

KING CETSHWAYO DISTRICT MUNICIPALITY TENDER DOCUMENT

TENDER REFERENCE: KCDM/MIG/02/2023

**TENDER FOR THE UPGRADE OF SEWAGE INFRASTRUCTURE IN MELMOTH:
REMAINDER OF THE INTERIM UPGRADES TO THE MELMOTH WWTW**

SITE/BRIEFING MEETING:

Tuesday, 12 September 2023 @ 11H00

TENDER CLOSING:

Friday, 29 September 2023 @ 12H00

The Tender Document (which includes the Form of Offer and Acceptance) completed in all respects, plus any additional supporting documentation required, must be addressed to the Municipal Manager and submitted in a sealed envelope with the legal name and address of the Tenderer, the Tender No. and tender title as well as the closing date indicated on the envelope. The sealed envelope must be inserted into the Tender Box situated in the foyer of King Cetshwayo House, Corner of Kruger Rand & Barbados Bay Road, CBD, Richards Bay before closing time. If the tender offer is too large to fit into the abovementioned Tender Box or the Box is full, please enquire at the reception counter as to where the SCM (Tender Office) is for alternative instructions. The onus remains with the Tenderer to ensure that the tender is placed in either the Tender Box or as alternatively instructed.

SERVICE PROVIDER'S DETAILS

Name of Service Provider:	
CSD Supplier Number	
Contact Person:	
E-mail Address:	
Telephone Number:	()Code
Fax Number:	()Code
Physical Address:	
Postal Address:	

NOTE:

The Service Provider shall be deemed to have satisfied himself/herself/themselves as to all the conditions and circumstances affecting this tender, including the physical aspects of working areas, and by the submission of a tender, will confirm acceptance of the conditions and circumstances applicable to any subsequent contract.

Enquiries relating to this tender must be directed as indicated below:

Tender Queries:	Technical Queries:
Contact Name: Mr. Z. Mkhwanazi	Contact Name: Mr. S. Ngcobo
Telephone: 035 - 799 2790	Telephone: 035 - 799 2691

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T1.1 Tender Notice and Invitation to Tender



KING CETSHWAYO DISTRICT MUNICIPALITY TENDER REFERENCE: KCDM/MIG/02/2023

TENDER FOR THE UPGRADE OF SEWAGE INFRASTRUCTURE IN MELMOTH: REMAINDER OF THE INTERIM UPGRADES TO THE MELMOTH WWTW

Interested parties must collect tender documents from the SCM Unit at King Cetshwayo House, Suite No. 8, Corner of Krugerrand & Barbados Bay Road, CBD, Richards Bay (035 799 2500), after a payment of **R 6621.15 (Incl. VAT)** non-refundable, cash or EFT (First National Bank, King Cetshwayo District Municipality, Acc. 62943444125, Bank code 210554, Ref. Your company name and Tender ref. no, tender deposit should be paid at the rates hall at of the King Cetshwayo District Municipality or alternatively download & print the bid document from www.etenders.gov.za. The King Cetshwayo District Municipality will strive to achieve targeted procurement in accordance with Preferential Procurement Policy Framework Act Regulation 2022 as outlined in the table below. Tenderers must also have a CIDB grading of **6CE** or Higher. The tender that fails to meet the stipulated criteria will be regarded as non-responsive.

Any tender submitted by a person(s) who is in the service of the state or if that person(s) is not a natural person, of which any director, manager, principal shareholder or stakeholder is a person in the service of the state or who is an advisor or consultant contracted with the Municipality shall not be considered in terms of regulation 44 of the Municipal Supply Chain Regulations. National Treasury has introduced the Central Supplier Data Base (CSD), where all suppliers are required to register. For more information, please contact Mr. Z. Mkhwanazi on (035) 799 2790 or visit the CSD website at www.csd.gov.za. Only tenderers who are registered with CSD and King Cetshwayo District Municipality Supplier Data base will be considered for this tender.

A compulsory tender briefing meeting will be held on the **12th of September 2023 at 11h00 at Melmoth SASOL Garage.**

Completed tenders in sealed envelopes bearing the tender number must be deposited in the Municipality's tender box in the foyer of King Cetshwayo House, Corner of Krugerrand & Barbados Bay Road, CBD, Richards Bay on or before **12:00 on the 29th of September 2023**, when tenders will be opened but not to public and be published on notice board and KCDM website. Tenders received after the due date and time will not be considered.

"King Cetshwayo District Municipality will strive to achieve the specific goals in line with PPPFA regulations 2022 and the RDP"

No	Categories	<50 million 80/20
1	Ownership: EME AND QSE: which is at least 100% owned by black people	10
2	Empowerment (Local Economic Development Sub-contracting (10%-30% and 40% where it is technically possible and subject to pre-approval: Enterprise owned by black people with CIDB Grading 4 or less.	4
3	RDP (Job creation and community upliftment), creation of jobs/labour intensive activities.	4
4	Other: Enterprise located within the province.	2
		20

This tender will be evaluated on a 80/20 preferential points system. Please ensure to submit a certified copy of your companies' BBBEE level status verification certificate with the tender document. Prospective service providers are required to ensure full completion and correctness of information when responding to MBD and all other required declarations in the document. The municipality reserves the right to validate the correctness of the declarations through various databases inclusive of the Central Supplier Database (CSD). Failure to fully complete and/or provision of incorrect information in the declaration will be regarded by the employer as a non-responsive tender.

Functional Evaluation Criteria:

Please note that this tender will be evaluated on functionality and compliance. The following criteria in "Functional Evaluation Criteria", will be applicable for the functionality and compliance and maximum weight of each criterion and any tenderer who scores less than 70 percent, in respect of "functionality" will be regarded as submitting a non-responsive tender and will be disqualified. Note that only tenderers who administratively comply (returnable and completeness of document) shall move to functionality stage.

#	Criteria Description		Weight
1	Service providers must comply with the following pre-requisites:		
	a.	Tenderer's experience in similar nature and value (No project will lead to disqualification)	25
	b.	Key Personnel: Site Agent / Contracts Manager (No experience or less than 1 year will lead to disqualification)	20
	c.	Key Personnel: Foreman (No experience or less than 1 year will lead to disqualification)	20
	d.	Quality Assurance/Quality Management System (No quality assurance will lead to disqualification)	15
	e.	Preliminary Construction Programme	20
	TOTAL		100

It will be the tenderer's responsibility to check the document on receipt for completeness and to notify the employer of any discrepancies or omissions. It is the tenderer's responsibility to provide all the data and information requested in the form required, failure to do so may be regarded by the employer as a non-responsive tender. Submissions may only be done on documentation supplied by the Municipality.

All communication between the employer and the tenderer shall be in a form that can be read, copied and recorded. All writing shall be in the English Language. The employer shall not take any responsibility for non-receipt of communications from a tenderer.

All tender enquiries which are non-technical must be directed to Zamo Mkhwanazi at Tel. 035-799 2790, Technical queries must be directed to Mr. Sphelele Ngcobo at Tel. 035 799 2691.

Tenderers who do not hear from the King Cetshwayo Municipality within 90 days of the closing date of the tender should consider their tender unsuccessful. Please note that no tender will be accepted by fax or e-mail.

Mr. P.P. Sibiya
Municipal Manager
King Cetshwayo District Municipality
Private Bag X1025
RICHARDS BAY
3900

T1.2 Tender Data

The conditions of Tender are the Standard Conditions of Tender as contained in Annex F of the CIDB Standard for Uniformity in Construction Procurement. (See www.cidb.org.za) which are reproduced without amendment or alteration are, for the convenience of Tenderers attached as an Annex to this Tender Data.

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.

Clause Number	Tender Data

F.1.1	The Employer is the King Cetshwayo District Municipality

F.1.2	The Tender documents issued by the employer comprise:

T1.1	Tender Notice and Invitation to Tender
T1.2	Tender Data
T2.1	List of Returnable Documents
T2.2	Returnable Schedules

Part 1: Agreements and Contract Data

C1.1	Form of Offer and Acceptance
C1.2	Contract Data
C1.3	Conditions of Contract
C1.4	Contractual Documentation

Part 2: Pricing Data

C2.1	Pricing Instructions
C2.2	Bills of Quantities

Part 3: Scope of Work

C3	Scope of Work

Part 4: Site Information

C4	Site Information

Part 5: Annexures

C5	Annexures

F.1.4	The Employer's agent, for the purposes of any communication between the employer and Tenderer, is:

Queries	Tender queries	Technical Queries
Name:	Mr. Zamo Mkhwanazi	Mr. S. Ngcobo
Postal Address:	Private Bag X1025 Richards Bay 3900	Private Bag X1025 Richards Bay 3900
Physical Address	King Cetshwayo House, Corner Kruger Rand & Barbados Bay Road, Richards Bay CBD	King Cetshwayo House, Corner Kruger Rand & Barbados Bay Road, Richards Bay CBD
Tel /Fax No.:	035 799 2790	035 799 2691
E-mail:	mkhwanaziz@kingcetshwayo.gov.za	ngcobosp@kingcetshwayo.gov.za

F.2.1 Only those Tenderers who are registered with the CIDB, in an equal or higher than 6 Civil Engineering works (6CE or higher) class of construction work and are registered with the CIDB as having a track record, are eligible to submit Tenders.

Add the following to F.2.1.1

- a) Only Tenderers that can furnish proof of extensive previous experience in projects of similar nature, value, complexity, construction methods and similar contract period should submit bids.
- b) The Tenderer need to meet the minimum score for functionality being 70%.
- c) Tenderer does comply with the legal requirements stated in the Employer's Procurement Policy.
- d) The Tenderer can demonstrate that he possesses the necessary professional and technical qualifications and competence, financial resources, equipment and other physical facilities, managerial capability, personnel, experience and reputation to perform the contract.
- e) The Tenderer can provide proof that he is in good standing with respect to duties, taxes, levies and contributions required in terms of legislation applicable to the work in the contract.
- f) The Tenderer can demonstrate that he will have in his employ during the contract period the necessary personnel satisfying the requirements of the Scope of Work for labour-intensive competencies for management and supervisory personnel.

F.2.12 If a Tenderer wishes to submit an alternative Tender offer, the only criteria permitted for such alternative Tender offer is that it demonstrably satisfies the Employer's standards and requirements, the details of which may be obtained from the Employer's Representative.

Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data must be submitted with the alternative Tender offer to enable the Employer to evaluate the efficacy of the alternative and its principal elements so as to take a view on the degree to which the alternative complies with the Employer's standards and requirements and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence and must clearly reflect all design assumptions. Pricing Data must reflect all assumptions in the development of the pricing proposal.

Acceptance of an alternative Tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the Tenderer, in the event that the alternative is accepted, to accept full responsibility and liability that the alternative offer complies in all respects to the Employer's standards and requirements.

The modified Pricing Data must include an amount equal to 5% of the amount Tendered for the alternative offer to cover the Employer's costs of confirming the acceptability of the detailed design before it is constructed.

F.2.13.3 Each Tender offer communicated on paper shall be submitted as an original.

F.2.13.5 The employer's address for delivery of Tender offers and identification details to be shown on each Tender offer package are:

Location of Tender box:		In the foyer of the offices of the King Cetshwayo District Municipality, Corner of Krugerrand & Barbados Bay Road, CBD, Richards Bay
Identification details	Reference	Reference No. KCDM/MIG/02/2023
	Title of Tender	UPGRADE OF SEWAGE INFRASTRUCTURE IN MELMOTH: REMAINDER OF THE INTERIM UPGRADES TO THE MELMOTH WWTW
	Closing Date	29 September 2023
	Time	12h00
Postal address:		Private Bag X1025, Richards Bay, 3900

F.2.13 A two-envelope procedure will not be followed.

F.2.15 The closing time for submission of Tender offers is as stated in the Tender Notice and Invitation to Tender.

F.2.15 Telephonic, telegraphic, telex, facsimile or e-mailed Tender offers will not be accepted.

F.2.16 The Tender offer validity period is 90 days.

F.2.18 The tenderer must submit to the Employer the names of all management and supervisory staff that will be employed to supervise the labour-intensive portion of the works together with satisfactory evidence that such staff members satisfy the eligibility requirement.

F.3.4 Tenders will be opened immediately after the closing time for Tenders.

F.3.8 Test for Responsiveness

F.3.8.1 Determine, after opening and before detailed evaluation, whether each tender offer properly received:

- a) Complies with the requirements of these Conditions of Tender,
- b) Has been properly and fully completed and signed, and
- c) Is responsive to the other requirements of the tender documents.

F.3.8.2 A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the Employer's opinion, would:

- a) Detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,
- b) Significantly change the Employer's or the tenderer's risks and responsibilities under the contract, or
- c) Affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified.
- d) Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation.

F.3.11.3 The procedure for the evaluation of responsive Tenders is as per Method 2.

F.3.11.4 Scoring Preference:

All Tenderers will be evaluated on the 80/20 preferential point structure of which 80 points will be price, and 20 points will be preference.

F3.11.5 Scoring Quality

Substitute the word 'quality' wherever it appears with the word 'functionality'.

The table below lists the scoring criteria and weighting for the score achieved against the relevant schedule:

#	DESCRIPTION OF FUNCTIONALITY CRITERIA	WEIGHT
1.	Tenderer's experience in similar projects (in nature and above R1 million) in last 5 years.	
	i. No Projects (disqualification) ii. One (1) project completed (5) iii. Two (2) projects completed (10) iv. Three (3) projects completed (15) v. Four (4) projects completed (20) vi. Five (5) projects and above (25) Returnable Schedule: RS011	25
2.	Qualifications and Key Personnel	
2.1	Site Agent/Contracts Manager with Civil Engineering/Project Management degree or Diploma with relevant experience in Project Management	
	i. No relevant or less than 1-year experience (disqualification) ii. 1 – 4 years relevant experience (5) iii. 4 – 8 years relevant experience (10) iv. More than 10 Years relevant experience (20) Returnable Schedule: RS012	20
2.2	Foreman with relevant experience	
	i. No relevant or less than 1-year experience (disqualification) ii. 1 – 4 years relevant experience (5) iii. 4 – 8 years relevant experience (10) iv. More than 10 Years relevant experience (20) Returnable Schedule: RS012	20
2.3	Quality Assurance/ Quality Management System	
	I. Nothing submitted (Disqualification) II. Poor and does not reflect ISO 9001: 2015 (3) III. Detailed company quality management program attached and referred to ISO 9001:2015 (7) IV. ISO 9001: 2015 Certified (15) Returnable Schedule: RS020	15

#	DESCRIPTION OF FUNCTIONALITY CRITERIA	WEIGHT
3.	Preliminary Construction Programme	
	Submission of the following comprehensive construction programme indicating all workflow items i. No Programme (disqualification) ii. Poor (5) iii. Fair (8) iv. Satisfactory (10) v. Good (15) vi. Excellent (20) Returnable Schedule: RS0018	20
	TOTAL	100

The Tenderer needs to score a minimum of 70% to be considered responsive.

F.3.12 Tender offers will only be accepted if:

- a) The Tenderer complies with the legal requirements stated in the Tender Data and Returnable Schedule.
- b) Tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation;
- c) Tenderer or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector;
- d) Tenderer has not:
 - i) Abused the Employer's Supply Chain Management System; or
 - ii) Failed to perform on any previous contract and has been given a written notice to this effect;
- e) 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.

F.3.17 The number of paper copies of the signed contract to be provided by the employer is: One.

T1.2.1 Specific Conditions of Tender

A. GENERAL

1. King Cetshwayo Municipality does not bind itself to accept the lowest or any tender and reserves the right to accept the whole or any part of a tender.
2. The conditions of tender are based on the Standard Conditions of Tender as contained in Annex F of Board Notice 136 Government Gazette No 38960 of 10 July 2015, Construction Industry Development Board (CIDB) Standard for Uniformity in Construction Procurement (see www.cidb.org.za) which are reproduced without amendment or alteration for the convenience of Tenderers as an Annex to this Tender Data.
3. 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.
4. This contract will be governed by King Cetshwayo District Municipality "Conditions of TENDER" as outlined in this document only and not any condition supplied by the Tenderer.
5. The quantities called for in this tender are an estimated quantity and King Cetshwayo District Municipality reserves the right to take more or less than the quantity specified.
6. Full details of items offered and or drawings / pamphlets etc. must be supplied together with the return documents. All additional drawings / pamphlets returned with the tender documents must be firmly bound and marked as "Additional" to the specific tender reference number.
7. All items offered on this tender must be new and of the latest design.
8. Only tenders on King Cetshwayo District Municipality official tender document will be accepted and the original document must be returned, fully completed and signed, in the form presented. Failure to do so will invalidate such tender.
9. It must be clearly understood by the Tenderer, that no order/s for such commodities or services required by the King Cetshwayo District Municipality will be recognized by the Tenderer unless King Cetshwayo District Municipality official order is issued and it is further understood that King Cetshwayo District Municipality will not accept responsibility for any payment to the Tenderer unless the delivery notes and invoices for such goods or services quote the relevant order number and is sent to King Cetshwayo District Municipality, Financial Department, Private Bag X 1025, RICHARDS BAY, 3900.
10. Should it be considered necessary by the Tenderer, in the interest of design, quality or inspection for whatever reason that a King Cetshwayo District Municipality official should proceed to other centres for inspection purposes, such costs shall be for the account of the Tenderer.
11. Only tenders received by 12h00 on the given closing date will be considered. No late tender will be accepted after this time.
12. No telegraphic, e-mail or faxed tenders will be accepted.
13. No correction fluid/ tape should be used on this tender document. Any alterations on the document should be signed by the responsible person completing the document; failing to adhere to this will disqualify your tender.
14. All letters requested on the tender document and submitted by the tenderer must be signed and also be certified where the tender document requires letters, failure to do so shall result in the rejection of the submitted letters and taken as non-submission.
15. Rates offered by the contractor on the BOQ will be indicative, and flat rates will be offered by employer.

16. ALL PRICES QUOTED MUST INCLUDE VALUE ADDED TAX AND MUST BE FIRM FOR A PERIOD OF (90) NINETY DAYS FROM CLOSING DATE OF THIS TENDER.
17. SERVICE PROVIDER (SP) TAX STATUS WILL BE VERIFIED ON CSD.
18. TENDERER'S FINANCIAL STANDING AND STABILITY
 - a. In terms of the Standard Conditions of Tender, the Tenderer shall provide information about its commercial position, which includes information necessary for the Employer to evaluate the Tenderer's financial standing.
 - b. A third-party credit bureau check will be used to determine the credit worthiness of the Tenderer.
 - c. The financial standing of the Tenderer will be assessed by third party credit checks on the main contractor.
 - d. An analysis of the Tenderer financial standing will be conducted by third party for the purposes of establishing the Tenderers financial viability and ability to meet all its contractual obligations for the duration of the contract, should the Tenderer be awarded the contract.
 - e. Tenders that do not meet King Cetshwayo District Municipality's financial requirements as per third party assessment, will be disqualified from further assessment.

B. DEMONSTRATIONS AND INSPECTIONS

19. All Tenderers must be prepared to demonstrate where required, free of charge and obligation, at the King Cetshwayo District Municipality or any other area within the boundary of the King Cetshwayo District Municipality, any items offered in this tender.
20. Where officials are required to attend demonstrations or inspections outside the District Municipality boundary of Richards Bay, all costs to attend such demonstration must be borne by the Tenderer.

C. DELIVERIES, COMPLETION AND PENALTIES

21. Delivery date to be negotiated on placing the order.
22. Tenderers shall furthermore note that goods or services will not be considered acceptable and consequently their obligations not fulfilled should goods or services fail to comply with the specifications in the tender document.
23. Where the supplier fails to deliver within the scope of the specifications of this tender, the Municipality reserves the right to obtain services from any other supplier that complies with the specifications and the Tenderer will be held responsible for all costs involved.

D. PAYMENTS

24. Payment will be made within 30 days from statement invoice date subject to satisfactory execution of the contract conditions and provided that the statement/invoice is without error.
25. Tenders must clearly state all settlement and trade discounts.
26. Any additional payment for extra work carried out on a contract will only be made provided that the contractor is issued with a variation order by the Municipal Manager or delegated official of the King Cetshwayo District Municipality.
27. King Cetshwayo District Municipality hereby indemnifies itself from any claims whatsoever, which may arise as a result of loss of income suffered by the Tenderer for any reason directly or indirectly during the course of this tender and King Cetshwayo District Municipality reserves the right to consider compensation at its own terms.

T1.3 Standard Conditions of Tender

(As contained in Annexure F of the Board Notice 136 of 2015: Standard for Uniformity in Construction Procurement)

F.1 General

F.1.1 Actions

F.1.1.1 The employer and each tenderer submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in F.2 and F.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.

F.1.1.2 The employer and the tenderer and all their agents and employees involved in the tender process shall avoid conflicts of interest and where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Tenderers shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process at the start of any deliberations relating to the procurement process or as soon as they become aware of such conflict and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate.

Note: 1) A conflict of interest may arise due to a conflict of roles which might provide an incentive for improper acts in some circumstances. A conflict of interest can create an appearance of impropriety that can undermine confidence in the ability of that person to act properly in his or her position even if no improper acts result.

2) Conflicts of interest in respect of those engaged in the procurement process include direct, indirect or family interests in the tender or outcome of the procurement process and any personal bias, inclination, obligation, allegiance or loyalty which would in any way affect any decisions taken.

F.1.1.3 The employer shall not seek, and a tenderer shall not submit a tender without having a firm intention and the capacity to proceed with the contract.

F.1.2 Tender Documents

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

F.1.3 Interpretation

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

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

F.1.3.3 For the purposes of these conditions of tender, the following definitions apply:

- a) **Conflict of interest** means any situation in which:
 - i) Someone in a position of trust has competing professional or personal interests which make it difficult to fulfil his or her duties impartially;
 - ii) An individual or organisation is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or
 - iii) Incompatibility or contradictory interests exist between an employee and the organisation which employs that employee.
- b) **Comparative offer** means the price after the factors of a non-firm price and all unconditional discounts it can be utilised to have been taken into consideration;
- c) **Corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process;
- d) **fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels;
- e) **Organization** means a company, firm, enterprise, association or other legal entity, whether incorporated or not, or a public body;
- f) **Functionality** means the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.

F.1.4 **Communication and employer's agent**

Each communication between the employer and a tenderer shall be to or from the employer's agent only, and in a form that can be read, copied and recorded. Writing shall be in the English language. The employer shall not take any responsibility for non-receipt of communications from or by a tenderer. The name and contact details of the employer's agent are stated in the tender data.

F.1.5 **Cancellation and Re-Invitation of Tenders****F.1.5.1** An organ of state may, prior to the award of the tender, cancel a tender if-.

- a) Due to changed circumstances, there is no longer a need for the services, works or goods requested; or
- b) Funds are no longer available to cover the total envisaged expenditure; or
- c) No acceptable tenders are received.

F.1.5.2 The decision to cancel a tender must be published in the CIDB website and in the government Tender Bulletin for the media in which the original tender invitation was advertised.

