOCIAL		
Inspect overall appearance of site. (paint work, cleanliness & housekeeping)	Weekly	CR
Resolve complaints		
Monitor behaviour of labourers	Daily	CR and IEC
	Daily	CR
SAFETY		
Inspect road signs, pedestrian and vehicle behaviour	At least once a week	CR

6.28 Fire Prevention and Control

Objective

- To avoid veld fires, claims and litigation.

Mitigation Measure

- Smoking shall be prohibited in the vicinity of flammable substances.
- Johannesburg Water and Contractor shall ensure that adequate fire-fighting equipment is available on site, in particular where flammable substances are being stored or used.
- Suitable precautions shall be taken (e.g. suitable fire extinguisher, welding curtains) when working with welding or grinding equipment near potential sources of combustion.

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- All fire control mechanisms (fire fighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services. Such mechanisms will be present and accessible at all times.
- All staff on site shall be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire.
- The Contractor shall contact the relevant authority of a fire outside of a demarcated area as soon as it starts and not to wait until can no longer control it.
- The Contractor shall take all reasonable and precautionary steps to ensure that uncontrolled fires are not started as a consequence of his activities on site.

6.29 Internal Audits and Reporting

Typically, an audit analyses the results obtained from monitoring, assesses whether objectives and targets have been met and whether there are variances from the stipulated EMP and legal requirements. In addition, the audit assesses whether EMP implementation has been undertaken according to planned arrangements and that the EMP itself is being appropriately updated. The audit should confirm that identified corrective actions have been undertaken and then assess the effectiveness of such actions. The timing of audits should be included in the implementation schedule in the EMP.

The key steps in a successful audit are:

- Establish audit procedures.
- Determine the frequency of audits.
- Ensure that the auditors are competent, in that they must be able to undertake the audit objectively and competently. Audits may be undertaken by internal or external parties, although certain I&AP requirements may define a need for external auditors.
- Maintain records of audits.

A procedure is to be developed by the project management team for conducting EMP audits, and should incorporate processes for scheduling and reporting, as well as the timing and frequency of the audits. This procedure should also address responsibilities and required resources. The EO is usually responsible for the maintenance of the environmental audit information that is required prior, during and after an audit

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Internal audits must be undertaken by Johannesburg Water Environmental Section. Audit will be conducted as per the Audit Schedule.

6.30 Noise Pollution

Temporary noise pollution due to construction works should be controlled by proper maintenance of equipment and vehicles, and tuning of engines and mufflers. Construction works should be completed in as short a period as possible by assigning qualified engineers and foremen. It is the responsibility of the Contractor to monitor for the mitigation of such impacts. Noise problems should be reduced to normally acceptable levels by incorporating low-noise equipment in the design and/or locating such mechanical equipment in properly acoustically lined buildings or enclosures. In the presence of adequate buffer zones between the facility and residential areas, noise control measures must be minimized.

6.31 Environmental Awareness Plan

OBJECTIVE: Ensure all operation personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm (Environmental Awareness Plan)

To achieve effective environmental management, it is important that Contractors and site employees are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. Johannesburg Water is responsible for informing its employees and contractors (transportation contractor) of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. Johannesburg Water's obligations in this regard include the following:

- Employees must have a basic understanding of the key environmental features of the depot and its surrounding environment.
- Ensuring that a copy of the EMP is readily available on-site, and that all site staff are aware of the location and have access to the document. Employees must be familiar with the requirements of the EMP and

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the environmental specifications as they apply to the operation of the facility.

- Ensuring that, prior to commencing any new site works, all employees have attended an Environmental Awareness Training course. The course must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- Awareness of any other environmental matters, which are deemed to be necessary by the depot manager.
- Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances, minimise of disturbance to sensitive areas (wetland), management of waste and prevention of water pollution
- Records must be kept of those that have completed the relevant training.
- Training should be done either in a written or verbal format but must be in an appropriate format and language for the receiving audience
- Refresher sessions must be held to ensure the operating staffs are aware of their environmental obligations.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

Environmental Awareness Training

Environmental Awareness Training must be undertaken by the Environmental Officer and must take the form of an on-site talk and demonstration by the Environmental Officer before the commencement of construction activities on site. A record of attendance of this training must be maintained by the Environmental Liaison Officer/SHE Officer on site.