F.1.6 Procurement procedures**F.1.6.1 General**

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

F.1.6.2 Competitive negotiation procedure

F.1.6.2.1 Where the tender data require that the competitive negotiation procedure is to be followed, tenderers shall submit tender offers in response to the proposed contract in the first round of submissions. Notwithstanding the requirements of F.3.4, the employer shall announce only the names of the tenderers who make a submission. The requirements of F.3.8 relating to the material deviations or qualifications which affect the competitive position of tenderers shall not apply.

F.1.6.2.2 All responsive tenderers, or not less than three responsive tenderers that are highest ranked in terms of the evaluation method and evaluation criteria stated in the tender data, shall be invited in each round to enter into competitive negotiations, based on the principle of equal treatment and keeping confidential the proposed solutions and associated information. Notwithstanding the provisions of F.2.17, the employer may request that tenders be clarified, specified and fine-tuned in order to improve a tenderer's competitive position provided that such clarification, specification, fine-tuning or additional information does not alter any fundamental aspects of the offers or impose substantial new requirements which restrict or distort competition or have a discriminatory effect.

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

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

F.1.6.3 Proposal procedure using the two stage-system**F.1.6.3.1 Option 1**

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

F.1.6.3.2 Option 2

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

F.1.6.3.2.2 The employer shall evaluate tenders received during the second stage in terms of the method of evaluation stated in the tender data and award the contract in terms of these conditions of tender.

F.2 Tenderer's obligations

F.2.1 Eligibility

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

F.2.1.2 Notify the employer of any proposed material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used by the employer as the basis in a prior process to invite the tenderer to submit a tender offer and obtain the employer's written approval to do so prior to the closing time for tenders.

F.2.2 Cost of tendering

F.2.2.1 Accept that, unless otherwise stated in the tender data, the employer will not compensate the tenderer for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer comply with requirements.

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

F.2.3 Check documents

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

F.2.4 Confidentiality and copyright of documents

Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the employer only for the purpose of preparing and submitting a tender offer in response to the invitation.

F.2.5 Reference documents

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

F.2.6 Acknowledge addenda

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

F.2.7 Clarification meeting

The arrangements for a compulsory clarification meeting are as stated in the Tender Notice and Invitation to Tender.

Tenderers must sign the attendance list in the name of the Tendering entity. Addenda may be issued, and Tenders will be accepted only from those Tendering entities appearing on the attendance list.

F.2.8 Seek clarification

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

F.2.9 Insurance

Be aware that the extent of insurance to be provided by the employer (if any) may not be for the full cover required in terms of the conditions of contract identified in the contract data. The tenderer is advised to seek qualified advice regarding insurance.

F.2.10 Pricing the tender offer

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

F.2.10.2 Show VAT payable by the employer separately as an addition to the tendered total of the prices.

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

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

F.2.11 Alterations to documents

Do not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations.

F.2.12 Alternative tender offers

F.2.12.1 Unless otherwise stated in the tender data, submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted as well as a schedule that compares the requirements of the tender documents with the alternative requirements that are proposed.

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

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

F.2.13 Submitting a tender offer

- F.2.13.1** Submit one tender offer only, either as a single tendering entity or as a member in a joint venture to provide the whole of the works, services or supply identified in the contract data and described in the scope of works, unless stated otherwise in the tender data.
- F.2.13.2** Return all returnable documents to the employer after completing them in their entirety, either electronically (if they were issued in electronic format) or by writing legibly in non-erasable ink.
- F.2.13.3** Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, with an English translation of any documentation in a language other than English, and the parts communicated electronically in the same format as they were issued by the employer.
- F.2.13.4** Sign the original and all copies of the tender offer where required in terms of the tender data. The employer will hold all authorized signatories liable on behalf of the tenderer. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer.
- F.2.13.5** Seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY". Each package shall state on the outside the employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.
- F.2.13.6** Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data in an envelope marked —financial proposal and place the remaining returnable documents in an envelope marked —technical proposal. Each envelope shall state on the outside the employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.
- F.2.13.7** Seal the original tender offer and copy packages together in an outer package that states on the outside only the employer's address and identification details as stated in the tender data.
- F.2.13.8** Accept that the employer will not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.
- F.2.13.9** Accept that tender offers submitted by facsimile or e-mail will be rejected by the employer, unless stated otherwise in the tender data.

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

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

F.2.15 Closing time

- F.2.15.1** Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Accept that proof of posting shall not be accepted as proof of delivery.
- F.2.15.2** Accept that, if the employer extends the closing time stated in the tender data for any reason, the requirements of these conditions of tender apply equally to the extended deadline.

F.2.16 Tender offer validity

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

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

F.2.16.3 Accept that a tender submission that has been submitted to the employer may only be withdrawn or substituted by giving the employer's agent written notice before the closing time for tenders that a tender is to be withdrawn or substituted.

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

F.2.17 Clarification of tender offer after submission

Provide clarification of a tender offer in response to a request to do so from the employer during the evaluation of tender offers. This may include providing a breakdown of rates or prices and correction of arithmetical errors by the adjustment of certain rates or item prices (or both). No change in the competitive position of tenderers or substance of the tender offer is sought, offered, or permitted.

Note: Sub-clause F.2.17 does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the Employer elect to do so.

F.2.18 Provide other material

F.2.18.1 Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer's commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment. Should the tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the employer's request, the employer may regard the tender offer as non-responsive.

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

F.2.19 Inspections, tests and analysis

Provide access during working hours to premises for inspections, tests and analysis as provided for in the tender data.

F.2.20 Submit securities, bonds, policies, etc.

If requested, submit for the employer's acceptance before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the conditions of contract identified in the contract data.

F.2.21 Check final draft

Check the final draft of the contract provided by the employer within the time available for the employer to issue the contract.

F.2.22 Return of other tender documents

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

F.2.23 Certificates

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

F.3 The employer's undertakings**F.3.1 Respond to requests from the tenderer**

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

F.3.1.2 Consider any request to make a material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used to prequalify a tenderer to submit a tender offer in terms of a previous procurement process and deny any such request if as a consequence:

- a) An individual firm, or a joint venture as a whole, or any individual member of the joint venture fails to meet any of the collective or individual qualifying requirements;
- b) The new partners to a joint venture were not prequalified in the first instance, either as individual firms or as another joint venture; or
- c) In the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.

F.3.2 Issue Addenda

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

F.3.3 Return late tender offers

Return tender offers received after the closing time stated in the Tender Data, unopened, (unless it is necessary to open a tender submission to obtain a forwarding address), to the tenderer concerned.

F.3.4 Opening of tender submissions

F.3.4.1 Unless the two-envelope system is to be followed, open valid tender submissions in the presence of tenderer's agents who choose to attend at the time and place stated in the tender data. Tender submissions for which acceptable reasons for withdrawal have been submitted will not be opened.

F.3.4.2 Announce at the opening held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened, the total of his prices, preferences claimed and time for completion, if any, for the main tender offer only.

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

F.3.5 Two-envelope system

F.3.5.1 Where stated in the tender data that a two-envelope system is to be followed, open only the technical proposal of valid tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data and announce the name of each tenderer whose technical proposal is opened.

F.3.5.2 Evaluate functionality of the technical proposals offered by tenderers, then advise tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who score in the functionality evaluation more than the minimum number of points for functionality stated in the tender data, and announce the score obtained for the technical proposals and the total price and any points claimed on BBBEE status level. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for functionality.

F.3.6 Non-disclosure

Not disclose to tenderers, or to any other person not officially concerned with such processes, information relating to the evaluation and comparison of tender offers, the final evaluation price and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.

F.3.7 Grounds for rejection and disqualification

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

F.3.8 Test for responsiveness

F.3.8.1 Determine, on opening and before detailed evaluation, whether each tender offer properly received:

- a) Meets the requirements of these Conditions of Tender,
- b) Has been properly and fully completed and signed, and
- c) Is responsive to the other requirements of the tender documents.

F.3.8.2 A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification outside of specified requirements. A material deviation or qualification is one which, in the Employer's opinion, would:

- a) Detrimentially affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,
- b) Significantly change the Employer's or the tenderer's risks and responsibilities under the contract, or
- c) Affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified.

F.3.9 Arithmetical errors, omissions and discrepancies

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

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

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

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

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

F.3.10 Clarification of a tender offer

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

F.3.11 Evaluation of tender offers**F3.11.1 General**

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

F.3.11.3 Method 2: Financial offer and preference

In the case of a functionality, price and preference:

- 1) Score functionality, rejecting all tender offers that fail to achieve the minimum number of points for functionality as stated in the Tender Data.
- 2) No tender must be regarded as an acceptable tender if it fails to achieve the minimum qualifying score for functionality as indicated in the tender invitation.
- 3) Tenders that have achieved the minimum qualification score for functionality must be evaluated further in terms of the preference points system prescribed in paragraphs 4 and

4 and 5 below.

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

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

$$P_s = 80 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right)$$

Where

P_s = Points scored for comparative price of tender or offer under consideration;

P_t = Comparative price of tender or offer under consideration; and

P_{min} = Comparative price of lowest acceptable tender or offer.

- 4)(a)(ii) An employer of state may apply the formula in paragraph (i) for price quotations with a value less than R30 000, if and when appropriate:
- 4)(b) Subject to subparagraph(4)(c), points must be awarded to a tender for attaining the B-BBEE status level of contributor in accordance with the table on the next page:
- 4)(c) A maximum of 20 points may be allocated in accordance with subparagraph (4)(b)
- 4)(d) The points scored by tender in respect of B-BBEE contribution contemplated in subparagraph (4) (b) must be added to the points scored for price as calculated in accordance with subparagraph (4)(a).
- 4)(e) Subject to paragraph 4.3.8 the contract must be awarded to the tender who scores the highest total number of points.

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

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

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

Where

P_s = Points scored for comparative price of tender or offer under consideration;

P_t = Comparative price of tender or offer under consideration; and

P_{min} = Comparative price of lowest acceptable tender or offer.

- 5)(b) A maximum of 10 points may be allocated in accordance with subparagraph (5)(b).
- 5)(c) The points scored by tender in respect of B-BBEE contribution contemplated in subparagraph (5) (b) must be added to the points scored for price as calculated in accordance with subparagraph (5)(a).
- 5)(d) Subject to paragraph 4.3.8 the contract must be awarded to the tender who scores the

highest total number of points.

F.3.11.6 Decimal places

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

F.3.11.7 Scoring Price

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

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

Where:

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

W_1 is the maximum possible number of tender evaluation points awarded for price as stated in the Tender Data.

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

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

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

F.3.11.8 Scoring preferences

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

F.3.11.9 Scoring functionality

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

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

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

where: S_o is the score for quality allocated to the submission under consideration;

M_s is the maximum possible score for quality in respect of a submission; and

W_2 is the maximum possible number of tender evaluation points awarded for the quality as stated in the tender data

F.3.12 Insurance provided by the employer

If requested by the proposed successful tenderer, submit for the tenderer's information the policies and / or certificates of insurance which the conditions of contract identified in the contract data, require the employer to provide.

F.3.13 Acceptance of tender offer

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

- a) Is not under restrictions, or has principals who are under restrictions, preventing participating in the employer's procurement,
- b) Can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract,
- c) Has the legal capacity to enter into the contract,
- d) Is not insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act, 2008, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of any of the foregoing,
- e) Complies with the legal requirements, if any, stated in the tender data, and
- f) Is able, in the opinion of the employer, to perform the contract free of conflicts of interest.

F.3.14 Prepare contract documents

F.3.14.1 If necessary, revise documents that shall form part of the contract and that were issued by the Employer as part of the tender documents to take account of:

- a) Addenda issued during the tender period,
- b) Inclusion of some of the returnable documents, and
- c) Other revisions agreed between the employer and the successful tenderer.

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

F.3.15 Complete adjudicator's contract

Unless alternative arrangements have been agreed or otherwise provided for in the contract, arrange for both parties to complete formalities for appointing the selected adjudicator at the same time as the main contract is signed.

F.3.16 Notice to unsuccessful tenderers

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

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

F.3.17 Provide copies of the contracts

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

F.3.18 Provide written reasons for actions taken

Provide upon request written reasons to tenderers for any action that is taken in applying these conditions of tender but withhold information which is not in the public interest to be divulged, which is considered to prejudice the legitimate commercial interests of tenderers or might prejudice fair competition between tenderers.

F3.19 Transparency in the procurement process

F3.19.1 The CIDB prescripts require that tenders must be advertised and be registered on the CIDB tender system.

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

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

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

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

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

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

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

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

T2.1 List of Returnable Documents

The Tenderer must complete and /or sign the following Returnable Documents:

1 Returnable Schedules – Evaluation Documents

RS001	:	Record of Addenda to Tender Documents
RS002	:	Compulsory Enterprise Questionnaire
RS003	:	Site Inspection Certificate
RS004	:	Contractor Registration with the Construction Industry Development Board
RS005	:	An original/certified copy of a valid Letter of Good Standing
RS006	:	Banking Information
RS007	:	Municipal Account Statement
RS008	:	Preferential Procurement
RS009	:	Certificate of Authority for Signatory
RS010	:	Schedule of Plant and Equipment
RS011	:	Tenderer's Experience
RS012	:	Key Personnel
RS013	:	Proposed Amendments and Qualifications
RS014	:	Declaration of Tenderers Past Supply Chain Management Practices
RS015	:	Declaration of Interest
RS016	:	Certificate of Independent Bid Determination
RS017	:	Day-works Schedule
RS018	:	Preliminary Programme
RS019	:	Declaration of Competency on Health and Safety Requirements
RS020	:	Quality Assurance and Environmental Management
RS021	:	Annual Financial Statement
RS022	:	Targeted Enterprise
RS023	:	Tenderer's Participation in Job Creation Using Local Labour

2 The Offer of the C1.1 Offer and Acceptance

3 C1.2 Contract Data (Part 2)

4 C2.2 Bill of Quantities

T2.2 RETURNABLE SCHEDULES TO BE COMPLETED BY TENDERER

Record of Addenda to Tender Documents

RS001

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.

Compulsory Enterprise Questionnaire**RS002**

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.

Failure to do so may lead to your Tender being disqualified.

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 6 partners

Section 5: Particulars of Companies and Close Corporations

Company Registration Number	
Close Corporation Number	
Tax Reference Number	

Section 6: Record of service of the state

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

☐ a member of any Municipal Council	☐ 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)	
		current	Within last 12

*insert separate page if necessary

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

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

☐ a member of any municipal council	☐ 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 authorized to do so on behalf of the enterprise:

- i) Authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;
- ii) Confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;

- iii) Confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;
- iv) Confirms that I / we are not associated, linked or involved with any other Tendering entities submitting Tender offers and have no other relationship with any of the Tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest;
- v) Confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed _____Date _____

Position _____

Tenderer _____

Site Inspection Certificate**RS003**

Site Inspection Certificates are signed and handed out by the Engineer at the Tender Site Inspection.

ATTACH YOUR SIGNED ORIGINAL SITE INSPECTION CERTIFICATE TO THIS PAGE

Failure to do so may lead to your Tender being disqualified.

Contractor Registration with Construction Industry Development Board

RS004

CIDB registration details are as follows:

Name of entity registered with CIDB: _____

Registration CRS number: _____

Registration category and class: _____

Failure to do so may lead to your Tender being disqualified.

Workmen’s Compensation Letter of Good Standing

RS005

PAGE TO WHICH A VALID CERTIFICATE NUMBER OF THE WORKMEN’S COMPENSATION COMMISSIONER LETTER OF GOOD STANDING MUST BE ATTACHED.

Please provide a valid certificate number of the Workmen’s Compensation if registered with the department of labour or attach valid original (or valid certified copy) of the Workmen’s Compensation commissioner letter of good standing from applicable agencies e.g., FEM, RAM etc, if not registered with the department of labour.

Workmen’s Compensation registration number: _____

Workmen’s Compensation certificate number: _____

OR

In the case where it is not possible for an applicant to obtain the above letter of good standing from the Workmen’s Compensation Commissioner, an affidavit is to be submitted advising that the business has registered with the Workmen’s Compensation Commissioner.

OR

In the case where a business does not employ any employees an affidavit Together with a Letter from the Workmen’s Compensation Commissioner addressed to the business, confirming that registration is not required, must be submitted.

FAILURE TO DO SO MAY LEAD TO YOUR TENDER BEING DISQUALIFIED.

Performance Security**RS006****RS006-1 – Confirmation of ability to obtain a Performance Guarantee**

The tenderer must note that on the allocation/awarding of work in the panel shall be required to provide a performance guarantee equal in value to 10 (ten) % of the work allocated amount excluding VAT, such performance guarantee shall be one of the options indicated on the table below. Tenderer shall only select one option that will be applicable only when work is allocated to the tenderer.

Type of Security	Contractor's choice (Indicate "Yes" or "No")
<u>Cash deposit of 10% of the Contract Sum</u> Attach a letter from the bank confirming availability of funds equivalent to 10 (ten) % of the tendered amount exclusive of VAT.	
<u>Fixed Performance Guarantee of 10% of the Contract Sum</u> Attach a letter of undertaking from a recognized financial institution, confirming the issuing of a performance guarantee equal to in value to 10 (ten) % of the tendered amount exclusive of VAT. The performance guarantee is to be issued by a Bank registered in terms of the Banking Act (94 of 1990).	
<u>Retention of 10% of the Works</u> Attach to this document a letter from the director/s giving the Employer consent to deduct 10 (ten) % retention from each progress payment due to the contractor until a limit of 10 (ten) % of the Value of Works is reached.	
<u>Cash deposit of 5% of the Contract Sum plus retention of 5% of the value of the Works</u> • Attach a letter from the bank confirming availability of funds equivalent to 5 (five) % of the tendered amount exclusive of VAT. • Attach a letter from the director/s giving the Employer consent to deduct 10 (ten) % retention from each progress payment due to the contractor until a limit of 5 (five) % of the Value of Works is reached.	

Tenderers Name..... Signature.....

Failure to do so may lead to your Tender being disqualified.

RS006-2 – Bank Rating**TENDERER'S FINANCIAL STANDING AND STABILITY**

- a In terms of the Standard Conditions of Tender, the Tenderer shall provide information about its commercial position, which includes information necessary for the Employer to evaluate the Tenderer's financial standing.
- b A third party credit bureau check will be used to determine the credit worthiness of the Tenderer.
- c The financial standing of the Tenderer will be assessed by third party credit checks on the main contractor
- d An analysis of the Tenderer financial standing will be conducted by third party for the purposes of establishing the Tenderers financial viability and ability to meet all of its contractual obligations for the duration of the contract, should the Tenderer be awarded the contract.
- e Tenders that do not meet King Cetshwayo District Municipality's financial requirements as per third party assessment, will be disqualified from further assessment.

The financial standing of the Tenderer will be assessed by evaluating the bank rating codes in order to carry out the financial risk analysis on the Tenderer. This is done as to establish the Tenderers financial viability and ability to meet all of its contractual obligation for the duration of the contract should the tenderer be awarded the contract.

Attach bank rating with bank Code A-C

NO	BANK CODE	DESCRIPTION OF BANK CODE
1.	A	Undoubted for the amount of enquiry
2.	B	Good for the amount of enquiry
3.	C	Good for the amount quoted if strictly in the way of business
4.	D	Fair Trade risk for amount of enquiry
5.	E	Figures considered too high
6.	F	Financial position unknown
7.	G	Occasional dishonours
8.	H	Frequent dishonours

Failure to do so may lead to your Tender being disqualified.

Municipal Account Statement**RS007****PAGE TO WHICH ANY OF THE FOLLOWING MUST BE ATTACHED**

IN THE CASE WHERE:	Please select the relevant option by ticking below
A. TENDERER AS LANDOWNER FOR PURPOSE OF CONDUCTING BUSINESS FROM PREMISES	
A.1 In the case where the tenderer owns the property from which the tenderer's business operates from, an original or certified copy of the tenderer's business municipal account (not older than 3 months) indicating the status of payment of all municipal rates and taxes i.e. property rates, electricity, water, refuse & sewer from the Municipality in which jurisdiction the said property is situated, must be submitted.	☐
OR	
A.2 In the instance where the tender occupies Tribal land an original/certified affidavit from commissioner of oaths, confirming that the tenderer is residing in the area where no municipal accounts are billed. If the property rates, electricity, water, refuse is charged by the municipality, the original or certified copy of the statement not older than three (3) months in the name of the service provider or any of its directors must be attached. NB: Should there be separate tax invoices from the municipality for property rates and services (taxes), you are required to submit the most recent of each of these invoices.	☐
<u>OR</u>	
B. TENDERER IS THE TENANT FOR PURPOSE OF CONDUCTING ITS BUSINESS FROM PREMISES	
B.1 In the case where the tenderer does not own property and is a tenant for the purpose of its business establishment, the tenderer to provide an original or certified copy of a certificate from its landlord certifying that all the tenants' payments in respect of all municipal rates and taxes i.e. property rates, electricity, water, refuse & sewer are paid up to date, or	☐
B.2 In the case where the tenderer as tenant is responsible for its own municipal accounts with the municipality then tenderer must attach the letter from the landlord certifying the above together with original or certified copies of all most recent relevant municipal invoices i.e., property rates, electricity, water refuse & sewer.	☐
B.3 In the case where the tenderer operates in the property owned by relative and does not pay rent or rates, an affidavit from the relative confirming such must be attached. Also, the up to date original or certified copy municipal rates statement of the relative must be attached or letter from the councillor in case of the Traditional Authority.	☐
B.4 In case where the potential service provider is under incubation programme an original or certified copy of the letter from the incubator confirming that the service provider is using their facilities (property). The incubator is to provide their original or certified copy of rates account or letter from the landlord.	☐
Failure to do so may lead to your tender being disqualified.	

Preferential Procurement - Optional**RS008****MBD 6.1****PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022**

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

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

1. GENERAL CONDITIONS

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

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

1.2 To be completed by the organ of state

(delete whichever is not applicable for this tender).

- a) The applicable preference point system for this tender is the 90/10 preference point system.
- b) The applicable preference point system for this tender is the 80/20 preference point system.
- c) Either the 90/10 or 80/20 preference point system will be applicable in this tender. The lowest/ highest acceptable tender will be used to determine the accurate system once tenders are received.

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

- (a) Price; and
- (b) Specific Goals.