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Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations. Contractors or Engineers staff, site staff, sub-contractors or visitors to site.

This induction training should include discussing Johannesburg Water’s environmental policy and values, the function of the EMP and the importance and reasons for compliance to these. The induction training must highlight overall do’s and don’ts on site and clarify the repercussions of not complying with these. The reporting procedure must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the SHE officer on site.

Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least once a month) where the foreman/site supervision manager, environmental and safety representative and all employees on site hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

6.32 General Housekeeping

All construction and operational areas must be kept in a neat and orderly condition at all times;

- An efficient removal system of waste and rubble must be ensured during all development phases;
- All operational facilities, including vehicles, should be actively maintained;
- Any areas for material storage, waste sorting and other potentially intrusive activities must be screened from view as far as considered feasible.

6.33 Waste Water Management

Sanitation Facilities

- Ablution facilities shall be provided on site.
- The positioning of the ablution facilities shall be done in consultation with Client and shall be placed so that it cannot contaminate the natural streams and rivers. One toilet shall be provided per 10 staff

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members on site. Toilets shall be positioned within walking distance of wherever employees are employed on the site. Toilets shall be provided with locks and doors shall be secured to prevent the toilets from blowing over.

- The toilets shall be placed outside of areas susceptible to flooding.
- Chemical toilets shall be serviced regularly by an authorised service provider and removed to a registered waste water treatment works and disposal certificates shall be obtained from the waste disposal facility for each disposal and retained on site.
- Polluted run-off must be discharged in the local sewerage main and not overland or into public streams. In instances where a sewerage main is not available, polluted run-off will be collected in sub-surface tanks and a reputable effluent removal contractor will be contracted to dispose of the waste in an environmentally acceptable manner. Official documentation shall be obtained from the waste disposal facility for each disposal and retained on site.
- Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present. No cooking shall be permitted to occur on open fires.
- Toilets situated close to the site boundaries or within sight of residential areas shall be hidden behind screens or other cover as approved by the Engineer;
- No spillage shall occur when the toilets are cleaned or emptied and the contents shall be properly stored and removed from Site.
- Discharge of waste from toilets into the environment and burial of waste is strictly prohibited;
- All building rubble and rubble from the demolished structures, solid and liquid waste must be disposed of as necessary at an appropriately licensed refuse facility.
- Ensure that no refuse wastes are burnt on the premises or on surrounding premises. No fires will be allowed on site.

Contaminated water

- Workshops, refuelling depots and washing areas shall be bunded.
- Any wastewater or spilled fuel collected within bunded areas around the refuelling area shall be disposed of as hazardous waste

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- Waste water containing hydrocarbons, paints oil etc. shall be treated as hazardous waste

6.34 Waste Management

Methods for waste management and waste minimisation shall be implemented from the outset of the contract as per the Waste Management Plan to be submitted to Client. All personnel shall be instructed to dispose of all waste in the proper manner. A waste avoidance and minimisation approach will be encouraged for the duration of the project. The following steps in order will be applied.

- Prevention – avoid and minimise waste
- Recycle – reuse and recover all general waste
- Treat – treatment in order to reduce toxicity reduce waste quantities
- Dispose – waste removal into a registered landfill facility

Solid waste

- Waste with the potential for market re-use will be stored in separate containers, this includes, scrap metal, used tyres and paper. This waste will be recycled where ever possible.
- Solid waste shall be temporarily stored in tip – poof metal drums or waste skips at an approved area on site for collection and disposal. This area shall be away from drainage lines or water courses.
- All general waste drums or skips will be appropriately labelled GENERAL WASTE
- A refuse control system shall be established for the collection and removal of refuse to the satisfaction of Client and ECO.
- No waste shall be burned at the site offices or anywhere else on the site.
- All building rubble shall be a) removed from the site and disposed of at an appropriate dumping site, or b) temporarily stored in a clearly demarcated area on site for future use.
- All waste shall be disposed at an appropriate waste disposal facility.