1.4 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

	POINTS	POINTS
PRICE	80	90
SPECIFIC GOALS	20	10
Total points for Price and SPECIFIC GOALS	100	100

- ## 2. DEFINITIONS

- ### 3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

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

80/20 or **90/10**

$$P_S = 80 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right) \text{ or } P_S = 90 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right)$$

Where

Ps = Points scored for price of tender under consideration

Pt = Price of tender under consideration

$$P_{\min} = \text{Price of lowest acceptable tender}$$

- 3.2. FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT
- 3.2.1. POINTS AWARDED FOR PRICE

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

80/20

or

90/10

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

Where

- Ps = Points scored for price of tender under consideration
- Pt = Price of tender under consideration
- Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

- 4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:
- 4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

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

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

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

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

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

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

The specific goals allocated points in terms of this tender	Number of points allocated (90/10 system) (To be completed by the organ of state)	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (90/10 system) (To be completed by the tenderer)	Number of points claimed (80/20 system) (To be completed by the tenderer)
Ownership: EME AND QSE: which is at least 100% owned by black people		10		
Empowerment (Local Economic Development Subcontracting (10%-30% and 40% where it is technically possible and subject to pre-approval: Enterprise owned by black people with CIDB Grading 4 or less.		4		
RDP (Job creation and community upliftment), creation of jobs/labour intensive activities.		4		
Other: Enterprise located within the Province		2		
		20		

DECLARATION WITH REGARD TO COMPANY/FIRM

- 4.3. Name of company/firm.....
- 4.4. Company registration number:
- 4.5. TYPE OF COMPANY/ FIRM

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

[TICK APPLICABLE BOX]

- 4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:
- i) The information furnished is true and correct;
 - ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
 - iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;
 - iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –
 - (a) disqualify the person from the tendering process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person’s conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
 - (e) forward the matter for criminal prosecution, if deemed necessary.

.....

SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME:

DATE:

ADDRESS:

.....

.....

Certificate of Authority for Signatory

RS009

This Returnable Schedule is to be completed by companies and close corporations.

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 or may attach the original or certified board resolution stating the nominated member. **Failure to do so may lead to your Tender being disqualified.**

A Company	B Joint Venture	C Close Corporation

A. CERTIFICATE FOR COMPANY

I, ..., managing director of the board of directors of
....., hereby confirm that by resolution of the board taken on ..
..... 20. . ., Mr/Ms, has been duly authorized to sign all
documents in connection with this tender and any contract resulting from it on behalf of the company.

As witnesses: -

1.....
Managing director

2.....
Date

B. CERTIFICATE FOR JOINT VENTURE

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorize Mr/Ms
....., authorized 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	AUTHORISING SIGNATURE, NAME & CAPACITY
Lead partner		

C. CERTIFICATE FOR CLOSE CORPORATION

We, the undersigned, being the key members in the business trading as.
..... hereby authorize Mr/Ms
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.

Schedule of Plant and Equipment

RS010

Tenderers to furnish with their tenders a complete list of the major items of plant and equipment which they propose to use in the work. After his tender has been accepted, the Contractor must satisfy the Project Manager at all times that such plant and equipment, or its equivalent, is available for use.

TYPE OF PLANT	MAKE & DESCRIPTION	NUMBER	
CATEGORY 1 – PLANT		Owned	Hired
TLB			
CONCRETE MIXER			
EXCAVATOR			
STAMPER/ WACKER			
CATEGORY 2 – EQUIPMENT		Owned	Hired
SHOVELS			
SPADES			
WHEELBARROWS			

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

Tenderer’s Experience

RS011

List of similar projects carried out over the past 5 years with a value of not less than R1 million.

1. Tenderers must take care to provide accurate information in this return. Incorrect contact details of references listed may have a negative impact on scoring.
2. Table RS011.1.1 is a statement of similar work successfully executed by the Tenderer. If the space provided is insufficient, add more projects on a separate sheet by photocopying this template.
3. The Tenderer must indicate the numerical list number out of a given total number of lists submitted on the right top corner of each list.
4. The Tenderer should also indicate duration of each project in weeks as this will be used to calculate the number of years of relevant experience.
5. The tenderer must attach their completion certificates or signed reference letter from the client outlining the tenderers performance.

Table RS011.1.1: List of similar Projects carried out over the past 5 years.

Employer:	Contact person. (Employer's Agent)	Description of contract (name of project)	Project Value (incl. VAT)	Completion Date	Duration (weeks)
1. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
2. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
3. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
4. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
5. Employer's name:	Consultant's name:				
Contact:	Contact:				
Tel:	Tel:				
Cell:	Cell:				
Fax:	Fax:				
Total duration in number of weeks (for official use only)					

Key Personnel**RS012****RS012-1 – List of Key Personnel Assigned to the Contract**

1. Provide relevant information as prescribed below for the following Key Persons proposed in the tender to fulfil the following positions:
2. Curriculum Vitae of all proposed staff need to be attached.

Table RS012.1.1: List of personnel to be assigned to this project.

Name	ID No.	Current Position	No. of Years Employed	Qualifications / Experience
CATEGORY 1 – CONTRACTS MANAGER / SITE AGENT (LIC NQF 5)				
1.				
2.				
3.				
4.				
CATEGORY 2 – FOREMAN (LIC NQF 4)				
5.				
6.				
7.				
CATEGORY 3 – HEALTH AND SAFETY STAFF (SAMTRAC NQF 5)				
8.				
9.				
10.				
CATEGORY 4 – SUPPORT STAFF				
11.				
12.				
13.				
14.				
CATEGORY 5 – ARTISANS AND OPERATORS				
15.				
16.				
17.				
18.				
19.				

.....
Signature

.....
Date

RS012-2 – Curriculum Vitae of Key Personnel

CV's and Certified Qualifications of each key personnel member must be submitted.

- Contracts Manager / Site Agent
- Foreman

Contractors shall employ in labour-intensive works where possible only those supervisory and management staff that have completed the required Skills Programme in terms of Appendix C of the “Guidelines for the implementation of labour-intensive infrastructure projects under the Expanded Public Works Programme (EPWP) Third Edition 2015”:

- Foremen / Supervisors at NQF level 4 “Matric/N3 with trade test in fitting/millwright
- Site Agent / Construction Manager with Degree or National Diploma in Civil Engineering.

CURRICULUM VITAE OF KEY PERSONNEL - MANAGEMENT

Curriculum Vitae of key management personnel to be attached to this page.

and

QUALIFICATIONS OF KEY PERSONNEL

RS012-3 – Attach a proposed organogram to this page.

Failure to do so may lead to disqualification.

Proposed Amendments and Qualifications

RS013

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.3.3 of the Standard Conditions of Tender referenced in the Tender Data regarding the Employer’s handling of material deviations and qualifications.

These amendments and qualifications, if accepted by the Employer, will be incorporated in the Acceptance Form as Deviations.

Page	Clause or item	Proposal

The undersigned, who warrants that he / she is duly authorized to do so on behalf of the Tenderer, confirms that the contents of this schedule are within his / her personal knowledge and are to the best of his / her belief both true and correct.

.....
Signature

.....
Date

Declaration of Tenderer's Past Supply Chain Management Practices**RS014**

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

Item	Question	Yes	No
4.1	Is the Tenderer or any of its directors listed on the National Treasury's database as a company or person prohibited from doing business with the public sector? (Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the <i>audi alteram partem</i> rule was applied).	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		
4.2	Is the Tenderer 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 Tenderer or any of its directors convicted by a court of law (Including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐

4.3.1	If so, furnish particulars:		
4.4	Does the Tenderer or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes	No
4.4.1	If so, furnish particulars:		
4.5	Was a n y contract between the Tenderer and the municipality / Municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes	No
4.5.1	If so, furnish particulars:		

CERTIFICATION

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

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

.....
Signature

.....
Date

.....
Position

.....
Name of Tenderer

Declaration of Interest

RS015

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 names of all directors / trustees / shareholders members, their individual identity Numbers and state employee numbers must be indicated in paragraph 4 below.
- 3.8 Are you presently in the service of the state? YES / NO
- 3.8.1 If yes, furnish particulars
.....
.....
- 1 MSCM Regulations: "in the service of the state" means to be –

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

2 Shareholder" means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.
- 3.9 Have you been in the service of the state for the past twelve months? YES / NO
- 3.9.1 If yes, furnish particulars.....

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

3.10.1 If yes, furnish particulars.....

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

3.11.1 If yes, furnish particulars.....

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

3.12.1 If yes, furnish particulars.....

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

3.13.1 If yes, furnish particulars.....

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

3.14.1 If yes, furnish particulars.....

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

Full Name	Identity Number	State Employee Number

.....
Signature

.....
Date

.....
Capacity

.....
Name of Tenderer

Certificate of Independent Bid Determination**RS016**

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 the 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 with any competitor regarding:
 - (a) Prices
 - (b) Geographical area where product or service will be rendered (market allocation)
 - (c) Methods, factors or formulas used to calculate prices;
 - (d) The intention or decision to submit or not to submit a bid;
 - (e) The submission of a bid which does not meet the specifications and conditions of the bid; or (f) Bidding with the intention not to win the bid.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.

9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
10. 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.
11. 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 Tenderer

Day-works Schedule

RS017

This day work schedule will be used at the discretion of the Agent for the valuation of extra work, which cannot conveniently be valued at rates submitted in the Bill of Quantities.

The rates entered for labour and material shall be inclusive of overhead charges and profit, site supervision of staff, insurances, holidays with pay and the use and maintenance of small hand tools and non-mechanical plant, traveling allowances, other emoluments and allowances. Provision will be made for the insertion of percentages to cover all these items which are henceforth termed “on-costs”. The rate used in the deduction of the value of the day work is thus the basic rate plus the percentage “on-costs”.

In the case of plant, no “on-costs” items is provided. The rate entered shall include any of the above “on-costs” which are pertinent and shall include operator’s costs, consumable stores, maintenance, etc.

The Tenderer must fill in each item listed below, or his Tender may be rejected as being incomplete.

A LABOUR

2 Semi-skilled _____ per hour plus _____ % “On-Cost”

3 Skilled _____ per hour plus _____ % “On-Cost”

B PLANT DESCRIPTION

RATE PER HOUR	WORKING	STANDING
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

NOTE: The rates for compressors shall include for hoses and pneumatic tools.

C MATERIAL

The TENDERER shall state the percentage “On-Cost” he will add to the basic price of materials.

_____ %

.....
Signature

.....
Date

Preliminary Programme

RS018

The tenderer shall outline in the table below or attached his proposed programme for the completion of the Works to conform with the requirements set out in the conditions of contract.

The tenderer shall take note of the Scope of Works Clause 5.2.7 items a. and b. regarding the requirements for programmes.

The successful Tenderer shall use the programme submitted below or attached as the basis for the detailed programme required in terms of the conditions of contract.

ACTIVITY NO.	DESCRIPTION OF WORK	ENVISAGED DURATION	STARTING WEEK	FINISHING

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

Declaration of Competency on Health and Safety Requirements

RS019

Tenderer to provide a declaration on his competencies in establishing and maintaining a Health and Safety plan as required in terms of the Construction Regulations of 2014.

In order to demonstrate these competencies, the Tenderer is to provide with his tender (and attached to this page as a separate document) brief statements as to a safety plan and how the safety management systems will work and what control procedures they plan on using to ensure safety on the construction site.

The following generic aspects should be covered in the safety plan:

- What administrative procedures the Contractor envisage using in the implementation and maintenance of the safety plan with reference to the construction site?
- How continuous assessment of the safety plan will be assessed and implemented with respect to construction site.
- What control systems the Contractor envisage to implement on site to support his safety program.
- How the Contractor will ensure that he adheres to the construction regulations in respect of competent persons for appointments.
- What external resources the Contractor envisage on using to ensure successful implementation and sustainability of the safety plan.
- What training to employees the Contractor envisage and how he would go about to execute it.
- The Contractor should indicate which competent (as described in the OHS Act) persons he currently has in his employ, or he plans on employing and attach abbreviated Curriculum Vitae of these persons.

DECLARATION BY TENDERER:

It is confirmed that an outline of the Health and Safety plan is attached hereto. We further declare that we have the competence and necessary resources to carry out work safely in compliance with the Construction Regulations 2014 and that an approved Health and Safety Plan will be submitted prior to commencing with this contract.

.....
Signature

.....
Date

Quality Assurance and Environmental Management

RS020

1. Quality assurance systems employed by the Bidder in his office in order to ensure compliance with stated employer’s requirements ISO 9001: 2015 Certification: Bidders who are certified as being compliant to the International Organisation for Standardisation’s ISO 9001: 2015 quality management standard, will score higher in the functionality. Proof of certification or application with evidence of previously started process must be attached in order to qualify for functionality points. The extent of the use of this system must be attached in order to qualify for higher scores.

2. Bidders who are following a quality management standard as set out by CESA/SABTACO will be deemed to be adequate if they indicate the extent of the use of this system which must be attached in order to qualify for satisfactory score.

3. Proof of certification of the tendering entity and its sub-contractor(s) or JV partner(s) must be submitted with the tender.

4. Note: Where the entity Tendering is a joint venture, provided one of these parties is ISO 9001: 2015 certified, and it has been indicated on the work plan submitted that the party will take responsibility for quality management.

5. Does the Tenderer have a Quality Management system which is certified in terms of ISO 9001: 2015?
..... YES

NO	

6. If “yes”, Tenderer to supply brief summary of structure of system
.....
.....
.....
.....
.....
.....
.....

7. If “no”, does the Tenderer intend to apply for certification?
By when?
OR

YES	NO
Date:	

8. If “no”, does the Tenderer have its own systems.....
.....

9. If “yes”, please supply details of the system
.....
.....
.....
.....

10. Does the Tenderer have an Environmental Management system which is certified in terms of ISO 14 000

YES	NO

11. Tenderer to supply brief summary of structure of system:

.....

.....

.....

.....

.....

.....

.....

12. If “no”, does the Tenderer intend to apply for certification?

By when?

OR

YES	NO
Date:	

13. If “no”, does the Tenderer have its own systems.....

.....

14. If “yes”, please supply details of the system

.....

.....

.....

.....

15. *If the Tenderer does not intend to apply for certification it shall submit details of the quality / environmental management system presently in place.*

16. *[The Tenderer shall insert here a copy of the company’s quality assurance plan, control procedures and the relevant documentation supporting its commitment to environmental management. In the event of these documents being too extensive to be included in the procurement document, an abbreviated version of the master document will be included, referring to the master document.]*

Name: Signature:

Date:

Position: Tenderer:

Annual Financial Statement

RS021

PAGE TO WHICH AN ANNUAL FINANCIAL STATEMENT MUST BE ATTACHED (FOR A PERIOD OF 3 YEARS)

The AFS must be in accordance to the nature of the business, whether they must be audited or not audited statement. (E.g., Pty companies: Need to be audited and Close Cooperation: do not need to be audited).

FAILURE TO DO SO MAY LEAD TO DISQUALIFICATION

Proposed Targeted Enterprises

RS022

RS022.1 PROPOSED TARGETED ENTERPRISES

Tenders are required to employ Targeted Enterprises on this contract; failure to do so shall lead to tenderer being completely disqualified. The Targeted Enterprises to be utilized should meet the requirements of Preferential Procurement Regulations, 2022 and be registered with CIDB with minimum grading of 2 CE to 4 CE, EME or QSE that is at least 51% Black owned. At least 30% of contract value excluding Contingencies and CPA must be subcontracted to the Targeted Enterprises. The objective is to bring about meaningful transformation in the Construction Industry through the following:

- Meaningful economic participation
- Transfer of technical, management and entrepreneurial skills
- Creation of sustainable Black Enterprises

The Targeted Enterprise ratio will be calculated based on the tendered sum of the works less the VAT, Contingencies, and CPA.

After award of the contract King Cetshwayo District Municipality will make available the list of all contractors registered on CSD database comprising of contractors from King Cetshwayo District Municipality jurisdiction, to provide the required goods and services of the applicable designated groups. Each supplier shall be expected to be eligible or qualify to upgrade to the next CIDB grading at the completion of the identified scope of works.

.....
Signature

.....
Date

RS022.2 ADEQUACY AND QUALITY OF MENTORSHIP AND SKILLS TRANSFER PROGRAMME

1. Tenderers are required to employ designated Subcontractors on this contract with the targeted enterprise(s). The designated sub-contractors to be utilized should be black owned business and registered with CIDB with minimum grading of 2CE to 4CE.
2. A contract Participation Goal of at least 30% for subcontracting to these designated subcontractors has to be achieved by the Tenderer. The objective is to bring about meaningful transformation in the construction industry through the following:
 - Meaningful economic participation
 - Transfer of technical, management and entrepreneurial skills
 - Creation of sustainable Black Enterprises
3. In pursuance of the above objectives, the Tenderer has to develop a mentoring and skills transfer programme which is a practical training programme for targeted black owned SMME construction companies preferably located in King Cetshwayo District Municipality.
4. The mentorship programme must clearly specify the role of the targeted enterprise(s) showing the areas of development in relation to the work packages assigned to the targeted enterprise(s)
5. The on-job training is to be organized and managed by the Developed Enterprise; in contracts awarded and managed by KCDM, but works are executed with the guidance and assistance of experienced Main Contractors at the tendering, mobilization, construction and completion phases.
6. Depending on the nature of contract, the training programme should among other things cover areas such as: understanding Technical Specifications; Standard Specifications; Interpretation of Technical Drawings; Tendering Procedures; Pricing and Unit Rates Build-up; Construction of Civil Works in the Water Industry: Reinforcement, Formwork and False-work; Clearing and Site Establishment; Site Organization and Administration; Surveying and Setting Out; Project Planning and Work Programming/ Scheduling; Contract Supervision and Administration; Environmental Issues; Financial Planning; Project Cost Control; Cash Flow Management; Measurement of Works and Pricing; Preparation of Payment Certificates; Preparation of Claims and Claims Management; Procurement of Equipment and Materials; Personnel Management; Accident and Safety Precaution; Communication. This is just a guide for the design of the mentorship programme.
7. The mentoring and skills transfer programme must indicate what evidence will be produced to show that training did take place. This could for instance be in the form of SAQA accredited modules by relevant CETAs.
8. The Main Contractor (Developed Enterprise) is strongly encouraged to choose relevant CETA accredited modules for training of targeted SMMEs in which case the CETA's NQF level certificates indicating the credits attained could be produced as evidence of the training of the targeted SMMEs. Examples could be NQF2, 3 or 5 in labour intensive construction (LIC) methods.
9. The mentorship and skills transfer programme will be assessed based on the submitted methodology or plan. It must be robust, well thought out and should meet most elements of the description given above depending on the nature of work:
10. A capacity building evaluation/ assessment form is to be designed by the main contractor in agreement with the targeted enterprise(s). This must be included in the tender document. The evaluation/ assessment form has to be filled in by all the contractors every month and after completion of the project. The form is to be used for assessing progress made with the training as well as identifying additional training (or gaps) requiring more training.
11. **The mentorship and skills transfer programme (refer to item no. 5 above) as well as the capacity building evaluation form (refer to item no. 10 above) must be attached below.**

.....
Signature

.....
Date

Tenderer’s Participation in Job Creation Using Local Labour

RS023

The Contractor shall be required to participate in job creation (employment of local labour) by executing various portions of the Works using local labour (unskilled or semi-skilled), recruited from the local community, who are South African Citizens or foreigners in possession of a work visa issued by the Department of Home Affairs (only one such foreigner may be employed on any project). Proof of citizenship or work visa may be audited during the contract period.

The creation of one job shall mean the temporary employment, for any period of time, of one such unskilled or semi-skilled labourer from the local community.

The Tenderer shall note the requirements for Job Creation Reporting for EPWP as set out in the Requirements of the Expanded Public Works Programme (EPWP) of the project specifications.

The number of jobs to be created using such local labour is inclusive of the local labour employed to execute various portions of the Works by both the main Contractor and any subcontractors, including the small development subcontractors.

The number of jobs to be created using such local labour shall include for a minimum percentage allocation to the following individual targeted groups:

- 55% Women;
- 55% Youth; and
- 2% Disabled.

The minimum required content of such local labour for this project shall be calculated as follows:

Minimum required content of such local labour (%) =
$$\frac{(100 \times \text{amount spent on wages for such local labour (excluding VAT)})}{\text{total value of the project (excluding VAT)}}$$

The minimum required content of such local labour for this project is stated in the Conditions of Contract Clause 4.10.4.

For purposes of completing the table on the next page containing the Tenderer’s declaration with respect to participation in job creation using local labour, the total value of the project shall be the amount of the Tender Offer.

TENDERER'S DECLARATION WITH RESPECT TO PARTICIPATION IN JOB CREATION USING LOCAL LABOUR:

The Tenderer shall complete the table below reflecting the anticipated local labour force to be employed on this contract, including such local labour employed by subcontractors.

I/We hereby tender to participate in job creation through the employment of local labour by creating the following number of jobs using unskilled or semi-skilled labourers, recruited from the local community, who are South African Citizens or foreigners in possession of a work visa issued by the Department of Home Affairs (only one such foreigner may be employed on any project), including for a minimum allocation of 55% Women, 55% Youth and 2% Disabled:

Local labour comprising unskilled or semi-skilled labourers recruited from the local community	Anticipated number of jobs to be created	Total number of person-days anticipated	Wage rate per person-day (excluding VAT) (Rand)	Total wage cost (excluding VAT) (Rand)
Contractor's local labour content			R180	
Subcontractors' local labour content				
Total anticipated wage cost of local labour content (excluding VAT)				R
Tender Offer (excluding VAT)				R
Hence anticipated local labour content expressed as a percentage of the Tender Offer (excluding VAT)				
Note: Should this percentage not equal or exceed the specified minimum percentage, the tender will be considered non-responsive in terms of sub clause C.3.8 of the Conditions of Tender and such a tender shall be rejected.				%
Specified minimum local labour content				5%

A penalty shall be applied to any shortfall in the local labour content achieved, as set out in the Requirements of the Expanded Public Works Programme (EPWP) of the project specifications. The penalty shall not apply to shortfalls in the allocations to the individual target groups (i.e., Women/Youth/Disabled), only to shortfalls in the total local labour content achieved.

The undersigned, who warrants that he/she is duly authorized to do so on behalf of the Tenderer, confirms that he/she understands the conditions for such participation and confirms that the tender satisfies the conditions for participation in job creation through the employment of local labour.

Name:

Duly authorized to sign on behalf of:

.....

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

Date

Failure to complete, sign and date this form shall result in the tender being considered non-responsive in terms of subclause C.2.14 of the Conditions of Tender and such a tender shall be rejected.

In the case where a business does not employ any employees an affidavit together with a letter from the Workmen’s Compensation Commissioner addressed to the business, confirming that registration is not required, must be submitted.

- 4) Documentary proof regarding any tendering issue will, when required, be submitted to the satisfaction of the relevant organ of state;
- 5) My municipal rates and taxes are paid up to date and the required proof is attached:

A. TENDERER IS LANDOWNER FOR PURPOSE OF CONDUCTING BUSINESS FROM ITS PREMISES

- A.1 In the case where the Tenderer owns the property from which the Tenderer’s business operates from, an original or certified copy of the Tenderer’s business most recent municipal account indicating the status of payment of all municipal rates and taxes i.e. property rates, electricity, water, refuse & sewer from the Municipality in which jurisdiction the said property is situated, must be submitted.

NB: Should there be **separate** tax invoices from the municipality for property rates and services (taxes), you are required to submit the most recent of each of these invoices.

OR

B. TENDERER IS THE TENANT FOR PURPOSE OF CONDUCTING ITS BUSINESS FROM PREMISES

- B.1 In the case where the Tenderer does not own property and is a tenant for the purpose of its business establishment, the Tenderer to provide an original or certified copy of a certificate from its landlord certifying that all the tenants payments in respect of all municipal rates and taxes i.e. Property rates, electricity, water, refuse & sewer are paid up to date, or
- B.2 In the case where the Tenderer as tenant is responsible for its own municipal accounts with the municipality then Tenderer to provide an original or certified copy of the letter from the landlord certifying the above together with all most recent relevant municipal invoices i.e. property rates, electricity, water refuse & sewer.
- B.3 In the case where the tenderer operates in the property owned by relative and does not pay rent or rates, an affidavit from the relative confirming such must be attached. Also the up to date original or certified copy municipal rates statement of the relative must be attached or letter from the councillor in case of the Traditional Authority
- B.4 In case where the potential service provider is under incubation programme an original or certified copy of the letter from the incubator confirming that the service provider is using their facilities (property). The incubator is to provide their original or certified copy of rates account or letter from the landlord.

.....
Signature

.....
Date

PART C1: AGREEMENTS AND CONTRACT DATA

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C1.1 Form of Offer and Acceptance

C2

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C1.3 Conditions of Contract

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C1.4 Contractual Documentation

C18

IMPORTANT NOTE ON C1.1:

ALL Tenderers MUST complete and sign Form A: OFFER (the first page hereafter).

Form B: ACCEPTANCE will be signed by the Employer and then only in the case of the successful Tenderer.

Form C: SCHEDULE OF DEVIATIONS must be signed by the Employer as well as the successful Tenderer after award of the contract.

Form D: CONFIRMATION OF RECEIPT must be signed by the successful Tenderer on receipt of a fully completed original copy of the Agreement including the Schedule of Deviations, if any.

A tender in which Form A: OFFER has not been completed and signed by the Tenderer, will not be valid and will be disqualified in the discretion of the Employer.

C1.1: FORM OF OFFER AND ACCEPTANCE

FORM A: OFFER

The Employer, identified in the Acceptance signature block, has solicited offers to enter a contract for the procurement of **TENDER NO. KCDM/MIG/02/2023: TENDER FOR THE UPGRADE OF SEWAGE INFRASTRUCTURE IN MELMOTH: REMAINDER OF THE INTERIM UPGRADES TO THE WWTW**

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

By the representative of the Tenderer, deemed to be duly authorized, signing this part of this Form of Offer and Acceptance the Tenderer offers to perform all of the obligations and liabilities of the Service Provider 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.

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

Rate Escalation

Year 2:%

Year 3:%

Signature(s)

Name(s)

Capacity

For the Tenderer:

(Insert name and address of organization)

Name & Signature of Witness

.....

Date

For official use		
INITIALS OF KCDM OFFICIALS AT THE TENDER OPENING SESSION		
1.	2.	3.

FORM B: ACCEPTANCE

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

The terms of the contract are contained in:

- C.1 Agreement, and Contract Data, (which include this Agreement)
- C.2 Pricing Data, including the Bill of Quantities
- C.3 Scope of Work
- C.4 Site Information
- C.5 Annexures

and the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Parts 1 to 5 above.

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

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

Notwithstanding anything contained herein and unless agreed mutually elsewhere in writing between the Employer and the Tenderer, this agreement comes into effect on the earliest of: (a) Two weeks following the date on which the Tenderer acknowledges the receipt of a formal letter awarding the contract; (b) the date when the Tenderer receives one fully completed original copy of this document, including the schedule of deviations (if any). Unless the Tenderer (now contractor) within five working days of the date of receipt of either the letter from the Employer alluded to in (a) or the document alluded to in (b) above notifies the Employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the parties, effective from the date of signature below by the Employer.

Signature: (of person authorized to sign the acceptance)

.....

Name: (of signatory in capitals)

.....

Capacity: (of Signatory)

.....

Name of Employer: (organization) King Cetshwayo District Municipality

Address: Corner of Kruger Rand & Barbados Bay Road, CBD, Richards Bay

Postal Address: Private Bag X1025, Richards Bay, 3900

Telephone number: 035 799 2500 Fax number:

AS WITNESS

Signature: Name: (*in capitals*)

Date:

FORM C: SCHEDULE OF DEVIATIONS

The extent of deviations from the tender documents issued by King Cetshwayo District Municipality prior to the tender closing date is limited to those permitted in terms of the Tender Data and the Conditions of Tender.

A Tenderer’s covering letter will not necessarily 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.

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.

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

- 1

Subject `

Details:

.....
2.

Subject

Details:

.....
3.

Subject

Details:

.....

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

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

FOR THE TENDERER:

Signature:

Name:

Capacity:

Tenderer: *(Name and address of organization)*

..... Witness:

Signature:

Name:

Date:

FOR KING CETSHWAYO DISTRICT MUNICIPALITY

Signature:

Name:

Capacity:

Witness:

Signature:

Name:

Date:

FORM D: CONFIRMATION OF RECEIPT

The Tenderer, (now Service Provider), identified in the Offer part of this Agreement hereby confirms receipt from the Employer, identified in the Acceptance part of this Agreement, of one fully completed original copy of this Agreement, including the Schedule of Deviations on this.

FOR THE CONTRACTOR:

Signature:

Name:

Capacity:

Signature and name of witness:

Signature:

Name:

C1.2: CONTRACT DATA

The Conditions of Contract are the General Conditions of Contract for Construction Works, Third Edition, 2015 published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House, 1685, is applicable to the Contract and is obtainable from www.saice.org.za

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

PART 1: DATA PROVIDED BY THE EMPLOYER

REF.CLAUSE NO.	DATA BY EMPLOYER
1.1.13	The Defects Liability Period is: 12 months
1.1.14	The time for achieving Practical Completion is: 6 months
1.1.1.15	The name of the Employer is: King Cetshwayo District Municipality
1.1.1.26	The Pricing Strategy is: Re-measurement Contract
1.2.1.2	The address of Employer:
	<u>Physical:</u> <u>Postal:</u>
	King Cetshwayo House, Private Bag X 1025 Cnr Krugerrand & Barbados Bay Streets, CBD Richards Bay, 3900
	Telephone No: (035) 799 2500 Fax No: (035) 799 1409
1.1.1.16	Name of the Employers Agent: Impumelelo Consulting Engineers (Pty) LTD
1.2.1.2	Address of the Employers Agent:
	<u>Physical:</u>
	60 Roberts Road Pietermaritzburg 3200
	Tel No.: (033) 342 1698 Fax No.: 033 568 3806 e-mail: admin@impumeleloconsulting.co.za
3.2.3	The Employer's Agent shall obtain the specific approval of the Employer before carrying out duties according to the following Clause of the General Conditions of Contract: Clause 6.3.1, issuing of a Variation Order with financial implications.
Clauses 4.1.1 and SCC 4.1.1:	CONTRACTOR'S GENERAL OBLIGATIONS Add.... The penalty for failing to achieve the monetary value of the target set by the Employer for local labour content in terms of Part F: Requirements of the Expanded Public Works Programme (EPWP) of section C3.3 Particular Specifications in Part C3: Scope of Works, is 3% of the monetary value by which the achieved monetary value falls short of the target monetary value.

REF. CLAUSE NO.	DATA BY EMPLOYER
5.3.1	The documentation required before commencement with Works execution are:
	1. Health and Safety Plan (Refer to Clause 4.3) 2. Initial programme (Refer to Clause 5.6) 3. Cash flow projection aligned to programme. 4. Insurance (Refer to Clause 8.6) 5. Performance Guarantee
5.3.2	The time to submit the documentation required before commencement with Works execution is: 14 Days
5.8.1	Non-working days are: Saturdays and Sundays
	The special non-working days are: Public holidays and the year-end break which commences on the first working day after 15 December and ends on the first Tuesday after 5 January of the next year.
5.9.4	The length of time for the Employer's Agent to issue additional information: 14 days
5.13.1	The penalty for failing to complete the Works will be the lesser of R2 000.00 or 0.05% of the offered total of prices excluding VAT per calendar day.
5.16.3	The latent defect period is: ten (10) years for civil engineering works.
6.8.2	Contract Price Adjustment: is NOT applicable.
6.10.1.5	The percentage advance on materials not yet built into the Permanent Works is: 80% provided a cession in favour of the Employer is provided from both the supplier and the Contractor.
6.10.3	The retention money: The percentage retention on the amounts due to the Contractor is 10% up to a limit of 5% of the contract value with 50% being released on issuing of Certificate of Completion.
6.10.5	The defects Liability Period is specified as being 12 Months.
8.6.1	INSURANCE EFFECTED BY THE EMPLOYER a) Notwithstanding anything elsewhere contained in this Contract 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 the Contractor and where the relevant Sub-contractors the following insurances which are subject to the terms, limits, exceptions and conditions of the Policy. CONTRACT WORKS AND SASRIA SPECIAL RISKS Insurance - which will provide cover against accidental physical loss or damage to the Works, Temporary Works and materials intended for incorporation in the Works. PUBLIC LIABILITY Insurance - which will provide indemnity against legal liability in the event of accidental death of or injury to third persons and/or loss of or damage to third party property arising directly from the execution of the contract and occurring during the period of insurance with a limit of indemnity of R3 000 000.00 in respect of all claims arising from any one occurrence or series of occurrences consequent on or attributable to one source or original cause. b) The Employer shall pay the premium in connection with the insurance affected by the Employer. A provisional sum is included in the Bill of Quantity and will have to be paid over to the Insurance Brokers by the awarded contractor.

REF. CLAUSE NO.	DATA BY EMPLOYER
	c) The Contractor shall not include any premium charges for this insurance except to the extent that he may deem necessary in his own interests to effect supplementary insurance to the insurance effected by the Employer. The Employer reserves the right to call for full information regarding insurance costs included by the Contractor. d) Any further clarification of the scope of cover provided by the Policies arranged by the Employer should be obtained from the Employer or their Insurance Brokers, Sankofa Insurance Brokers, Telephone (011) 025 6566 e-Mail nngwenya@sankofaib.co.za. e) In the event of any occurrence which is likely to or could give rise to a claim under the insurances arranged by the Employer the Contractor shall:- (i) In addition to any statutory requirement or other requirements contained in the Contract immediately notify the Employer's Insurance Brokers or the Insurers by telephone, telex or telefax giving the circumstances nature and an estimate of the loss or damage or liability; (ii) complete a Claims Advice Form available from the Insurance Brokers to whom the form must be returned without delay; and (iii) Negotiate the settlement of claims with the Insurers through the Employer's Insurance Brokers and shall when required to do so obtain the Employer's approval of such settlement. The Employer and Insurers shall have the right to make all and any queries on the site of the Works or elsewhere as to the cause and the results of any such occurrence and the Contractor shall co-operate in the carrying out of such enquiries. f) The Contractor will be liable for the amount of the Deductible (First Amount Payable) in respect of any claim made by or against the Contractor or Sub-contractors under the insurance effected by the Employer. The Deductible (First Amount Payable) for which the Contractors are responsible and which are applicable in respect of each and every occurrence or series of occurrences attributable to one source or original cause giving rise to loss or damage or liability indemnifiable are as follows: - 1) Under the Contract Works Insurance shall be:- i) Elemental perils R 5 000.00 ii) Theft, Malicious Damage R 5 000.00 iii) Any other Cause R 5 000.00 2) Under the Public Liability Insurances in respect of loss of or damage to property shall be:- i) Underground Services R 5 000.00 ii) Any Other Cause R 5 000.00 3) Under any other insurance shall be as specified in such insurance policy. g) Any amount which becomes payable to the Contractor or any of his Sub-contractors as a result of a 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 and liabilities or responsibilities in terms of the Contract.

	INSURANCE EFFECTED BY THE CONTRACTOR a) The Contractor and Sub-contractor shall where applicable provide as a minimum the following: i) Insurance of Construction Plant and Equipment (including tools offices and other temporary structures and contents) and other things (except those intended for incorporation into the Works) brought onto the site for a sum sufficient to provide for their replacement; ii) Insurance in terms of the provisions of the Compensation for Occupational Injuries and Diseases Act (COIDA) Act No 130 of 1993; iii) Employers Common Law Liability Insurance with a limit of indemnity of not less than R 1 000 000.00; iv) Motor Vehicle Liability Insurance comprising (as a minimum) "balance of Third Party" Risks including Passenger Liability indemnity of not less than R 1 000 000.00 (one million Rand); and i) Where the Contract involves manufacturing and/or fabrication of the Works or parts thereof at premises other than at the Contract Site the Contractor shall satisfy the Employer that all materials and equipment for incorporation in the Works are adequately insured during manufacture and/or fabrication. In the event of the Employer having an insurable interest in such Works during manufacture or fabrication then such interest shall be noted by the endorsement to the relevant Policies of Insurance. b) The insurance to be provided by the Contractor and his Sub-contractor shall be effected with Insurers and on terms approved by the Employer (which approval shall not be unreasonably withheld) and shall be maintained in force for the duration required (including any period of maintenance). The Contractor shall within fourteen (14) days of commencement of the contract produce to the Employer the relevant Policies of Insurance. c) If the Contractor fails to effect and keep in force the insurances referred to then the Employer may effect and keep in force any such insurances and pay such premiums as may be necessary for that purpose and from time to time deduct the amount paid by the Employer from any monies due or which may become due to the Contractor or recover same as a debt from the Contractor.
8.6.1.1.2	The value of Plant and materials supplied by the Employer to be included in the insurance sum is R Nil.
8.6.1.1.3	The amount to cover professional fees for repairing damage and loss to be included in the insurance sum is R 250,000.00
8.6.1.3	The limit of indemnity for liability insurance is R 10 000 000 for any single claim, the number of claims to be unlimited during construction and Defects Liability Period
10.4	Dispute resolution by amicable settlement, failure of which will require to further the dispute through adjudication and thereof to arbitration.
10.5.3	The number of Adjudication Board Members to be appointed is: 1

PART 2: DATA TO BE PROVIDED BY CONTRACTOR

REF. CLAUSE No	DATA BY CONTRACTOR
1.1.1.9	Name of Contractor:
1.2.1.2	Address of Contractor:
	<u>Physical:</u> <u>Postal:</u>
	
	
	<u>e-mail:</u> <u>Telephone No:</u> <u>Fax No:</u>
1.1.1.14	Time for achieving Practical Completion of the whole of the Works is:(Max 6 months of that current financial year)
6.2.1	The security to be provided by the Contractor shall be the following: a) Cash deposit of 10% of the contract sum. b) Fixed performance Guarantee of 10% of the contract sum. c) Retention of 10% of the works. d) Cash deposit of 5% of the contract sum plus retention of 5% of the value of the works. e) Fixed performance guarantee of 5% of the contract sum plus retention of 5% of the value of the works.

C1.3: CONDITIONS OF CONTRACT

The Conditions of Contract are the General Conditions of Contract for Construction Works, Third Edition, 2015.

The additional clauses to the General Conditions of Contract are:

PREAMBLE

The Special Conditions of Contract contains clauses hereinafter defined and forms an integral part of the Conditions of Contract. In the case of any discrepancy or conflict with any part of the General Conditions of Contract, the Special Conditions of Contract shall take precedence and shall govern.

CONTRACTOR'S RESPONSIBILITY FOR SETTING OUT Add to Clause 9.1.5.1

The Contractor shall take special precautions to protect all permanent survey beacons, bench-marks, stand boundary pens and trigonometrical beacons regardless whether such pegs or beacons were placed before or during the execution of the contract. If any such beacons or pegs which would not otherwise have been affected by construction of the works, have been disturbed by the Contractor or his employees, the Contractor shall have them replaced by a registered land surveyor at his own cost.

NATURAL VEGETATION (ADDITIONAL SUB CLAUSE) Add new Clause 8.1.6

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

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

ENGAGEMENT OF EMPLOYEES

DELAY THROUGH OPPORTUNITIES AFFORDED TO OTHER PERSONS Add to Clause 10.1.3

"Whenever the Contractor considers that he is suffering a delay in the smooth running of his work as the result of the execution of any work on the Site by other persons he shall report to the Engineer/Employer in writing within twenty-four (24) hours of the occurrence thereof the circumstances and extent of such delay. The Engineer/Employer shall take such steps to resolve the problem as he considers necessary. Failure on the part of the Contractor to report to the Engineer/Employer such delay at the time of its occurrence shall invalidate any claim to any extension of time in terms of **Clause 10.1.1**".

SCC 4.1.1 Extent of Contractor's obligations

Add the following new paragraphs to the end of Clause 4.1.1:

"If the Contractor fails to achieve the monetary value of the target set by the Employer for local labour content in terms of the Requirements of the Expanded Public Works Programme (EPWP) in the Particular Specifications, 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."

Add new Clause 4.11.2

"The Contractor shall at all times exercise strict control over his employees to prevent, as far as possible, any unruly or unlawful behaviour by or amongst the labourers, local community members or leadership thereof and other employed by him.

The Contractor shall not engage or otherwise employ on the Works any person who, at the time of signing the contract, was employed by the Employer upon the Works, unless the Contractor obtains the written consent of the Employer or Employer's Representative in respect of the employment of such person".

INSURANCES Amend Clause 8.6

Clause 8.6 of the General Condition of Contract will be superseded by a principle controlled construction insurance which is provided by the King Cetshwayo District Municipality on all contracts.

Tenderers are to specifically note the detail of insurances affected by the employer as depicted under **Clause 8.6.1** as “insurance effected by the Contractor”.

Additional Special Conditions of Contract

The following additional Special Conditions of Contract clauses SCC 1.1 and SCC 5.3 shall apply only in those circumstances where the Employer is required to apply for a construction work permit in terms of Construction Regulation 3(1):

SCC 5.3 Commencement of the Works

Delete the entirety of Clauses 5.3.1, 5.3.2 and 5.3.3 and replace them with the following:

“SCC 5.3.1 Commencement of the Works

Upon the Employer’s Agent’s instruction, the Contractor shall, save as may be otherwise provided in the Contract, or be legally or physically impossible, commence carrying out the Works. Such instruction shall be provided not later than 14 days after the Commencement Date. Such instruction shall be subject to:

SCC 5.3.1.1 The timely submission by the Contractor, and approval by the Employer’s Agent, of documentation required before commencing to carry out the Works and before the Employer applying for a permit to do construction work, as set out in the Contract Data,

SCC 5.3.2 Unacceptable documentation

If the documentation referred to in Clause SCC 5.3.1 is not submitted within the number of days stipulated in the Contract Data from the date that the Agreement, made in terms of the Form of Offer and Acceptance, comes into effect, or if such documentation is found to be unacceptable, the Employer may terminate the Contract in terms of Clause 9.2.

SCC 5.3.3 Time to instruct commencement of the Works

Where the Contractor delays the submission by the Employer of the application for a permit to do construction work and such permit is not received within 14 days following the Commencement Date such that the Employer’s Agent’s instruction to commence carrying out the Works cannot be given, without prejudice to the Employer’s rights to terminate the contract under Clause 9.2, the Employer’s Agent shall delay issuing the instruction to commence carrying out the Works until such time as the permit to do construction work has been received. The Contractor shall have no entitlement under Clause 5.12 to an extension of time for Practical Completion.

EXTENSION OF TIME DUE TO INCLEMENT WEATHER**Add the following to sub-Clause 5.12.2.2**

(b) Abnormal climatic conditions.

No extensions of the time for completion shall be granted on the grounds of normal rainfall conditions, but extension of time in terms of **Clause 5.12** of the General Conditions of contract on the grounds of abnormal rainfall or wet conditions shall be calculated separately for each calendar month or part thereof, according to the following formula. It shall be calculated as follows for the time for completion, including any extension thereof:

$$V = (Nw - Nn) + \frac{(Rw - Rn)}{X}$$

V	=	Extension of time for calendar days of the calendar month concerned. If the value negative and the absolute value thereof is greater than Nn, V is taken as negative
Nw	=	Actual number of days during calendar month on which a rainfall of Y mm or more is recorded.
Nn	=	Average number of days in the calendar month concerned on which a rainfall of Y more is recorded in terms of existing rainfall data
Rw	=	Actual rainfall for the calendar month concerned in mm
Rn	=	Average rainfall for the calendar month in mm deduced from existing rainfall data.

For the purposes of the contract Nn, Rn, X and Y shall have the values as stipulated below.

The total extension of time is the algebraic sum of the monthly totals for the period concerned, extension of time for parts of a month shall be calculated by using pro rata values of Nn and Rn. If the algebraic sum of the monthly totals is negative, no reduction of the time for completion as a result of rainfall shall be applicable.

This formula does not take any delays as a result of flood damage, which may cause further or simultaneous delays, into consideration and flood damage shall be treated separately for purposes of extension of time for completion.

The factor (Nw – Nn) is considered as a fair allowance for deviation from the normal for the number of days on which the rainfall exceeds Y mm. The factor (Rw – Rn)/X is considered as a fair allowance for deviation from the normal for the number of days on which the rainfall does not exceed Y mm, but on which wet conditions will hamper or disrupt work.

The Contractor shall keep daily rainfall records and submit it to the Employer's Representative at every site meeting. No additional payment shall be made for the supply and installation of the rain gauge or for the keeping of the rainfall records and all costs must be included in the scheduled items:

Information of the records of the nearest rainfall station are given below for the Contractor's information:
* WB42 climate statistics from the South African Weather Services.

Rainfall station	:	Ulundi
Average annual rainfall	:	667.5mm
Period	:	2010 - 2020

Average number of days per year with rainfall exceeding:

Y =	10mm
X =	20mm

MONTH	Nn (No)	Rn (mm)	MONTH	Nn (No)	Rn (mm)
January	2.1	97.1	July	0.6	13.6
February	1.9	70.2	August	0.3	15.5
March	3.1	82.4	September	1	52.2
April	1.1	35.9	October	2.6	75.5
May	0.6	21.1	November	3	98.4
June	0.4	9.6	December	2.8	96

EXTENSION OF TIME DUE TO DISRUPTION OF LABOUR**Add the following to Sub Clause 5.12.2.4**

“Labour disruptions on a regional or national level due to political unrest, organised mass action or related incidents will be considered to be beyond the Contractor’s control.

Any strike within the confines of the Contractor’s company and/or this project only, will be deemed to be within the Contractor’s control”.

DEFECTS LIABILITY PERIOD Add the following to Sub Clause 7.9**7.9.1 Emergency repairs during defects liability period****7.9.1.1 Classification**

Any defect resulting in an interruption in the supply of services will be deemed an emergency repair, and the timing of the works is then of an urgent nature. Such classification will be at the discretion of the Engineer and communicated as such to the Contractor.

7.9.1.2 Availability of Contractor for emergency repairs

During the defect’s liability, the Contractor will ensure that a member of his staff will at all times of day or night be contactable through a cell phone in the event of having to affect an emergency repair.