Litter

- No littering by construction workers shall be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter.
- Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse.

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- Littering, discarding or burying of any materials shall not be allowed on site.

Hazardous waste

- Hazardous waste shall be temporarily stored in tip – proof metal drums or waste skips at an approved area on site for collection and disposal. This area shall be away from drainage lines or water courses.
- All hazardous waste drums or skips will be appropriately labelled HAZARDOUS WASTE.
- Hazardous waste such as bitumen, tar and oil shall be disposed of at a registered waste disposal facility. Special care shall be taken to avoid spillage of tar products such as tar prime or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water.
- All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced with clean soil. Soil contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.
- Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and returned to the supplier. Water and oil shall be separated in an oil trap. Oils collected in this manner shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at an approved hazardous waste disposal site. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.
- Sludge should be managed in accordance with the Sludge Guideline 2010.
- Sludge should be kept only at the drying bed and no sludge should be stored at a permeable ground or natural ground.
- Hazardous waste shall be disposed of at a registered hazardous waste disposal site, disposal certificates shall be kept in the site file for record.

Medical Waste

- All medical waste will be contained in the special bins provided. All sharp needles must be separated from other medical waste,

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- All out dated and disused medicines will be disposed of as a hazardous medical waste or returned to the supplier for disposal. (Tablets and syrups will be crushed and/or dissolved before disposal as hazardous waste),
- Medical waste used on personnel coming for treatment at the clinic are to be placed on a demarcated container storage room,
- The Occupational Health Nurse will notify a service provided for removal of the medical waste prior exceeding 90 days.
- The service provider to provide Waste Manifest as well as the Safe Disposal Certificate, to the OHN who
- The OHN will arrange for an approved hazardous waste disposal company to collect and dispose of this medical waste. The OHN is responsible for and authorised to keep all records in connection herewith (disposal certificates).

6.35 Erosion Management Plan

The objective to control soil erosion from an ecological perspective is:

- To reduce the effects of raindrop splash erosion on exposed soil surfaces.
- To keep rainwater on the soil surface for as long as possible to increase the infiltration rate and reduce surface runoff.
- To reduce the speed of surface runoff to reduce the erosion effect of the soil surface.
- To provide methods to retain soil, debris, seed banks and organic matter being carried away by runoff.
- To improve water retention of the area (Coetzee, 2005).

Areas with a high soil erosion potential on the site

Areas identified as being of high soil erosion potential on the site include:

- Any areas without vegetation cover
- Excavated areas
- Steep areas
- Areas which undergo overland flow of water.
- Areas close to water

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- Irrigated areas
- Compacted areas
- Rivers
- Drainage lines
- Any areas where developments cause water flow to accelerate on a soil surface.

If any erosion features are present as a result of the activities mentioned above the ELO must:

Assess the situation.

- Take photographs of the soil degradation.
- Determine the cause of the soil erosion.
- Inform and show the relevant contractors the soil degradation.
- Inform the contractor that rehabilitation must take place and that the contractor is to implement a rehabilitation method statement and management plan.
- Monitor that the contractor is taking action to stop the erosion and assist them where needed.
- The progress of the rehabilitation must be monitored weekly and recorded in the site diary.
- All actions with regards to the incidents must be reported on in the monthly Audit report.
- If the erosion incident has not being addressed by the contractor within 14 days of you reporting it, the Johannesburg Water's Environmental Section must be informed.

The contractor/ developer (with the EO's consultation) must:

Select a system to treat the erosion

Design the treatment system

Implement the system

Monitor the area to see if the system functions like it should, if it the system fails adapt or adjust the system to ensure erosion is controlled.