The Contractor shall as a minimum comply with the following requirements:

- i) A minimum of 1 artisan and 1 skilled labourer shall be available to attend to an emergency repair at all times during normal hours and after hours.
- ii) Suitable tools, plant, transport, test equipment, spares and repair kits shall be available at all times to do the necessary emergency repairs.
- iii) Above labour and resources shall be available on all weekdays including Saturdays, Sundays and public holidays and the names, addresses and contact information shall be made available to the Employer and Engineer for this purpose.

7.9.1.3 Procedure for commencement and execution of works

Upon notification of a defect by the Employer, the Engineer or his representative will instruct the Contractor to attend to the said emergency repair, which instruction will be verbal, and thereafter confirmed in writing.

The Contractor must within 6 hours from such notification arrive on site so as to define the extent of the repair required and must immediately make arrangements to have such a repair rectified, which repair must be affected within 12 hours thereafter.

7.9.1.4 Communication in the event of emergency repairs

The Contractor will immediately upon arrival inform the Engineer of the extent of the problem and also of the anticipated timeframe required to affect the repairs thereto.

Immediately upon completion of the repairs, the Contractor has to provide a verbal notification to the Engineer to the fact that the works have been completed and confirm same within 12 hours in writing.

7.9.1.5 Failure to effect emergency repairs

In the event that the Contractor should fail to attend to the emergency repairs as described above and within the response times noted, the Employer shall be entitled to carry out such work by his own workman or by other persons without further notification to the Contractor and to recover the cost thereof from the Contractor.

CESSION FOR CASH ADVANCEMENTS

No cessions for cash advancements will be entertained by the employer for whatever reason. Cessions will only be accepted for payment of material and nominated sub-contractors, and payment will only be affected on delivery and fixing of material in the required position.

OCCUPATIONAL HEALTH AND SAFETY ACT

The Contractor shall comply with all the requirements of the Occupational Health and Safety Act (Act No. 85 of 2014) and the Regulations framed there under.

The Contractor shall also ensure that any Sub- Contractor employed by him shall also comply with the Act and the Regulations.

The contractor shall submit an approved Health and Safety plan prior to commencement with this contract.

TENDER ACCEPTANCE

The Employer does not bind itself to accept the lowest tender or any tender or furnish any reasons for the acceptance or rejection of any tender.

C1.4: CONTRACTUAL DOCUMENTATION

C1.4.1 CONSTRUCTION GUARANTEE

Contract No: Tender No. **KCDM/MIG/02/2023**

WHEREAS **King Cetshwayo District Municipality** (hereinafter referred to as the Employer") entered into, a Contract with:

(hereinafter called "the Contactor") on the: day of: 20

for

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 give 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 exclusion 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 authorized 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, alterations 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 full 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.
5. Our total liability hereunder shall not exceed the Guaranteed Sum of
..... Rand (in words); R (in figures)
6. The Guarantor reserves the right to withdraw from this guarantee by depositing the Guaranteed Sum with the beneficiary, whereupon our liability hereunder shall cease.

7. 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

this day of 20

Signature

Duly authorized to sign on behalf of

Address
.....
.....

As witnesses:

1

2.

C1.4.2 AGREEMENT OF INDEMNITY IN TERMS OF OCCUPATIONAL HEALTH AND SAFETY ACT 2014

THE KING CETSHWAYO DISTRICT
MUNICIPALITY

duly represented herein by in his
capacity as

..... (hereinafter referred to as
"EMPLOYER")

and

.....

duly represented herein by in his capacity as

.....
(hereinafter referred to as the "MANDATORY")

The EMPLOYER and the MANDATORY hereby agree, in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act 2014 (Act 85 of 2014, hereinafter referred to as “the Act”), that as far as the work described in 1 hereafter, the following arrangements and procedures shall apply between them to ensure compliance by the MANDATORY with the provisions of the Act, namely:

1. DESCRIPTION OF WORK:

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

2. DEFINITIONS:

- 2.1. EMPLOYER: means any person who employs or provides work for any person and remunerates that person or expressly or tacitly undertakes to remunerate him but excludes a labour broker as defined in Section 1(1) of the Labour Relations Act, 1956 (Act No 28 of 1956).
- 2.2. MANDATORY: includes an agent, a contractor or a sub-contractor for word, but without derogating from his status in his own right as an employer or a user.

3. ARRANGEMENTS AND PROCEDURES:

- 3.1. The MANDATORY as an employer in his own right, undertakes to acquaint the appropriate officials and employees of the MANDATORY with all relevant provisions of the Act and the regulations promulgated in terms of the Act;
- 3.2. The MANDATORY undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations will be fully complied with;

- 3.3. The MANDATORY hereby accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the EMPLOYER from itself being obliged to comply with any of the aforesaid duties, obligations and prohibitions; and
- 3.4. The MANDATORY agrees that any duly authorised officials of the EMPLOYER shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the MANDATORY has complied with his undertakings as set out more fully in paragraphs 1 and 2 above, which steps may include, but not be limited to, the right to inspect any appropriate site or premises.
- 3.5. The MANDATORY undertakes to furnish the EMPLOYER with a letter of good standing in terms of Section 89 of the Compensation for Occupational Injuries and Diseases Act 2014 (Act No 130 of 2014) before any work in terms of this agreement is commenced.
- 3.6. The MANDATORY undertakes to appoint a designated responsible person in terms of the Act, and to furnish the EMPLOYER with a copy of such appointment before any work in terms of this agreement is undertaken

THUS DONE AND SIGNED AT RICHARDS BAY ON THIS DAY OF 20.....

AS WITNESSES:

1.
(For and on behalf of the
EMPLOYER)
2.

THUS, DONE AND SIGNED AT RICHARDS BAY ON THIS DAY OF 20.....

AS WITNESSES:

1.
2.

(For and on behalf of the **MANDATORY**)

C1.4.3 TRANSFER OF RIGHTS AND INDEMNITY FOR MATERIALS ON SITE TRANSFER OF RIGHTS FOR MATERIAL ON SITE

Claim for materials on site, Payment Certificate No: Date:

Contract No: for (*contract title*)

I, the undersigned (*name of signatory*) in my capacity as
..... of (*name of Contractor*)

..... duly authorised hereto on behalf of the Contractor hereby transfer, cede and assign all the Contractor's rights, title and interest in and to the materials and goods, for which evidence of bona fide ownership is attached hereto,

unto and in favour of (*name of Employer*)

Insofar as the Contractor retains actual control of the materials and goods, the right of ownership thereof passes to the Employer by *constitutum possessorium*.

I herewith indemnify the Employer against any claim to and in respect of said materials by reason of the Contractor's sequestration or liquidation or of any effect in the Contractor's title to the materials and agree that no payment for materials on site will be made by the Employer until such time as I have submitted documentary proof of bona fide ownership of the said materials and goods.

The transfer shall become effective upon conclusion of the Contractor receiving payment from the Employer or from any other person on behalf of the Employer for the materials and goods as Materials on Site, payment of retention money thereon excluded.

I further confirm that I am fully responsible for all materials and goods listed under this Transfer of Rights and that they have been insured adequately against all risks and will remain insured until they are built into or used in the permanent works and taken over by the Employer.

This certificate of Transfer of Rights applies only to the materials and goods as listed in the following table:

DESCRIPTION OF ITEM	UNIT	QTY	RATE	AMOUNT	SUPPLIER
TOTAL VALUE OF MATERIALS AND GOODS					

Signed by Date
for and on behalf of the Contractor,

Witnesses by Date

[Note: This form, together with the documentary proof of ownership or proof of payment by the Contractor to the supplier, shall accompany the Contractor's claim for payment for materials on site in terms of Clause 49.1.5 of the General Conditions of Contract 2015.]

INDEMNITY FOR MATERIALS ON SITE

We the.....(Bank or Insurance Company)

do hereby bind ourselves as surety in solidum and co-principal debtors to recompense the employer in the event of his not acquiring ownership of materials for whatever reason, or in the event of his lawfully being required to make payment of any sum of money to any third party in order to obtain or retain ownership of full and free possession of the said materials, in circumstances where the employer has paid the Contractor for the said materials on site in terms of Clause 52 (1)(e) of the General Conditions of Contract, and for all losses, damages and expenses that may be suffered or incurred by the Employer as a result of such payment for the said materials on site, renouncing all benefits from the legal exceptions ordinis se excursionis et divisions “No value received” and all other exceptions which might or could be pleaded against the validity of this guarantee, with the meaning and effect of which exceptions we declare ourselves to be fully acquainted; provided that the liability of the undersigned under this guarantee is limited to and shall not exceed

R..... (.....)

and will lapse after issue of the Certificate of Completion of the Contract, unless the surety is advised in writing by the Employer before issue of the said Certificate of his intention to institute claims and the particulars thereof, in which event this guarantee shall remain in force until all such claims are paid or settled.

This undertaking is not negotiable nor transferable and must be returned to us upon payment of the above-mentioned amount.

Bank/Insurance Company:

Address:
.....

..... Date:

PART C2: PRICING DATA

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C2.1: PRICING INSTRUCTIONS

1. Measurement and payment shall be in accordance with the relevant provisions of Clause 8 of each of the SANS 1200 Standardised Specifications for Civil Engineering Construction referred to in the Scope of Work. The Preliminary and General items shall be measured in accordance with the provisions of SANS 1200-A, *General*.
2. The units of measurement described in the Bills of Quantities are metric units. Abbreviations used in these Bills of Quantities are as follows:

%	=	percent
h	=	hour
ha	=	hectare
kg	=	kilogram
kl	=	kilolitre
km	=	kilometre
km-pass	=	kilometre-pass
kPa	=	kilopascal
kW	=	kilowatt
l	=	litre
m	=	metre
mm	=	millimetre
m ²	=	square metre
m ² -pass	=	square metre-pass
m ³	=	cubic metre
m ³ -km	=	cubic metre-kilometre
MN	=	meganewton
MN.m	=	meganewton-metre
MPa	=	megapascal
No.	=	number
Prov sum	=	Provisional sum
PC sum	=	Prime Cost sum
R/only	=	Rate only
sum	=	lump sum
t	=	ton (1000 kg)
W/day	=	Work day

3. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
4. The prices and rates in these Bills of Quantities are fully inclusive prices for the work described under the items.

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

5. It will be assumed that prices included in these Bills of Quantities are based on Acts, Ordinances, Regulations, Bylaws, International Standards and National Standards that were published 28 days before the closing date for Tenders. (Refer to www.stanza.org.za or www.iso.org for information on standards)
6. Where the Scope of Work requires detailed drawings and designs or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amount Tendered such items.
7. An item against which no price is entered will be considered to be covered by the other prices or rates in the

Bills of Quantities. A single lump sum will apply should a number of items be grouped together for pricing purposes.

8. The quantities set out in these Bills of Quantities are approximate and do not necessarily represent the actual amount of work to be done. The quantities of work accepted and certified for payment will be used for determining payments due and not the quantities given in the Bills of Quantities.
9. Reasonable compensation will be received where no pay item appears in respect of work required in the Bills of Quantities in terms of the Contract and which is not covered in any other pay item.
10. The short descriptions of the items of payment given in these Bills of Quantities are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.
11. Descriptions in the Bills of Quantities are abbreviated and comply generally with those in the SANS 1200 Standardised Specifications.

ITEMS SCHEDULED FOR CONSTRUCTION USING LABOUR-INTENSIVE METHODS

Those parts of the Works to be constructed using labour-intensive methods are marked in the Schedule of Quantities with the letters LI, either in a separate column or as a prefix or suffix against every item so designated. The Works or parts of the Works so designated are to be constructed using labour-intensive methods only, unless otherwise specified in the Scope of Work.

The items marked with the letters LI include:

- (a) Items in the COLTO Standard Specifications that would normally be carried out using labour-intensive construction methods.
- (b) Items in the COLTO Standard Specifications that would normally be carried out using plant but which have been modified specifically so as to require the use of labour-intensive construction methods instead of plant for some or all of the work components of the item.
- (c) New items that have been written for this contract specifically requiring the use of labour-intensive construction methods rather than plant for some or all of the work components of the item.

The items marked with the letters LI are not necessarily an exhaustive list of all the activities which could be carried out using labour-intensive methods. Where a minimum percentage for local labour content is specified, additional activities may need to be identified to be carried out using labour-intensive methods rather than plant in order to meet such target.

Those parts of the contract to be constructed using labour-intensive methods have been marked in the bill of quantities with the letters LI in a separate column filled in against every item so designated. The works, or parts of the works so designated are to be constructed using labour-intensive methods only. The use of plant to provide such works, other than plant specifically provided for in the scope of works, is a breach to the contract. The items marked with the letters "LI" are not necessarily an exhaustive list of all the activities, which must be done by hand, and this clause does not over-ride any of the requirements in the generic labour intensive specification in the Scope of Works.

Payment for items which are designated to be constructed labour-intensively (either in this schedule or in the scope of works) will not be made unless they are constructed using labour-intensive methods. Any unauthorised use of plant to carry out work, which was to be done labour-intensively will not be condoned, and any works so constructed will not be certified for payment

C2.2: BILLS OF QUANTITIES

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
1	SANS 1200 A, PSA & PSAB	SECTION 1: PRELIMINARIES AND GENERAL				
1.1		FIXED CHARGES				
1.1.1	8.3.1	Contractual Requirements	Sum	1		
	8.3.2	<u>Establish of Facilities on the Site :</u>				
	8.3.2.1	<u>Facilities for Engineer:</u>				
1.1.2		Engineers site office	Sum	1		
1.1.3		Nameboards	No.	2		
	8.3.2.2	Facilities for Contractor:				
1.1.4		Office storage and sheds	Sum	1		
1.1.5		Workshops	Sum	1		
1.1.6		Ablution and latrine facilities	Sum	1		
1.1.7		Tools and equipment	Sum	1		
1.1.8		Water supplies, electric power and	Sum	1		
1.1.9		Dealing with water (Subclause 5.5)	Sum	1		
1.1.10		Access (Subclause 5.8)	Sum	1		
1.1.11	8.3.3	Other fixed-charge obligations	Sum	1		
1.1.12	8.3.4	Remove Engineer's and Contractor's Site establishment on completion	Sum	1		
	PI & Annex D	HEALTH AND SAFETY				
1.1.13		Preparation of Health and Safety Plan	Sum	1		
1.1.14		Health and Safety Training	Sum	1		
1.1.15		Personal Protective Clothing and Equipment	Sum	1		
1.1.16		Fences, Signs and Barricades	Sum	1		
1.1.17		Establishment of Safety Administration	Sum	1		
1.1.18		Other Health and Safety Fixed-charge Obligations	Sum	1		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
1.2	8.4	TIME-RELATED ITEMS				
1.2.1	8.4.1	Contractual Requirements	Month	6		
	8.4.2	Operate and maintain facilities on the Site:				
	8.4.2.1	Facilities for <u>Engineer</u> :				
1.2.2		Engineers site office	Month	6		
1.2.3		Nameboards	Month	6		
	8.4.2.2	Facilities for Contractor:				
1.2.4		Offices and storage sheds	Month	6		
1.2.5		Workshops	Month	6		
1.2.6		Ablution and latrine facilities	Month	6		
1.2.7		Tools and equipment	Month	6		
1.2.8		Water supplies, electric power and	Month	6		
1.2.9		Dealing with water (Subclause 5.5)	Month	6		
1.2.10		Access (Subclause 5.8)	Month	6		
1.2.11	8.4.4	Company and head office overhead costs	Month	6		
1.2.12	8.4.5	Other time-related obligations	Month	6		
	PI & Annex D	HEALTH AND SAFETY				
1.2.13		Implementation and maintenance of Health and Safety Plan	Month	6		
1.2.14		Provision of Construction Safety Officer(s)	Month	6		
1.2.15		Implementation and maintenance of Training	Month	6		
1.2.16		Maintenance of Personal Protective Clothing and Equipment	Month	6		
1.2.17		Maintenance of Fences, Signs and Barricades	Month	6		
1.2.18		Implementation and maintenance of Safety Administration	Month	6		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
1.2.19	Annex C	Other Health and Safety Time-related Obligations	Month	6		
1.2.20		Submission of Health and Safety File	Month	6		
		ENVIRONMENTAL				
1.2.21		Allow for Environmental compliance (refer to Environmental Management Plan under Annexure C in the tender document)	Month	6		
1.3		SUMS STATED PROVISIONALLY BY ENGINEER				
1.3.1		Allow for Community Liason Officer (CLO)	PC	1	29 810.00	29 810.00
1.3.2		Overhead, charges and profit on item 1.3.1	%	29 810.00		
1.3.3		Allow payment for controlled construction insurance'	PC	1	41 400.00	41 400.00
1.3.4		Overhead, charges and profit on item 1.3.3	%	41 400.00		
1.3.5		Allow for soil tests as directed by Engineer	PC	1	20 700.00	20 700.00
1.3.6	8.8	Extra-over 1.3.5 for administration, profit, etc.	%	20 700.00		
1.3.7		Allow payment for Accredited training	PC	1	124 190.00	124 190.00
1.3.8		Extra-over 1.3.7 for costs, profit, etc	%	124 190.00		
1.3.9		Allow for sewer tests as directed by Engineer	PC	1	41 400.00	41 400.00
1.3.10		Extra-over 1.3.9 for administration, profit, etc.	%	41 400.00		
1.4	8.8	TEMPORARY WORKS				
1.4.1	PSA3	Deal with traffic and maintain road (or accommodation of traffic)	Sum	1		
1.4.2		Dealing with Sub-surface water	Sum	1		
1.4.3		Dealing with sewerage flows	Sum	1		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	
TOTAL BROUGHT FORWARD						
1.5	8.7	DAY WORK (Provisional Item) Any other allowance to be included in the rates {Establishment/Destabishment}				
1.5.1		<u>i) Labour</u>				
1.5.2		a) Contractor Representative	hr	8		
1.5.3		b) Foreman	hr	8		
1.5.3.1		c) Artisan				
1.5.3.2		i) Welder	hr	8		
1.5.3.3		ii) Millwright	hr	4		
1.5.4		iii) Electrician	hr	3		
1.5.5		d) Team Leader	hr	16		
1.5.6		e) Skilled Employee	hr	16		
1.5.7		f) Semi-skilled Employee	hr	16		
1.5.8		g) Unskilled Labour	hr	16		
1.5.9		h) Plumber	hr	16		
1.5.10		i) Imported Labour	hr	16		
1.5.11		j) Local Employee	hr	16		
		k) Surveyor	hr	8		
		<u>ii) Plant</u>				
1.5.12		<u>Tipper Truck</u>	km	50		
		a) 10 m3				
		<u>Flatbed Truck</u>				
1.5.13		a) 7t	km	50		
1.5.14		b) LDV	km	50		
1.5.15		c) Backhoe Loader (TLB) 6 - 7 tonne	hr	8		
1.5.16		d) Excavator 35 - 40 tonne	hr	8		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
1.5.17		<u>Concrete mixer</u> a) (small, towable)	hr	16		
1.5.18		<u>Wheelbarrow Haul</u> a) 0 - 100m	0.06m ³	95		
1.5.19		b) 101 - 200m	0.06m ³	70		
		iii) Miscellaneous				
1.5.20		a) Compressor with 2 Breakers and 2 Operators	hr	4		
1.5.21		b) Handheld portable compactor	hr	5		
1.5.22		c) Water Pump (Q=20C/s@ 120m head) diesel driven	hr	5		
1.5.23		d) Water Pump (Q=9C/s@ 36m head} diesel driven	hr	40		
1.5.24		e) Welding unit (300 Amp)	hr	32		
1.5.25		f) 1.5 kVA diesel-driven generator	hr	40		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
2.	SANS 1200 C&PSC	SECTION 2: SITE CLEARANCE				
2.1		Clear Site				
2.1.1	8.2.1	Clear and grub site (where directed by Engineer):	m2	2 574		
2.1.2		Remove weeds and unwanted plants, load, transport and dispose on suitable waste site identified by the contractor (subjected to approval by the Engineer)	m2	275		
2.1.3		Collect unwanted debris, rubbish and material, load, transport and dispose on suitable waste site identified by the contractor (subjected to approval by the Engineer)	m3	110		
2.1.4		Excavation by hand in soft material to expose existing services (incl. backfill and compaction after identifying service location)	m3	37		
2.1.5		Allow for construction of storm water berms with suitable material from other excavations on site and compacted to 93% MOD AASHTO. Where ordered by the engineer (Provisional). Refer to details on drawing R11-024-20-DET-04	m3	41		
2.1.6		Removal of existing HDPE temporary pipework, loading, transport and offloading of material at clients storage facility (allowance for 4 Km travel)	m	250		
2.1.7		Breaking and removal of existing concrete lining to install new infrastrucutre (incl. loading, transport and dispose on suitable waste site identified by the contractor (subjected to approval by the Engineer)	m3	1		
2.1.8		Draining of existing sludge ponds by means of water pump	Sum	1		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.	SANS 1200 DA, DM, ME	SECTION 3: EARTHWORKS & LAYERWORKS Excavation by hand or machine for: sludge ponds, sludge drying beds, sludge storage area, modifications at inlet works, flow splitter box, new outlet structure, modifications to pond earth walls, retaining walls, gabions, reno mattresses, pipe outlet structure, concrete lined channels, manholes, etc. (excluding pipe trenches)				
3.1		Topsoil				
3.1.1	DA 8.3.1	Remove topsoil to a nominal depth of 150mm, stockpile and maintain	m2	545		
3.2		Cut to fill (In-situ material)				
3.2.1	DM 8.3.4	Excavate in in-situ material, select suitable material during cut operation (including temporary stockpiling), fill or backfill where required and compacted material to 93% MOD AASHTO maximum density in layers not exceeding 150mm thickness.	m3	105		
3.3		Cut to stockpile (In-situ material)				
3.3.1	DM 8.3.4	Excavate in in-situ material, select and stockpile suitable material for usage on site where required (incl. loading, transport and offloading at suitable position on site as well as disposal of excess material at end of contract)	m3	74		
3.4	1200 DM	Cut to spoil (In-situ material)				
3.4.1	DM 8.3.7	Excavate in in-situ material, select, load, transport and dispose of unsuitable material on suitable waste site identified by the contractor (subjected to approval by the Engineer) (Transport within freehaul distance)	m3	192		
3.4.2	DM 8.3.7	Extra-over item 3.4.1 for hauling of spoil material in excess of the freehaul distance (Provisional)	m ³ .km	1 920		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
3.5		Extra-over item 3.2 to 3.4 for excavating and breaking down of material in:				
3.5.1	DM 8.3.6	Hard excavation	m3	37		
3.6		Preparation and compaction of in-situ material				
3.6.1	DM 8.3.3 (a)	Rip & re-compacted to 93% MOD AASHTO maximum density	m3	264		
3.7		Borrow to fill				
		Import G7 material from commercial source and compact to 93% mod AASHTO density in layers not exceeding 150mm thickness.				
3.7.1	DM 8.3.4	(Min CBR = 15% @ 93% mod AASHTO, PI < 12, Max swell of 1.5% @ 100% mod AASHTO) Finish off to levels and dimensions indicated.	m3	75		
		Import G5 material from commercial source and compact to 95% mod AASHTO density in layers not exceeding 150mm thickness.				
3.7.2	DM 8.3.4	(Min CBR = 45% @ 93% mod AASHTO, PI < 10, Max swell of 0.5% @ 100% mod AASHTO) Finish off to levels and dimensions indicated.	m3	4		
3.8		Subbase				
		Construct 150 mm thick subbase with imported G5 material and stabilised to C4 classification with OPC and compacted to 95% mod AASHTO density (including excavation, stockpiling, transport, loading etc).				
3.8.1	ME 8.3.3		m3	125		
		Process materials <u>by</u> means of :				
3.8.2	ME 8.3.5	Stabilising (OPC) <u>Stabilising Agent:</u>	m3	125		
3.8.3	ME 8.3.8	Ordinary Portland Cement (OPC)	t	8		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
3.9		Surface finishes				
3.9.1	DA 8.3.6	Topsoiling of material stockpiled under item 3.1 (including loading, transport, offloading, placing, etc.)	m3	436		
3.9.2	DM 8.3.7	Disposal of excess topsoil material on suitable waste site identified by the contractor (subjected to approval by the Engineer) (Transport within freehaul distance)	m3	109		
3.9.3	PB	Grassing of embankments and or flat areas. Where ordered by the engineer (Provisional).	m2	1 450		
3.10		Ancillary Items				
3.10.1	PSDB2	Soilcrete	m3	55		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
4.	SANS 1200 DB, LB& LD	SECTION 4: SEWERS				
4.1	1200 DB	Excavation Excavate in all materials for trenches backfill, compact to 93% Mod AASHTO, and dispose of surplus/ unsuitable material, for pipes: 160 mm dia - 200mm dia for total trench depth:				
	DB 8.3.2 (a)					
4.1.1		Exceeding 0m but not exceeding 1,0m	m	2		
4.1.2		Exceeding 1,0m but not exceeding 2,0m	m	13		
4.1.3		Exceeding 2,0m but not exceeding 3,0m	m	104		
	DB 8.3.2 (a)	Excavate in all materials for trenches backfill, compact to 93% Mod AASHTO, and dispose of surplus/ unsuitable material, for pipes: 250mm dia - 315 mm dia for total trench depth:				
4.1.4		Exceeding 0m but not exceeding 1,0m	m	288		
4.1.5		Exceeding 1,0m but not exceeding 2,0m	m	316		
4.1.6		Exceeding 2,0m but not exceeding 3,0m	m	3		
	DB 8.3.2 (b)	Extra-over items 4.1.1 to 4.1.6 including for				
4.1.7		Hard rock excavation	m3	80		
4.2	1200 LB	Bedding & Selected Fill Bedding layer and cradle from trench excavations including, screening, placing and compacted to 93% Mod AASHTO density				
4.2.1	LB 8.2.1	Selected granular material	m3	42		
4.2.2	LB 8.2.1	Selected fill material	m3	175		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
		Bedding layer and cradle from other excavations including, screening, placing and compacted to 93% Mod AASHTO density				
4.2.3	LB 8.2.2.1	Selected granular material	m3	14		
4.2.4	LB 8.2.2.1	Selected fill material	m3	58		
		Bedding layer and cradle from commercial source including placing and compacted to 93% Mod AASHTO density				
4.2.5	LB 8.2.2.3	Selected granular material	m3	14		
4.2.6	LB 8.2.2.3	Selected fill material	m3	58		
4.3	1200 LO	Pipework Supply, lay, joint on bed Class C bedding and test structured sewer PVC pipes with seal ring joint				
4.3.1	LD 8.2.1	110mm dia. Class 34	m	12		
4.3.2	LO 8.2.1	160mm dia. Class 34	m	40		
4.3.3	LO 8.2.1	250mm dia Class 34	m	302		
4.3.4	LO 8.2.1	315mm dia Class 34	m	276		
		Supply, lay, joint on Class C bedding (or fix to concrete where applicable) and test HDPE PE100 pipes with Butt-fusion jointing as per SANS 0269.				
4.3.5	LD 8.2.1	110mm dia. HDPE Class 10 pipe	m	12		
4.3.6	LO 8.2.1	200mm dia. HDPE Class 10 pipe	m	180		
4.3.7	LO 8.2.1	250mm dia. HDPE Class 10 pipe	m	6		
4.3.8		Extra-over item 4.3.6 for drilling 40mm dia. holes on the bottom of the outlet pipe at 200mm c/c	m	16		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
4.4	1200 LD	Fittings Supply, fit, lay, bed on Class C bedding (or fix to concrete where applicable) and test of fittings and specials for HDPE and uPVC pipework (complete with butt-fusion jointing (SANS 0269), spigot and socket jointing, solvent weld jointing or flange jointing where applicable):				
4.4.1	LD 8.2.2	HDPE Fittings				
	PE					
4.4.1.1		200mm dia. HDPE PE100 PN10 Y-Junction (45°) - butt-fusion jointing	No.	2		
4.4.1.2		200mm dia. HDPE PE100 PN10 Y-Junction (50°) - butt-fusion jointing	No.	2		
4.4.1.3		200mm dia. HDPE PE100 PN10 long radius bend - butt-fusion jointing	No.	18		
4.4.1.4		200mm x 110mm x 200mm dia. HDPE PE100 PN10 reducing tee - butt-fusion jointing	No.	12		
4.4.1.5		250mm dia. HDPE PE100 PN10 equal tee - butt-fusion jointing	No.	2		
4.4.1.6		200mm dia. HDPE PE100 PN10 end cap - butt-fusion jointing	No.	6		
4.4.1.7		Extra-over item 4.4.1.6 to drill 110mm dia hole at invert of end cap	No.	2		
4.4.1.8		200mm dia. HDPE PE100 PN10 stub with flange (butt-fusion jointing & SANS 1123 1000/3 Flange)	No.	60		
4.4.1.9		250mm x 200mm dia. HDPE PE100 PN10 reducer - butt-fusion jointing	No.	2		
4.4.2	LD 8.2.2	Steel Fittings (Hot dip galvanized)				
4.4.2.1		200mm x 200mm dia. Steel cross with all ends flanged SANS 1123 1000/3	No.	6		
4.4.2.2		200mm dia JIS Equal tee with both ends flanged SANS 1123 1000/3	No.	4		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
4.4.2.3		200mm dia JIS long radius elbow with both ends flanged SANS 1123 1000/3 200mm x 600mm long steel pipe with puddle	No.	2		
4.4.2.4		flange and both ends flanges SANS 1123 1000/3	No.	4		
4.4.2.5		200mm dia JIS long radius elbow with one end flanged SANS 1123 1000/3	No.	4		
4.4.2.6		200mm x 8" BSP threaded flange (SANS 1123 1000/3)	No.	12		
4.4.2.7		8" BSP threaded end cap	No.	12		
4.4.3	LD 8.2.2	PVC Fittings				
4.4.3.1		160mm dia. x 45° Bend (spigot & socket)	No.	1		
4.4.3.2		160mm dia. x 45° Rodding Eye	No.	1		
4.4.3.3		160mm x 160mm dia. Equal tee (solvent weld)	No.	4		
4.4.3.4		160mm x 110mm dia. Reducer (Solvent Weld)	No.	16		
4.4.4	LD 8.2.2	Valves				
4.4.4.1		200mm AVK knife valve with handwheel (flanged SANS 1123 1000/3) or similar approved	No.	6		
4.4.4.2		200mm AVK knife valve with 1500mm extended spindle and handwheel (flanged SANS 1123 1000/3) or similar approved	No.	4		
4.5		Miscellaneous Supply and install afl miscellaneous items complete as per drawings and specifications.	No.	4		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
4.5.1		Stainless steel penstock with hand wheel to fit 300mm wide channel and fixed to concrete (refer to drawing no.R11-024-20-00 L002)	No.	2		
4.5.2		Stainless steel penstock with hand wheel to fit 600mm wide channel and fixed to concrete (refer to drawing no.R11-024-20-00 L002)	No.	1		
4.5.3		50mm x 5mm Stainless Steel clamp for 200mm dia. Pipe bolted to concrete with 2x M12 chemical anchors	No.	46		
4.5.4		GRP grating with 38mm bearing bar depth and banded	m2	3		
4.5.5		1100mm high GRP handrail (two teir, including 90° corners) bolted to top of concrete retaining wall with M12 chemical anchors	m	66		
4.5.6		50mm x 4mm Angle iron (galvanized) bolted to concrete wall with M12 chemical anchors at 370mm c/c	m	6		
4.5.7		50mm x 4mm Angle iron (galvanized) bolted to concrete wall with M12 chemical anchors at 425mm c/c	m	2		
4.5.8		40mm x 4mm Angle iron (galvanized) bolted to concrete wall with M12 chemical anchors at 230mm c/c	m	5		
4.5.9		700mm x 596mm x 5mm thick V-notch stainless steel plate	No.	1		
40273		Bolts, nuts and gaskets to fix flange adaptors, valves, crosses, tees, bends, etc.	Sum	1		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
4.6	1200 LD	Manholes Supply and construct 1000mm internal diameter concrete sewer manhole complete				
	LD 8.2.3	as per dwg R11-024-20-DET-03, including concrete floors, benching and cover slab, including precast concrete frame and lid with steel edges - Medium Duty.				
4.6.1		0m to 1,0 m	No.	14		
4.6.2		1,0 to 2,0 m	No.	14		
4.6.3		2,0 to 3,0 m	No.	2		
		Supply and construct 1000mm internal diameter concrete service manhole complete as per dwg R11-024-20-DET-03, including concrete floors and cover slab, including precast concrete frame and lid with steel edges - Medium Duty.				
	LD 8.2.3					
4.6.4		0m to 1,0 m	No.	1		
4.6.5		1,0 to 2,0 m	No.	1		
4.6.6		2,0 to 3,0 m	No.	13		
4.7		Grid inlet Supply and construct grid inlet complete as per dwg R11-024-20-DET-11, including concrete floor, brickwork, benching, cover slab and CI grid				
4.7.1		1440mm X 1040mm X 1000mm Deep	No.	1		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
5.	SANS 1200 G	SECTION 5: CONCRETE WORK				
5.1	G 8.4.2	Blinding layer in 15 Mpa/19mm concrete				
5.1.1		50mm minimum thickness	m2	440		
5.2	G 8.4.3	Strength concrete: 30 Mpa/19mm				
5.2.1		Sludge storage area	m3	33		
5.2.2		Concrete lined stormwater channel	m3	9		
5.3	G 8.4.3	Strength concrete: 35 Mpa/19mm (Water				
5.3.1		New inlet structure	m3	1.3		
5.3.2		Flow splitter box	m3	3		
5.3.3		Sludge ponds	m3	70		
5.3.4		Sludge drying area	m3	157		
5.3.5		New outlet channel	m3	3.3		
5.3.6		Pipe support columns	m3	1.5		
5.4	G 8.1.1	Formwork				
5.4.1	G 8.2.1	Rough vertical plane to:				
5.4.1.1		Sludge storage area	m2	9		
5.4.1.2		Concrete lined stormwater channel	m2	21		
5.4.2	G 8.2.2	Smooth vertical plane to:				
5.4.2.1		New inlet structure walls	m2	9		
5.4.2.2		Flow splitter box	m2	21		
5.4.2.3		Sludge drying area	m2	350		
5.4.2.4		New outlet channel	m2	26		
5.4.2.5		Pipe support columns	m2	20		
5.4.3		Box out holes / form voids				
5.4.3.1		200mm dia HDPe pipe	No.	8		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
5.4.3.2		200mm dia steel pipe with puddle flange	No.	4.0		
5.4.3.3		250mm dia pipe	No.	4.0		
5.4.3.4		315mm dia pipe	No.	2.0		
5.4.3.5		90mm dia pipe	No.	1.0		
5.5	G 8.1.2	Reinforcement				
5.5.1	G 8.1.2.2	Mild steel bars				
5.5.1.1		8mm to 25mm	t	0.1		
5.5.2	G 8.1.3	<u>High-tensile steel bars</u>				
5.5.2.1		8mm to 25mm	t	11.0		
5.5.3		<u>High-tensile welded mesh reinforcement</u>				
5.5.3.1		Ref 245	m2	1150.0		
5.6	G8.4.4	Unformed finishes				
5.6.1		Steel floated finish				
5.6.1.1		Top of walls	m2	33.0		
5.6.1.2		Floors and channels floors	m2	820.0		
5.7	G8.5	Joints (Refer to drawing no. R11-024-20- 00-L001)				
5.7.1		Construction joint (100mm depth)	m	8.0		
5.7.2		Expansion joint (100mm depth)	m	88.0		
5.7.3		Expansion joint (200mm depth)	m	3.0		
5.7.4		Expansion joint (300mm depth)	m	11.0		
5.7.5		Saw-cut joint	m	44.0		
5.8		Under floor liners				
5.8.1	PD	2.0 mm HDPE lining installed and welded to suppliers specification complete with 32x vents	m2	820.0		
TOTAL CARRIED FORWARD						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
5.8.2		Grade U4 bidum installed under HDPe lining	m2	820		
5.8.3		250 micron "USB Green" polyethylene waterproof sheeting, with minimum 200mm overlaps at intersections, sealed at laps with "Gunplas" pressure sensitive tape	m2	330		
5.9		Test cubes Allow for preparing sets of six 152 x 152 x 152mm concrete test cubes cast from batches of concrete required for the contract as specified, made, stored, cured and tested				
5.9.1		in accordance with SANS methods 861 and 863 including use of approved cube moulds, transporting, paying all charges and submitting reports to Employer. (Only test sets that are approved will be paid for.) (Provisional)	No.	40		
5.10		Ancillary Items Break into existing concrete wall to connect new 250mm dia pipe. Make good with 30 Mpa/19mm concrete after connection (incl. loading, transport and disposal of rubble on suitable waste site identified by the contractor (subjected to approval by the Engineer)				
5.10.1		Break into existing concrete wall to connect new 315mm dia pipe. Make good with 30 Mpa/19mm concrete after connection (incl. loading, transport and disposal of rubble on suitable waste site identified by the contractor (subjected to approval by the Engineer)	Sum	1		
5.10.2		Remove section of existing inlet channel wall (incl. loading, transport and disposal of rubble on suitable waste site identified by the contractor (subjected to approval by the Engineer)	Sum	1		
5.10.3			m3	0.1		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
6.	SANS 1200 DB, L & LB	SECTION 6: MEDIUM PRESSURE PIPELINES				
6.1	1200 DB	Excavation				
	DB 8.3.2 (a)	Excavate, including shoring, in all material for For pipes up to 110 mm dia.:				
	DB 8.3.2 (b)	Over Up To				
6.1.1		1.0 m 2.0m	m	90		
6.1.2	1200 LB	Extra-over items 6.1.1 including for (prov.): Hard rock excavation	m3	3		
6.2	1200 LB	Bedding & Selected Fill				
	LB 8.2.1	Bedding layer and cradle from trench excavations including, screening, placing and compacted to 93% Mod AASHTO density:				
6.2.1	LB 8.2.1	Selected granular material	m3	4		
6.2.2	LB 8.2.1	Selected fill material	m3	18		
		Bedding layer and cradle from other excavations including, screening, placing and compacted to 93% Mod AASHTO density:				
6.2.1	LB 8.2.1	Selected granular material	m3	2		
6.2.2	LB 8.2.1	Selected fill material	m3	4		
6.3	1200 L	Medium Pressure Pipeline				
6.3.1		Supply, handle, lay, bed on Class C pipe bedding, joint with HDPE compression couplings, test and disinfect HDPE PE 100 Class 10 pipes of the following diameters: 25 mm diameter	m	40		
TOTAL CARRIED FORWARD						

SECTION 6: MEDIUM PRESSURE PIPELINES						
ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
6.3.2		90 mm diameter	m	50		
6.4	1200 L	Specials & Fittings Supply, handle, lay, bed on Class C bedding, joint, incl. cut pipes to length where required, test and disinfect.				
6.4.1	L 8.2.2	HDPE compression fittings Class 10:				
6.4.1.1		90mm dia x 90 deg elbow	No.	8		
6.4.1.2		90mm dia x 2" Male adaptor elbow	No.	1		
6.4.1.3		90mm dia Flange Adaptor (SANS 1123 1600/3)	No.	2		
6.4.1.4		25mm dia x 90 deg elbow	No.	1		
6.4.1.5		25mm dia equal tee	No.	1		
6.4.1.6		25mm dia x 1" Male adaptor	No.	2		
6.4.1.7		75mm dia x 1" Saddle	No.	1		
6.4.2		Valves				
6.4.2.1	L 8.2.3	Supply and install 80mm AVK ball check valve (or similar approved) flanged SANS 1123 1000/3	No.	1		
6.4.2.2	L 8.2.3	Supply and install 80mm AVK isolation valve (or similar approved) flanged SANS 1123 1600/3	No.	1		
6.4.2.3	L 8.2.3	1" BSP male threaded brass tap	No.	1		
6.4.3		<u>Specials and other fittings</u>				
6.4.3.1		25mm Female/ Female Elbow (Galv.)	No.	2		
6.4.3.2		25mm x 1000mm long stand pipe (Galv.)	No.	2		
6.4.3.3		25mm Socket (Galv.)	No.	2		
6.4.3.4		40mm x 6mm Galv. angle Iron, 1000mm long	No.	2		
TOTAL CARRIED FORWARD						

SECTION 6: MEDIUM PRESSURE PIPELINES						
ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
6.4.3.5		Bolts, nuts and gaskets to fix flange adaptors and valves	Sum	1		
6.4.3.6		Tools and gear for maintenance and operation	PC	1	8 280.00	8 280.00
6.4.3.7		Overhead, charges and profit on item 6.4.3.6	%	10 000,0		
6.4.4	L 8.2.11	Ancillaries				
6.4.4.1		Supply concrete and cast anchor/thrust blocks	m3	1		
6.5	L8.2.13	Valve Chamber and Manhole				
6.5.1		Construct valve chamber for isolating valve and non return valve complete with concrete base, 110mm drain pipe, precast manhole rings, cover slab, vent and CI lid as per details on drawing R11-024-20-00-PS01	Sum	1		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
7.	PF & PG	SECTION 7: PUMP INSTALLATION				
7.1		Pump Sump				
		Supply all material and construct pump sump complete with concrete base, 1250mm				
7.1.1	PF&PG	precast manhole rings with steps, jointing of rings, cover slab, vent, and CI lid as indicated on the drawing no. R11-024-20-00-PS01	Sum	1		
7.2		Pump				
7.2.1	PF & PG	Supply, deliver and install Lowara DOMO 15T pump (or similar approved)	Sum	1		
		Design, manufacture, deliver, install, commission MCC panel for pump as				
7.2.2	PF & PG	described in project specifications (including supply, cabling and commissioning of ultrasonic level control to pump and MCC panel)	Sum	1		
7.2.3	PF&PG	Supply, deliver, install and connect switch- gear armoured cable for pump unit	m	100		
7.2.4		Allow for electrical connection to control panels and lighting	PC	1	82 790.00	82 790.00
7.2.5		Overhead, charges and profit on item 7.2.4	%	100 000,0		
7.2.6		Supply and install chain to secure pump to cover slab (incl. chemical anchor)	m	4		
7.2.7	PF&PG	Pump station commissioning and testing	Sum	1		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
8.	SANS 1200 DA&DK	SECTION 8: GABIONS AND PITCHING				
8.1		Reno mattress and gabions				
8.1.1	DA 8.3.2	Excavate by hand and prepare ground for gabions and reno mattresses	m3	14		
8.1.2	DK 8.2.1	Surface preparation for bedding of gabions and reno mattresses	m2	50		
8.1.3	DK 8.2.2	Supply and install gabions complete as per details on drawing No. R11-024-20-DET-05 & 06	m3	6		
8.1.4	DK 8.2.2	Supply and install reno mattresses complete as per details on drawing No. R11-024-20-DET-05 & 06	m3	13		
8.1.5	DK 8.2.4	Grade U4 bidum installed under gabions and reno mattresses	m2	60		
8.2		Pitching				
8.2.1	DK 8.2.5	Stone pitching around pipe outlet complete as per details on drawing No R11-024-20-DET-07	m2	10		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
9.		SECTION 9: SUB-SURFACE DRAINS				
9.1	1200 DB	Excavation				
	DB 8.3.2 (a)	Excavate in all materials for trenches backfill, compact to 93% Mod AASHTO, and dispose of surplus / unsuitable material, for pipes: 100 mm dia - 300mm dia for total trench depth:				
9.1.1		Exceeding 1,0m but not exceeding 2,0m	m	23		
9.1.2		Exceeding 2,0m but not exceeding 3,0m	m	60		
9.1.3		Exceeding 3,0m but not exceeding 4,0m	m	6		
9.1.4		Exceeding 4,0m but not exceeding 5,0m	m	6		
9.1.5		Exceeding 5,0m but not exceeding 6,0m	m	18		
	DB 8.3.2 (b)	Extra-over items 9.1.1 to 9.1.5 including for (prov.):				
9.1.6		Hard rock excavation	m3	12		
9.2		Filter Material				
		Supply all material and place coarse filter medium to neat dimensions as shown on the drawings including transport and all labour - 19 mm diameter stone				
9.2.1			m3	14		
		Supply all material and place fine filter medium 0.7 m wide and to depths as shown on the drawings or directed by the Engineer incl transport and labour				
9.2.2			m3	167		
9.3		Polyester Material				
		Supply and install polyester material "Kaymat" grade A2 or similar approved for total width required for trenches for total trench depth:				
9.3.1		Exceeding 1,0m but not exceeding 2,0m	m	23		
9.3.2		Exceeding 2,0m but not exceeding 3,0m	m	60		
9.3.3		Exceeding 3,0m but not exceeding 4,0m	m	6		
9.3.4		Exceeding 4,0m but not exceeding 5,0m	m	6		
TOTAL CARRIED FORWARD						

SECTION 9: SUB-SURFACE DRAINS						
ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
9.3.5		Exceeding 5,0m but not exceeding 6,0m	m	18		
9.4		Pipes for sub-surface drains Supply, fit, lay, bed and test of fittings and specials for sub-surface drain pipework:				
9.4.1		160mm dia	m	113		
9.5		Pipe fittings Supply, fit, lay, bed and test of fittings and specials for sub-surface drain pipework				
9.5.1		160mm dia Y-Junction (45°)	No.	4		
9.5.2		160mm dia x 45° Bend	No.	2		
9.5.3		160mm dia x 90° Bend	No.	1		
9.5.4		160mm dia Rodding eye	No.	4		
TOTAL CARRIED FORWARD TO SUMMARY						

ITEM	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
10.		SECTION 10: FENCING				
10.1		Betaview Fence				
		As per drawing no. R11-024-20-DET-12				
10.1.1		Supply and install betaview fence or similar approved as per detail. Rate to include for all excavation, concrete bases and erection costs. Final dimensions to be finalised on site	m	1 100		
10.2		Galvanised steel security gates				
10.2.1		Supply and erect 5m x 1.8m high galvanised vehicle gate as per detail drawing R11-024- 20-	No.	2		
TOTAL CARRIED FORWARD TO SUMMARY						

**Upgrade of sewage infrastructure in Melmoth: Remainder of the interim upgrades to the Melmoth WWTW
SUMMARY**

BILL	DESCRIPTION	AMOUNT
1	PRELIMINARIES AND GENERAL	
2	SITE CLEARANCE	
3	EARTHWORKS & LAYERWORKS	
4	SEWERS	
5	CONCRETE WORK	
6	MEDIUM PRESSURE PIPELINES	
7	PUMP INSTALLATION	
8	GABIONS AND PITCHING	
9	SUB-SURFACE DRAINS	
10	FENCING	
	SUB-TOTAL	
	CONTINGENCIES 10%	
	SUB-TOTAL	
	15% VAT	
TOTAL CARRIED TO TENDER		

PART C3: SCOPE OF WORK

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PJ	SLUICE GATE / PENSTOCK	C157

C3 SCOPE OF WORKS

C3.1 DESCRIPTION OF WORKS

C3.1.1 Employer's objectives

The employer's objectives are to deliver adequate public infrastructure and services to communities residing within its boundaries, and in this instance to upgrade the existing Waste Water Treatment Works (WWTW) of Melmoth.