Monitoring must continue until the area has been stabilized

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General Erosion

The civil works contractor may use the following instruments to combat erosion when necessary:

- Reno matrices
- Slope attenuation
- Shade catch nets
- Mulching
- Hydro-seeding or transplanting
- Re-vegetating
- Tilling (roughing the surface)

Erosion Management control measures

Ensure that all soil surfaces are protected by vegetation or a covering to avoid the surface being eroded by wind or water.

Ensure that heavy machinery don't compact areas that are not meant to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area.

Surface water control measures

Prevent the concentration or flow of surface water or storm water down cut or fill slopes or along pipeline routes or roads and ensure measures to prevent erosion are in place prior to construction.

Storm water and any runoff generated by hard surfaces should be discharged into retention swales or areas with rock rip-rap. These areas should be grassed with indigenous vegetation. These energy dissipation structures should be placed in a manner that flows are managed prior to being discharged back into the natural water courses, thus not only preventing erosion, but also supporting the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.

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- Mitigate against siltation and sedimentation through the use of the above mentioned structures and ensure that all structures do not cause erosion.
- Ensure that all storm water control features have soft engineered areas that attenuate flows, allowing for water to percolate into the local aquifers.
- Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation.
- Vegetation clearing should occur in parallel with the construction progress to minimize erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.
- Minimise the diversion of flows into different catchments.
- If implementing dust control measures, prevent over-wetting, saturation and run-off that may cause erosion and sedimentation.
- Water course (stream) crossings should not trap any run-off, thereby creating inundated areas, but allow for free flowing water courses.

ALL EROSION CONTROL MEASURES

Areas susceptible to erosion must be protected by appropriate measures and repair of any damage caused by erosion due to construction activities must be under taken as soon as possible.

Minimise erosion and sedimentation into water courses through effective stabilisation (gabions and reno mattresses) and re-vegetation of disturbed river banks (Refer to rehabilitation specifications and erosion control measures below).

Stabilisation of sandy, dispersive slopes or slopes steeper than 1:3 will be required.

Ensure that bare soil is covered and hydro seeded to reduce topsoil loss.

6.36 Alien Invasive Species

In terms of National Environmental Management: Biodiversity Act 2004 (Act no. 10 of 2004) section 75, 76 and its regulations (Alien invasive Species Regulations, 2014) Organs of state are obliged to draw up an Invasive

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Species Monitoring, Control and Eradication Plan for land under their control, “[hereafter termed a Control Plan]. These Plans have to cover all Listed Invasive Species in terms of section 70 (1).

Control and eradication of listed invasive species

In terms of section 75 the following must be undertaken:

- (1) Control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs.
- (2) Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.
- (3) The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.

Mitigation Measures

- The Control and Eradication Plan of alien invasive species must be compiled and implemented at all JW sites.
- The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent.
- Application shall be under the direct supervision of a qualified technician or trained personnel. All surplus herbicide shall be disposed of in accordance with the supplier’s specifications.
- All alien vegetation in the area and densifiers creating a fire hazard shall be cleared and treated with herbicides in accordance with JW vegetation Management Plan.
- The application shall be according to set specifications and under supervision of a qualified technician and possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.
- Small weeds shall be uprooted before sprout on site.
- One may not uproot or remove such plants and dump or discard them elsewhere to regrow or allow their seeds to be spread or blown onto other properties.
- MSDS’s for the herbicides shall be kept in a file and made known to the responsible personnel or Storeman.

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- Herbicides shall be kept at the designated area and the area shall be labelled.
- If a spill occurs, the spill shall be treated with the use of spill kit and contaminated material disposed of accordingly.