C3.1.2 Overview of the works

The works comprises the completion of the remaining work for the interim upgrades to the existing Melmoth WWTW which includes clearing, earthworks, sewer pipework, sewer manholes and concrete works on the sludge ponds, sludge drying beds and sludge storage area. Refer to layout drawing R11-024-20-00-001 and R11-024-20-00-002 depicting an overview of the works.

C3.1.3 Extent of the works

Material will be supplied by the contractor, the detail of which is indicated on the Schedule of Quantities and Specifications. This material should be directly delivered to the contractor's site office and the contractor will allow for offloading, handling, storage and stacking at the point of delivery, and the further distribution thereof to locations where this material is required, and finally for the complete installation of this material, which should include for all labour, plant and auxiliary items required.

The contract is for the supply of all labour, plant and materials to complete the works comprising of the completion, testing and commissioning of the following components of work:

General

- Site establishment and removal of establishment on completion.
- Complying with relevant health and safety regulations.
- Management and supervision of contract.

Included Work

This contract provides for:

- The maintenance of records and accurate measurements of the works for certification by the Engineer.
- The compilation of as-built drawings on completion of the works.
- The supply and application of all safety equipment and clothing applicable to the works.
- The supply of all plant, equipment, materials, transport, labour, incidentals, fuels etc. and supervision to carry out the works.
- The removal of all redundant material, rubble and spoil to the designated Municipal dump area, or other designated area as directed.
- The construction and testing.
- Payment of import and custom duties.
- Transportation and delivery to the designated site in and in the vicinity of the site as required in terms of scope of works.
- Supervision of erection of the contract works, i.e., offloading from transport, safe storage,

handling to situation, installing, setting to work, testing, maintaining prior to the practical completion date and all other work incidental thereto.

Scope of Work

- Additions to the existing inlet works to accommodate new 315Ø pipeline to proposed sludge ponds.
- Additional pipeline to increase capacity of existing pipework up to the existing inlet at the ponds as a temporary measure.
- Construction of a new flow splitter box at the head of the proposed sludge ponds.
- Construction of two (2) 250Ø uPVC pipelines from the splitter box to the head of each sludge pond.
- Damage repairs and earthworks to existing sludge ponds completed in the previous contract.
- Removal of standing water in existing sludge ponds completed in the previous contract.
- Construction of sub soil drains to drain sub surface water.
- Lining of sludge ponds with HDPe lining and concrete lining.
- Installation of 200Ø HDPe pipework discharging into the sludge ponds.
- Installation of 200Ø HDPe pipework draining sludge from ponds to sludge drying areas including manholes, valves, bends, tees, anchoring, etc.
- Damage repairs and earthworks to platform of existing sludge drying beds and storage area.
- Construction of final layer works underneath the proposed concrete sludge drying beds and storage area.
- Construction of concrete lined sludge drying beds and storage area.
- Supply and installation of a pipe draining system from the sludge drying area to a pump sump.
- Construction of a pump sump from precast manhole rings.
- Supply and installation of a submersible pump complete with pipework, valves, non-return valves, switchgear and electrical supply.
- Installation of a rising main discharging at the splitter box.
- Replace existing temporary overflow pipes with larger diameter pipes.
- Supernatant flow pipework (250Ø) from the sludge ponds to the existing aerobic ponds, including manholes.
- New overflow pipework from pond 1 to pond 2 including manholes and a new outlet structure.
- Commissioning and testing of works.
- Concrete lined stormwater drainage channels.
- Clearance of areas and removal of vegetation inside existing ponds.
- Grassing of embankments.
- Removal of temporary pipe system upon completion of work.

- Removal of sections of the temporary pond dividing earth walls.
- Sewer characteristics tests.
- Water reticulation system on site.
- Erosion protection by installing gabions, reno mattresses of stone pitching.
- Ancillary works and tidying up of the site.

C3.1.4 Location of the works

The project site is situated within the King Cetshwayo District Municipality, KZN and located within Mthonjaneni Local Municipality. The central co-ordinates of the area are approximately S 28°34'17.99" Latitude and E 31°24'31.20" Longitude.

C3.2 ENGINEERING

C3.2.1 Design services and activity matrix

Responsibilities for the design and activity matrix can briefly be classified as follows:

- Final design for fixed works	:	Employer
- Design for temporary works	:	Contractor
- Preparation of as-built drawings	:	Contractor

C3.2.2 Employers design

The employer's design is depicted on the tender drawings and provides for detailed design of all of the fixed works. The drawings will be issued as construction drawings upon the award of the contract.

C3.2.3 Contractor's design

The contractor to note the sandy conditions of the soil and the risk of collapse of the trenches and to allow for the design of shoring as temporary works so as to safeguard his employees. The design will be deemed to be incorporated into the rates tendered.

The contractor to incorporate into the rates tendered for excavation the cost for the dewatering of excavations.

The contractor to at the outset satisfies the Engineer as to the construction methodology to be followed, in particular with regards to the tie-in and disconnection of existing services and will not proceed until this has officially been approved. Approval thereof will however not transfer the responsibility for safe working practice from the contractor, who will remain responsible thereof.

C3.2.4 Drawings

The drawings used for setting up the Schedule of Quantities are as follows:

DRAWING NO.	DESCRIPTION

R11-024-20-00-001	WWTW SITE DEVELOPMENT PLAN
R11-024-20-00-002	SITE LAYOUT PLAN
R11-024-20-00-L001	SLUDGE DRYING BED LAYOUT
R11-024-20-00-L002	FLOW SPLITTER BOX LAYOUT PLAN
R11-024-20-00-LS01	LONG SECTIONS PLAN 1 OF 6
R11-024-20-00-LS02	LONG SECTIONS PLAN 2 OF 6
R11-024-20-00-LS03	LONG SECTIONS PLAN 3 OF 6
R11-024-20-00-LS04	LONG SECTIONS PLAN 4 OF 6
R11-024-20-00-LS05	LONG SECTIONS PLAN 5 OF 6
R11-024-20-00-LS06	LONG SECTIONS PLAN 6 OF 6
R11-024-20-00-PS01	PUMP CHAMBER DETAIL
R11-024-20-00-R001	FLOW SPLITTER BOX REINFORCING
R11-024-20-00-R002	SLUDGE DRYING BED REINFORCING
R11-024-20-00-R003	SLUDGE DRYING BED REINFORCING
R11-024-20-00-R004	NEW CHAMBER REINFORCEMENT LAYOUT AND SECTIONS
R11-024-20-00-SEC01	SLUDGE PONDS SECTION
R11-024-20-00-SEC02	SECTION WALL C THROUGH SLUDGE DRYING BED
R11-024-20-00-SEC03	TYPICAL SECTION
R11-024-20-DET-01	CONTRACTOR SIGN BOARD
R11-024-20-DET-01A	SIGN SUPPORT STRUCTURE
R11-024-20-DET-02	PIPELINE MARKERS
R11-024-20-DET-03	SEWER MANHOLES
R11-024-20-DET-04	STORMWATER DETAIL
R11-024-20-DET-05	GABION & RENO MATTRESS DETAIL SHEET 1 OF 2
R11-024-20-DET-06	GABION & RENO MATTRESS DETAIL SHEET 2 OF 2
R11-024-20-DET-07	HEADWALL OUTLET
R11-024-20-DET-08	SEWER PIPE BACKFILL DETAIL
R11-024-20-DET-09	STAND TAP DETAIL
R11-024-20-DET-10	SUBSOIL DRAIN DETAIL
R11-024-20-DET-11	STORMWATER GRID INLET DETAIL
R11-024-20-DET-12	FENCING AND GATE DETAILS

C3.2.5 As-built drawings and information

All information in possession of the contractor that is required by the Engineers representative on order to complete the as-built drawings and to prepare a completion report for the employer must be submitted to the engineer's representative before a Completion Certificate will be issued for the works.

C.3.3 PROCUREMENT

C.3.3.1 Preferential procurement procedures

The works shall be executed in accordance with the conditions attached to preferences granted in accordance with the preferencing schedule.

C3.3.2 Scope of mandatory subcontract work

Competitive Tenders shall be invited in respect of each of the above portions of the works in accordance with the relevant provisions of the latest edition of the CIDB Standard for Uniformity in Construction Procurement.

The Employer together with the Contractor shall evaluate the Tenders received in accordance with the provisions of the Standard Conditions of Tender contained in Annex F of Standard for Uniformity in Construction Procurement. The evaluation panel shall comprise equal representatives from the Employer and from the Contractor.

The Contractor shall without delay enter into contract with the successful Tendering subcontractor based on their accepted Tender submission. The Contractor shall remain responsible for providing the subcontracted portion of the works as if the work had not been subcontracted.

C3.4 CONSTRUCTION

C3.4.1 Standard Specification

The standard specifications on which this contract is based are the Standard Specifications for Civil Engineering Construction (SANS 1200).

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

SANS 10396: 2003:	Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures
SANS 1914-1 to 6 (2002):	Targeted Construction Procurement
SANS 1921 – 1 (2004):	Construction and Management Requirements for Works Contracts Part 1: General Engineering and Construction Works and where accommodation of traffic is involved.
SANS 1921-2 (2004):	Construction and Management Requirements for Works Contracts; and Part 2: Accommodation of Traffic on Public Roads Occupied by the Contractor

C3.4.2 Project Specifications

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

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

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

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

The standard specifications which form part of this contract have been written to cover all phases of work normally required for road contracts, and they may therefore cover items not applicable to this particular contract.

PART A: PROJECT SPECIFICATIONS

PS1 WORKS SPECIFICATIONS

PS1.1 Applicable national and international standards

All construction work must be undertaken in accordance with the Standard Specifications for Civil Engineering Construction SANS 1200. Together with the amendments as indicated in PART A: Project Specifications, PART B1: Variations and Additions to Standardised Specifications, of this document.

Although not bound in nor issued with the Document, the following Sections of the Standardized Specifications of SANS 1200 shall form part of this Contract:

STANDARDIZED SPECIFICATIONS APPLICABLE TO THIS CONTRACT

SANS 1200 A	-	GENERAL
SANS 1200 C	-	SITE CLEARANCE
SANS 1200 D	-	EARTHWORKS
SANS 1200 DA	-	EARTHWORKS (SMALL WORKS)
SANS 1200 DB	-	EARTHWORKS (PIPE TRENCHES)
SANS 1200 DK	-	GABIONS AND PITCHING
SANS 1200 DM	-	EARTHWORKS (ROAD AND SUBGRADE)
SANS 1200 G	-	CONCRETE (STRUCTURAL)
SANS 1200 GA	-	CONCRETE (SMALL WORKS)
SANS 1200 GB	-	CONCRETE (ORDINARY BUILDINGS)
SANS 1200 GE	-	PRECAST CONCRETE (STRUCTURAL)
SANS 1200 L	-	MEDIUM PRESSURE PIPELINES
SANS 1200 LB	-	BEDDING (PIPES)
SANS 1200 LD	-	SEWERS
SANS 1200 M	-	ROADS (GENERAL)
SANS 1200 ME	-	SUBBASE

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

SANS 10396: (2003): Implementing Preferential Construction Procurement Policies using Targeted Procurement Procedures

SANS 1914-1 TO 6 (2002): Targeted Construction Procurement

SANS 1921 – 1 (2004): Construction and Management Requirements for Works Contracts Part 1: General Engineering and Construction Works and where accommodation of traffic is involved:

SANS 1921-2 (2004): Construction and Management Requirements for Works Contracts; and Part 2: Accommodation of Traffic on Public Roads occupied by the Contractor.

Standard Specification for Civil Engineering Construction (SANS 1200 Series)

Model Preambles of Trades - 1999 Edition

National Building Regulations

PS1.2 Particular/generic specifications

As well as the 'Variations and Additions to Standardised Specifications' contained in Part B: Project Specifications, of this document, the following Particular Specifications as contained in PART B1, are applicable to this Contract:

PA	Painting and Corrosion Protection
PB	Grassing
PC	Denso HT Petroleum Tape Wrapping System
PD	HDPE Liners
PE	HDPE Butt Fusion Jointing
PF	Pumping Equipment
PG	Electrical Equipment
PH	Generic Labour-Intensive Specification
PI	Occupational Health and Safety Specification (OHSA 1993 Health and Safety Specification)
PJ	Sluice gate / Penstock

PS1.3 Certification by recognized bodies

No certification of items included in the works is required.

PS2 PLANT AND MATERIALS

PS2.1 Plant and materials provided by the employer

No plant or material will be provided by the employer.

PS2.2 Materials and samples

All tests must be done in accordance with TMH 1 "Standard Methods of Testing Construction Materials".

The contractor, when using materials that are required to comply with any standard specification, shall, if so ordered, furnish the engineer with certificates showing that the materials do so comply.

Where so specified, materials shall bear the official mark of the appropriate authority. Samples ordered or specified shall be delivered to the engineer's office on the site free of charge.

Where proprietary products have been specified, similar products may be used subject to the prior written approval of the engineer.

Unless otherwise specified, all proprietary materials shall be used and placed in strict accordance with the relevant manufacturer's current published instructions.

Unless anything to the contrary is specified, all manufactured articles or materials supplied by the contractor for the permanent works shall be unused.

Earth, stone, gravel, sand, and all other materials excavated or present on the site or within the road reserve, or in borrow areas shall not become the property of the contractor, but will be at his disposal only in so far as they are approved for use on the contract.

Existing structures on the site shall remain the property of the employer and except as and to the extent required elsewhere in the contract, shall not be interfered with by the contractor in any way.

Materials to be included in the works shall not be damaged in any way and, should they be damaged on delivery or by the contractor during handling, transportation, storage, installation or testing they shall be replaced by the contractor at his own expense.

All places where materials are being manufactured or obtained for use in the works, and all the processes in their entirety connected therewith shall be open to inspection by the engineer (or other persons authorised by the engineer) at all reasonable times, and the engineer shall be at liberty to suspend any portion of work which is not being executed in conformity with these specifications".

The contractor shall satisfy himself that any quarry selected for use provides the necessary mined material in accordance with the specification.

PS3 CONSTRUCTION EQUIPMENT

PS3.1 Requirements of equipment

The Contractor shall ensure that any equipment, plant and machinery used on site is safe for use. The necessary requirements as stipulated by the OHS Act 85/1993 and Construction Regulations 2014 shall apply. The Contractor shall ensure that operators are competent and that certificates are kept on site in the health & safety file. All relevant Contractors must ensure the same.

PS3.2 Equipment provided by the employer

No equipment will be provided by the employer.

PS4 EXISTING SERVICES

PS4.1 Known services

It is not foreseen that any existing underground service will require removal, realignment or temporary replacement. However, it will be required by the Engineer that before any work can commence, in close proximity to the proposed work, that the contractor verify the actual position of each service and bring to the attention of the Engineer any service that is not recorded.

As the contractor is not authorised to remove or replace these facilities he shall:

- (i) Give preliminary notice, in writing to the relevant service provider, that the services on the site will require removal or protection prior to works being carried out in the vicinity of each station. The contractor shall advise the service provider of:
 - a) The number of services and their locations and
 - b) The proposed dates when works will commence in the vicinity of each service.
- (ii) In addition to the above preliminary notice, give the service provider 14 days written notice of the intention to commence work in the vicinity of each facility.
- (iii) Upon completion of the work in the vicinity of each facility, the contractor shall notify the service provider, in writing, that work is complete, and the service may be reinstated.

PS4.2 Damage to services

Any cost of repairs, replacement and/or installation of the stations and equipment resulting from the contractor's negligence or unauthorised action shall be to the contractor's account.

PS5 SITE ESTABLISHMENT

PS5.1 Services and facilities provided by the employer.

The Employer will not provide any of the following services.

- electricity
- water supply
- telecommunication services
- ablution facilities
- accommodation
- medical / first aid facilities
- fire protection services
- security

PS5.2 Contractor's camp

The campsite earmarked for this contract will be located within the project footprint. The campsite will be identified after the appointment of the contractor.

PS6 SERVICES AND FACILITIES PROVIDED BY THE CONTRACTOR

PS6.1 Contractor's camp

The Contractor needs to take full cognisance of the local regulations regarding the clearing of bush and felling of trees. No trees may be removed without the Engineer's written permission. In establishing and maintaining the camp site due cognisance of the requirements of the project specification and EMP are to be taken.

The standard of the Contractor's camp, offices, accommodation, ablution, and other facilities must comply with the requirements of the authorities concerned. Details of the above shall also be submitted to the Engineer for approval.

PS6.2 Facilities for the Engineer

Engineers site office

PS6.3 Electricity

The Contractor must make his own arrangement with the Mthonjaneni Local Municipality for a supply from their network if so required.

The Contractor may allow in his tender under the relevant items in the Preliminary & General Section of the Schedule of Quantities for a metered connection. The rate(s) must provide full compensation for the installation, maintenance of the connection and meter, the removal of the connection on completion of the contract, the reading of the meter and monthly consumption charges payable to the Nkandla Local Municipality.

Supply is not guaranteed, and the Contractor must provide at his own expense sufficient backup generators to prevent any loss that might occur due to an interruption of supply should he deem this to be a potential risk to his construction activities.

PS6.4 Water

The Contractor must make his own arrangement with Mthonjaneni Local Municipality / King Cetshwayo District Municipality for a supply from their network if so required.

The Contractor should allow for a metered water connection in his tender under the relevant items in the "Schedule of Quantities".

The rate(s) must provide full compensation for the installation, maintenance of the connection and water meter, the removal and making good of the connection on completion of the contract, the reading of the water meter and monthly consumptions charges payable to the King Cetshwayo District Municipality. Supply is not guaranteed, and the Contractor must provide at his own expense sufficient storage capacity to prevent any loss that might occur due to an interruption of supply should he deem this to be a potential risk to his construction activities.

The Contractor shall further make his own arrangements regarding the possible conveyance and storage of water where required. Water for construction purposes obtained from the metered supply or from raw water sources by arrangements with the King Cetshwayo District Municipality.

PS6.5 Sanitary arrangements

No formal water borne sewer connection is available. If so required, the Contractor must make his own arrangement for a conservancy tank to be installed at the camp site and must make allowance for the regular draining of the conservancy tank by means of honey sucker tankers and dispose of the sewerage at the inlet works of the Melmoth WWTW.

The rate(s) must provide full compensation for the installation, maintenance of the all the sewer pipework and conservancy tank, regular draining of the conservancy tank, the removal of the sewer pipework and conservancy tank upon completion of the contract.

The Contractor shall provide portable chemical latrines. All latrines must, for the duration of the contract, be kept in a clean and hygienic condition to the satisfaction of the Engineer. Sufficient facilities shall be provided for the contractor's employees in compliance with the local health department regulations.

The Contractor shall arrange for a suitable toilet for use by the Engineer. (This may be shared with the Contractor).

PS6.6 Wastewater control

Liquid waste may not be disposed of directly into the ground or watercourses. Liquid waste that is removed from site must be disposed of into the nearest municipal sewage reticulation system unless it does not comply with the King Cetshwayo District Municipality discharge standards.

All runoff from truck washing areas and wash water from concreting vehicles and other equipment shall be collected and directed to a settling dam, HDPE lined, 10m x 4m x 1m deep. Lining to be HI-DRILINE 400 (400 microns) with joints sealed using the HYPERFLEX jointing system. The overflow pipe is to be connected to a temporary 160mm diameter uPVC pipe with discharge to a suitable watercourse.

All liquid waste from vehicle maintenance and runoff from workshops, fuel depot etc. is to be collected and disposed of via a licensed waste disposal contractor. Where possible this liquid should be sent for recycling. On completion of the contract, the dam is to be removed.

PS6.7 Fire protection

The Contractor shall provide adequate firefighting equipment in his working area (including first response vehicle equipped with firefighting equipment). The type, capacity, location and number of items of firefighting equipment shall be to the satisfaction of the Employer's and relevant Forestry Safety / Fire Manager. The Contractor shall also ensure that his employees are trained in the operation of the equipment.

Special attention will have to be given when working in areas adjacent to the commercial plantations and adequate firefighting equipment to be available for emergencies.

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

PS6.8 Refuse and wastes

Separate waste disposal facilities are required for dry/wet concrete; bricks; general rubble and general domestic refuse such as paper, tins, plastics and glass.

The Contractor will make arrangements with a waste disposal company for the removal of waste at regular intervals to the solid waste disposal site currently used by nearest Local Municipality / King Cetshwayo District Municipality.

PS6.9 Accommodation and transport

The Employer will not provide any accommodation for the Contractors employees.

No accommodation for employees is to be provided on the Construction site or the Contractors lay-down area

A 24 hour, seven days a week presence of security personnel will be permitted if required by the Contractor.

Transport of contractor's local employees to the Construction Site or lay-down area will be the responsibility of the Contractor.

PS6.10 Site facilities

The Contractor is responsible for providing appropriate toilets and ablution facilities and for the maintenance thereof. This aspect is also covered in the Environmental regulations and the Contractor is to specify the details of what is intended to be provided in the Contractors Environmental Management Plan.

The Contractor is responsible for providing suitable site offices at the Contractors lay-down area for the Engineer and his own personnel with all required fittings, furniture and office equipment and services for his employees and for the maintenance and cleanliness thereof.

The Contractor is responsible for providing a suitable shaded eating area in the Contractors-lay-down area with tables and seating and for the maintenance and cleanliness thereof.

PS6.11 Security

The Contractor is responsible for the security related to the Construction Site and the Contractors lay-down area.

The Contractors lay-down area must be protected by a suitable security fence and the fence is to be covered with green shade cloth as specified in the Environmental Regulations in this Contract.