6.37. Emergency Planning and Response Procedures

The Contractor is to explain and implement emergency procedures and plans for events such as fire, explosion, spillage of hazardous substances, evacuation, *etc.* to staff prior to any construction activities taking place (usually during induction phase). The following associated activities are to be undertaken by the Contractor:

- Development and compilation of an emergency procedure and plan.
- Emergency Procedure and Plan is to describe the measures required to manage emergencies during the construction phase and transportation and / or storage of hazardous materials and waste.
- The Contractor is to ensure that emergency procedures mock training sessions are carried out on an ad hoc basis.
- The Contractor is to inform his workforce of the locality of the designated emergency meeting point.
- Emergency contact numbers are to be displayed in prominent places and are to include numbers such as the Police, the Fire Department, Ambulance Services, *etc.*

The ELO should compile and keep an Incidents and Accidents Register on site in which all incidents and accidents are recorded, e.g. chemical spills, fires, accidents involving workers and vehicles, *etc.*

The following information must be recorded in the Incidents Register:

- The name and contact details of the persons involved
- The person recording the incident
- The date and time of incident
- The nature, extent and cause of the accident
- The name and contact details of any persons notified of the incident
- The actions taken to deal with the incident and whether the accident has been sufficiently

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- Dealt with additional steps required to prevent recurrence of the incident.

INCIDENT REPORTING

The Contractor ELO/ SHE representative will be responsible for reporting all incidents that occur on site using Client's Flash Report form. The Client's Environmental Incident Reporting procedure will be followed to report all incidents to Client. Johannesburg Water's Incident and Investigation Reporting procedure will be followed to report all environmental events to the Environmental Section. The environmental officer will analyse the statistics to identify trends and high risk activities. Statistics will be distributed to the site manager; SHE rep's for information and shall be discussed at all OHS &E Committee meetings.

7. RECORD KEEPING, COMPLIANCE AND PENALTIES

Various records will be kept on site for monitoring purposes these include but not limited to:

- Copy of Environmental Management Plan
- Approved Environmental Method Statements
- Environmental Authorisation
- Environmental induction attendance register
- Hazardous chemicals register
- Waste disposal register and disposal certificates
- Oil/fuel spill register

Records of non-compliance shall also be kept on record and will include the nature and magnitude of the non-compliance in a register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. External complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a public complaints register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings. A score of 90% is required for the Monthly Audit undertaken by the Johannesburg Water's Environmental Officers.

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8. DECOMMISSIONING

Objective

- To avoid and or minimise the potential environmental and social impacts associated with the decommissioning phase

Mitigation Measures

Mitigation measures as detailed in the construction phase on the EMP regarding impacts on flora, fauna, habitats and wetlands would be applicable to this phase.

- Rehabilitation to be undertaken in terms of specifications outlined in the Rehabilitation section of this EMP as well as in terms of any specific requirements applicable at the time.
- Johannesburg Water EO will need to supervise decommissioning activities.

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JW EMP Annexure A: Environmental Management Requirement Acknowledgement Letter

Environmental Requirement for Contractors and Suppliers working for Johannesburg Capital Expenditure (CAPEX) projects	Unique no	JWEMP:122017
	Revision no	00

I, the undersigned, hereby acknowledge that I have obtained copies of the following listed documentation and confirm that I fully understand the contents thereof and the consequences of non-compliance. The Contractor furthermore reiterates its commitment to compliance of the requirements contained within the following provided documentation:

Name of the Contractor	
Vendor Number	
Project Number	
Scope of Work	
Declaration by Capital Expenditure Projects Contractor	
- I undertake to adhere to the requirements as set out in: - Johannesburg Water Environmental Management Plan and Waste Management Plan - Environmental requirements for Contractors working on Capital Expenditure Projects - I undertake to comply with all applicable environmental legal and other requirements. - Undertake to comply with Johannesburg Water's environmental standards, policies and procedures where applicable. - I pledge to inform all staff of their role in managing environmental impacts on site. - I am fully aware that incidents must be reported within 24 hours of occurrence. - I pledge to implement environmental best practice on site at all times during the contract. - I pledge that all non-conformances issued to us will be addressed promptly.	
I hereby acknowledge that I have obtained copies of Johannesburg Water Environmental Management Plan and Waste Management Plan and confirm that I fully understand the contents thereof and the consequences of non-compliance. The Contractor furthermore reiterates their commitments to	

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compliance of the requirements contained within the following provided documentations and conform to all above mentioned requirements.

Signed at on this Day of 20.....

Contractor	Signature:	Date:
Project Engineer (Witness)	Signature:	Date:

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