The Employer is not liable for losses of the Contractor's or his Subcontractor's plant, equipment or materials from his designated working area, although it has been fenced off.

The Contractor is to set up an appropriate system to secure the Construction Site and the Contractors lay-down area to manage and control all incoming and outgoing personnel, visitors and traffic. The Contractor is to provide details of what he proposes in this regard and the Contractors authority includes the right to search any person or vehicle before entry or exit and to refuse entrance to Site to any person not meeting security requirements.

When objects have been found or lost at Site this shall be reported immediately to the Construction Managers Site Office and a register should be kept to this effect from time to time as required, the Engineer will issue appropriate directives or procedures regarding security and access to Site, which promulgations will be strictly adhered to by the Contractor.

Any breach of security must be reported to the Engineer immediately.

PS6.12 Safety and first aid

All site facilities must conform to the Occupational Health and Safety Act (Act No 85 of 1993). The Contractor shall provide first aid facilities complying with the requirements of this Act for his employees as well as the employees of his Sub-contractors and/ or visitors on site.

PS6.13 Storage facilities

The Contractor is responsible for ensuring that all equipment and materials required under his Contract are delivered to his working area and for the receipt, offloading and storage of the delivered goods.

PS6.14 Laboratory facilities

Although it shall not be a requirement of this Contract that the Contractor supply and maintain a testing laboratory on site, the proposed off-site commercial laboratory to be used shall be approved by the Engineer prior to any testing for this Contract being conducted therein.

The Contractor shall provide and allow for his own facilities, operations and procedures for the testing of materials and the process control testing of materials and workmanship in order to ensure compliance with the requirements of the specifications. The Engineer will only carry out control testing. Laboratory facilities and testing apparatus can either be provided on the Site of Works or the Contractor may make use of a private laboratory to be approved by the Engineer.

The Engineer will not consider any claims related to delays to the Works due to test results being awaited. It is in the Contractor's own interest to ensure that samples and/or the necessary facilities are provided timeously.

Should the Contractor decide to use an outside or private laboratory, the tendered amount shall include for the Contractor's overheads, profit and all costs associated with the use of the outside laboratory (including transport of samples).

PS6.15 Vehicles and equipment

"Construction Plant" includes all types of plant including but not limited to, cranes, piling rigs, excavators, road vehicles, and all lifting equipment.

The Principal Contractor shall ensure that all such plant complies with the requirements of the OHS Act 85/1993 and Construction Regulations 2014. The Principal Contractor and all relevant Contractors shall inspect and keep records of inspections of the construction plant used on site. Only authorized/competent persons are to use machinery under proper supervision. Appropriate PPE and clothing must be provided and maintained in good condition at all times.

PS6.16 Hired plant and machinery

The Principal Contractor shall ensure that any hired plant and machinery used on site is safe for use. The necessary requirements as stipulated by the OHS Act 85/1993 and Construction Regulations 2014 shall apply. The Principal Contractor shall ensure that operators hired with machinery are competent and that certificates are kept on site in the health & safety file. All relevant Contractors must ensure the same.

PS6.17 Advertising rights

The Contractor shall not publish, or cause to be published, any papers, articles or information relating to this project, nor permit any advertising mentioning the subject of this Contract, nor display, or permit to be displayed, any advertisements on the Site, or elsewhere, in connection with this Contract, without the prior permission, in writing, of the Employer. The Contractor shall be responsible for the observance of this Clause by his employees and by his Sub-Contractors.

PS6.18 Notice boards

The Contractor shall provide two contract name boards. Details of the Name board is bound in at Section C5, Annexure A of this document. The Engineer will clarify the positions of the boards on the site.

PS7 SITE USAGE

The extent of the works is indicated on the appropriate drawings and the contractor has to restrict his activities to within practical limits and servitude so as to ensure the least possible area is disturbed.

Further commercial plantations outside the township boundary are considered no-go areas for the duration of the contract.

PS8 WATER FOR CONSTRUCTION PURPOSES

Refer to PS6.4. Contractor will be responsible for making his own arrangements in this regard.

PS9 SURVEY CONTROL AND SETTING OUT OF THE WORKS

Control beacons for setting out the proposed works will be shown to the Contractor on official handing over of the site. The Contractor shall be responsible for setting out of the works. A registered Land Surveyor shall replace control or any property beacons damaged by the Contractor during the course of construction at his cost.

PS10 CONSTRUCTION MANAGEMENT

Construction management of the works

PS10.1 Applicable SANS 1921 standards

SANS 1921 – 1 (2004): Construction and Management Requirements for Works Contracts Part 1: General Engineering and Construction Works and where accommodation of traffic is involved:

SANS 1921-2 (2004): Construction and Management Requirements for Works Contracts; and Part 2: Accommodation of Traffic on Public Roads occupied by the Contractor.

PS10.2 Particular / generic specifications

As well as the 'Amendments to the Standard Specifications' contained in PART B: Project Specifications, of this document, the following Particular Specifications as contained in PART C, are applicable to this Contract:

PA	Painting and Corrosion Protection
PB	Grassing
PC	Denso HT Petroleum Tape Wrapping System
PD	HDPE Liners
PE	HDPE Butt Fusion Jointing
PF	Pumping Equipment
PG	Electrical Equipment
PH	Generic Labour-Intensive Specification
PI	Occupational Health and Safety Specification (OHSA 1993 Health and Safety Specifications)
PJ	Sluice gate / Penstock

PS10.3 Planning and programming

A detailed programme is required within 7 days after the commencement date. The programmed shall not be in the form of a bar chart only but shall show clearly the anticipated quantities of work to be performed each week, together with the manner in which the listed plant is to be used, as well as the anticipated earnings for the various sections of work.

Failure to comply with these requirements will entitle the Engineer to use a programme based on his own assumptions for the purpose of evaluating claims for extension of time or additional payments.

If, during the progress of work, the quantities of work performed per week fall below those shown on the programme, or if the sequence of operations is altered, or if the programme is deviated from in any other way, the Contractor shall, within 2 days of having been notified by the Engineer, submit a revised programme and network.

If the programme has to be revised by reason of the Contractor falling behind his programme, he shall produce a revised programme showing how he intends to regain lost time in order to ensure completion of the Works within the time for completion as defined in Clause 5.6 of the General Conditions of Contract plus any granted extension of time. Any proposal to increase the tempo of work must be accompanied by positive steps to increase production by providing more labour and plant on site, or by using the available labour and plant in a more efficient manner.

Failure on the part of the Contractor to submit the programme or to work according to the programme or revised programme shall be sufficient reason for the Engineer to take steps as provided in Clause 5.7 of the General Conditions of Contract.

The approval by the Engineer of any programme shall have no contractual significance other than the Engineer will be satisfied if the work is carried out according to such programme and that the Contractor undertakes to carry out the work in accordance with the programme.

It shall not limit the right of the Engineer to instruct to vary the programme if required by circumstances. The contractor is also referred to Clause 5.6 of the General Conditions of Contract when drawing up his programme.

Tenderers shall, with their tenders, submit to the Engineer a preliminary programme in the form of a bar chart indicating for each portion of the works, the proposed order and rate of progress of the various construction activities. The programme shall be consistent with the construction period tendered to complete the contract.

The successful tenderer shall be required to take cognisance when preparing the construction program and shall note the following:

The programme shall be in the form of a bar chart (Gantt chart) or any other time-activity form acceptable to the Engineer, and shall clearly show:

- (i) The proposed rate of progress in order to complete the works within the required period as tendered, showing the various activities, their durations and proposed resourcing levels (major plant and labour) for each element of the works. Sufficient detail shall be provided to enable the Engineer to be able to gauge construction progress. All activities, including establishment on site, trimming and finishing and the completion of all minor ancillary works are to be included in the programme.
- (ii) The sequence of activities and any dependencies (time or resource related) between them.
- (iii) The critical path activities.
- (iv) Key dates in respect of work to be carried out, or information, etc., to be provided, by others.
- (v) Other information specifically required by the Engineer.

In drawing up the programme the contractor shall make allowance for the following:

- a) Construction of all works is to be completed in 12 months.
 - (i) All special non-working days are defined in C1.3.1: Conditions of Contract, Part 3: Contract Specific Data, Clause 5.8.1.
 - (ii) The expected delays defined in Section C3: Scope of Works Part A, PS 10.6.22: Extension of time resulting from inclement weather.
 - (i) Known physical conditions or artificial obstructions.
 - (ii) Occupational, Health & Safety approvals.
 - (iii) The accommodation and safeguarding of public traffic.
- b) Restrictions on the supply of material from commercial sources.
 - (iv) Allowance must be made to accommodate sub-contractors working on the site such as electrical and gas contractor.
 - (v) Environmental requirements as per Specification.
 - (vi) Geotechnical aspects which could have an impact on the works.
 - (vii) On site access as per own requirements and construction methodology.
 - (viii) Critical aspects which could have an impact on the works.
 - (ix) Accommodation of traffic for access and egress from Medway Road.

The following details shall be submitted together with the programme:

- (i) The number of working hours per day, working days per week, assumed holiday or shut down periods on which the programme is based.

- (ii) The overall labour and major plant resource levels and production rates on which the programme is based.
- (iii) The detailed traffic accommodation proposals on which the programme is based.
- (iv) A budget forecast of the value of completed work, excluding CPA and contingencies but including VAT, month by month, for the full contract period.

These additional items shall also be revised when any revision is made to the programme.

Failure to comply with these requirements entitles the Engineer to use a programme based on his own assumptions to evaluate claims for extension of time for completion of the works, or for additional compensation.

Minor revisions to the approved programme may be introduced from time to time by mutual agreement between the Contractor and the Engineer. Should the Engineer believe that a major revision of the programme is required, the Contractor will be notified in writing and an updated programme shall be submitted within two weeks of receipt of such notification.

It should be noted that it is in the Contractor's interest to provide a comprehensive programme giving as much information as possible about the times allowed for the various activities as well as resource or other limitations affecting the programme, since the approved programme may be used to evaluate any claims in terms of the General Conditions of Contract for extension of time.

The Contractor shall submit to the Engineer, at least three working days before each monthly site meeting, copies of the following:

- (i) The contract programme with progress charts and programme graphs updated to reflect the actual progress to date.
- (ii) A summary of progress on site over the month preceding the site meeting. The report shall be in the form of a detailed narrative to the contract programme.
- (iii) Details of activities running late, indicating what steps have been or will be taken to ensure that the work is completed within the specified time.
- (iv) A report on all labour, plant and materials on site.
- (v) All other appendices to the monthly site meeting minutes, as required by the Employer."

c) Programme revisions

The programme will be reviewed at the monthly site meetings at which the contractor shall provide sufficient detail that will allow the comparison of completed work per activity against the original approved programme. The contractor shall indicate what resources and programme changes he intends to implement in order to remedy any activity that has fallen behind. The engineer may demand from the contractor a major revision of the programme. Such a revision shall be submitted for approval within fourteen days (14) of the demand."

PS10.4 Sequence of the works

No phased construction is anticipated.

PS10.5 Software application for programming

Microsoft Projects will be the software platform used for preparing and providing the programme in accordance with the requirements as set out in the specification.

PS10.6 Methods and procedures

PS10.6.1 Contractors' areas and housekeeping

Before moving onto Site, the Contractor shall indicate how he intends to utilise the Construction site and Contractors lay-down area. The Contractor shall indicate proposed locations of offices, ablutions and toilets, stores, car park, equipment park, pre-cast yard etc. for the Engineer's approval.

All persons on Site are expected to contribute towards keeping the Site orderly and tidy. Rubbish, such as cartons, papers, tins and bottles shall be suitably disposed of.

The Contractor and his Subcontractors shall only store waste material, rubbish, spoil, etc, at places and in a manner designated by the Engineer.

Rubble and waste construction materials may not be buried or burnt.

The Contractor shall ensure that his working area and that of his Subcontractors' is kept neat, tidy and clean at all times.

If the Contractor fails to maintain satisfactory standards of housekeeping to the reasonable satisfaction of the Engineer, then the Engineer may undertake this work with other resources and back-charge the cost to the Contractor.

The Contractor's work is not completed until he has tidied and cleaned his working area to the reasonable satisfaction of the Engineer.

PS10.6.2 Access

The Engineer shall have the right to enter at any reasonable time, any part of the Contractor's working area or offices.

PS10.6.3 Hours of work

Although the Site will be accessible 24 hours a day, the Contractor is required to define his standard working hours which must comply with statutory requirements.

The Contractor is reminded that every employee shall take at least 24-hour continuous rest in any period of seven days.

Requests for working outside these agreed hours shall be made to the Engineer at least 24 hours in advance in the prescribed format.

The Contractor shall ensure that adequate supervision is provided outside normal working hours.

PS10.6.4 Restricted areas

Various areas of the Site may be designated from time to time as restricted for some reason. Notices of these areas will be issued by the Engineer in writing. All personnel are expected to observe the conditions laid down in these notices.

The Contractor's employees must follow the defined roads and walkways when coming to or leaving their normal workplace. Taking short cuts through other sections of the Works is not permitted.

PS10.6.5 Emergency procedures and safety

The Contractor will prepare issue procedures for warnings of emergency, evacuation arrangements, communication arrangements and responsibilities for action in an emergency.

The Contractor shall submit a list of names and telephone numbers of persons to be contacted in case of accident or emergency outside normal working hours.

PS10.6.6 Access to and within the site

Access to the site of the works can be obtained from the R66 provincial road.

The contractor must evaluate the construction space, site conditions and constraints together with any other aspect that may influence his construction activities and or methodology and allow for it in his tendered rates. No additional claims will be considered in this regard.

No separate payment shall be made for this as all costs related thereto shall be deemed to be covered by the tendered rates.

PS10.6.7 Possible areas for stockpiling or spoiling of material

Suitable areas for the temporary stockpiling of topsoil will be in areas as agreed with the Engineer.

All spoil material shall be hauled to and disposed of at the Municipal Refuse Site.

Excesses clean sand material, which is to be spoiled, shall be transported and stockpiled on a site indicate and approved by the municipality.

PS10.6.8 Dust control

The Contractor shall apply water using a water tanker at regular intervals to access and construction roads where dust is causing a nuisance. The application rate should be sufficient to keep the routes dust free during the movement of construction equipment.

PS10.6.9 Delivery of material

The Contractor shall ensure that all material delivered and removal vehicles carrying loose material are suitably covered to prevent the loss of material. The rates tendered shall include for suitable covers including for sub-contractors supplying or removing materials.

PS10.6.10 Source of materials

The Contractor will be responsible for locating of all materials complying with the relevant minimum requirements to be used in this contract. No separate payments shall be made for this as all costs related thereto shall be deemed to be covered by the tendered rates.

PS10.6.11 Borrow site and spoil areas

All spoil material shall be hauled to and disposed of at the Municipal Refuse Site located within L.M. of construction. Any spoil sites other than the Municipal Refuse Site shall be determined on site in conjunction with the Engineer. The Contractor shall be permitted to use only those spoil areas approved by the Engineer.

PS10.6.12 Nature of ground conditions

No geotechnical assessment of the site was undertaken. Before tendering the Contractor must form his own opinion by his independent enquiry and observation as to the character of the strata through which the excavations are to be made.

PS10.6.13 Groundwater

Some groundwater seepage through the ground profile should be anticipated after periods of rainfall.

The elevation of groundwater seepage is influenced by the rainfall and during the wet season the elevation of the perched water table can rise particularly after prolonged heavy storm events.

The subsoil conditions in existence must be evaluated by the contractor for any aspect that may influence his construction activities and or methods of construction allowance for de-watering of trenches and excavations so as to make allowance therefore in his tendered rates.

No separate payment shall be made for this as all costs related thereto shall be deemed to be covered by the tendered rates.

PS10.6.14 Flooding

The site is prone to very high rainfalls during summer. With the typical high-water tables, the excavations may easily become flooded. The Contractor shall take the necessary temporary precautions to direct storm water away from his excavations, work areas, temporary works and haul roads.

PS10.6.15 Dealing with water

Where necessary, the Contractor shall construct temporary drainage channels to divert ground water from his excavation, work areas, temporary works and haul roads and should this be necessary excess water must be pumped out.

No compensation for any variation of the actual conditions during construction from data given will be considered. Neither will additional compensation be considered for data omitted or inaccurately given. The rates tendered shall allow for the requirements of this clause and all incidentals.

PS10.6.16 Maintenance

The Contractor shall be responsible for maintenance of the works until final completion of the works.

PS10.6.17 Finishing and tidying

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

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

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

PS10.6.18 Security Regulations

PS10.6.18.1 General

All personnel on Construction Site or Contractors lay-down area must possess an identification card supplied by the Contractor. Particulars to be reflected on the identification card include at least the surname and initials of the employee together with an identity number and occupation and a recent photograph.

Only persons with legitimate business on the Construction Site or Contractors lay-down area and in possession of positive identification are allowed access to these areas.

PS10.6.18.2 Vehicles

Contractors' and visitors' cars are not allowed within the Construction Site area. Cars must be parked in the car park at the Construction lay-down area.

A limited number of Contractor vehicles will be allowed entry to the Construction Site and suitable vehicle entry discs should be issued by the Contractor at the discretion of the Engineer on receipt of an application signed by the Contractor.

No motorcycles, two wheel or four-wheel types will be allowed on the Site.

PS10.6.18.3 Visitors

Visitors are subject to all rules of identification, safety and discipline and if occasional must be accompanied by a host who has undergone formal Safety induction for the Construction Site. Regular visitors can apply for a permanent identification card but are then obliged to attend the Construction Site Safety induction program. A visitor is regarded to be a "regular" visitor if he/she visits the Construction Site once or more per week.

Visitors must be provided with, or provide their own, mandatory Personal Protective Equipment.

PS10.6.18.4 Recruiting

No recruiting of personnel will be allowed at the Construction Site or Contractors lay-down area.

PS10.6.19 Site Instruction Book

The Contractor shall supply, at his own expense an A4 size triplicate book which shall be kept in the site office. All correspondence between the Engineer's and Contractor's site staff shall be entered into this book, and each entry signed and dated by both parties. It shall be available from the first day of the contract and at all times be accessible to the Engineer.

The original shall be issued to the Contractor, the first copy is to be forwarded to the office of the Engineer and the second copy shall remain in the book. Engineer's version of the entries that have been lost will be assumed correct and binding. If the Contractor should lose the book it will be considered a grave offence on his part. In such case the Engineer's version of the entries that have been lost will be assumed correct and binding.

PS10.6.20 Daily records

A site diary is to be compiled jointly by the contractor's and the employer's representative on site and is to be signed and agreed by both parties. The original signed copy is to be retained by the employer's representative.

The contractor is to keep daily records of people and equipment on site in a format to be agreed by the employer's representative and provide copies to the employer's representative when requested.

PS10.6.21 Permits

No security/entrance permits are required by the contractor's personnel to enter the site.

PS10.6.22 Extension of time for completion

PS10.6.22.1 Climatic records and claims for extension of time arising from climatic conditions.

The Contractor shall record all rainy and windy periods during the execution of the Works. The recordings shall be submitted to the Engineer's Representative on a weekly basis, together with a statement recording the Contractor's opinion of the effect on the progress of the Works and on his construction program of any climatic conditions which he may consider to be abnormal and/or to constitute a reason for an extension of the time for Completion of the Works.

Claims for an extension of Time for Completion due to climatic condition whether it may be an initial or final claim in accordance with Clause 5.12 of the General Conditions of Contract (GCC), shall be submitted to the Engineer's Representative on a weekly basis, notwithstanding any provisions or conditions contained in the GCC to the contrary, in order that such claims may be investigated at the time.

Should the Contractor wish to invoke or submit a claim for extension of time for the completion of the Works due to the Works being delayed by reason of climatic conditions he shall do so in writing giving, inter alia, the following details:

- (1) (a) The periods and time work or the works was stopped and proceeded with.
- (b) A report on resources on site, active and/or in readiness, at the time of the alleged delay or disruption,

The reports shall be certified by the Engineer's representative.

- (2) The reasons construction could not or cannot (as the case may be) proceed or commence, with reference to the approved construction program activities and an identification of the crucial path activity affected.
- (3) The circumstances surrounding any instruction by a third party to stop work due to inclement weather such as Industrial Council Officers, etc.

Only when works shall have been completed in terms of Sub-Clause 5.5.1 of the GCC shall the extension of time for completion resulting from climatic conditions, if any, be finalized by the Engineer.

PS10.6.22.2 Principles and method for granting extension of time resulting from climatic conditions

"Normal climatic conditions" shall not be deemed to constitute "circumstance of any kind" in terms of Sub-Clause 5.12 of the Conditions of Contract.

Extension of time resulting from "abnormal climatic conditions" in terms Clause 5.12 of the Conditions of Contract shall be determined in accordance with the rainfall formula contained in PS10.6.23.

PS10.6.23 Weather conditions

No extensions of the time for completion shall be granted on the grounds of normal rainfall conditions, but extension of time in terms of Clause 5.12.2.2 of the General Conditions of contract on the grounds of abnormal rainfall or wet conditions shall be calculated separately for each calendar month or part thereof, according to the following formula. It shall be calculated as follows for the time for completion, including any extension thereof:

$$V = \frac{(R_w - R_n)}{(N_w - N_n) + X}$$

V = Extension of time for calendar days of the calendar month concerned. If the value of V is negative and the absolute value thereof is greater than N_n, V is taken as negative N_n.

N_w = Actual number of days during calendar month on which a rainfall of Y mm or more is recorded.

N_n = Average number of days in the calendar month concerned on which a rainfall of Y mm or more is recorded in terms of existing rainfall data

R_w = Actual rainfall for the calendar month concerned in mm

R_n = Average rainfall for the calendar month in mm deduced from existing rainfall data.

For the purposes of the contract N_n, R_n, X and Y shall have the values as stipulated below.

The total extension of time is the algebraic sum of the monthly totals for the period concerned, extension of time for parts of a month shall be calculated by using pro rata values of N_n and R_n . If the algebraic sum of the monthly totals is negative, no reduction of the time for completion as a result of rainfall shall be applicable.

This formula does not take any delays as a result of flood damage, which may cause further or simultaneous delays, into consideration and flood damage shall be treated separately for purposes of extension of time for completion.

The factor $(N_w - N_n)$ is considered as a fair allowance for deviation from the normal for the number of days on which the rainfall exceeds Y mm. The factor $(R_w - R_n)/X$ is considered as a fair allowance for deviation from the normal for the number of days on which the rainfall does not exceed Y mm, but on which wet conditions will hamper or disrupt work.

The Contractor shall keep daily rainfall records and submit it to the Engineer at every site meeting. No additional payment shall be made for the supply and installation of the rain gauge or for the keeping of the rainfall records and all costs must be included in the scheduled items:

Rainfall station : Ulundi

Average annual rainfall : 667.5mm

Period : 2010 - 2020

Average number of days per year with rainfall exceeding:

$Y = 10\text{mm}$

$X = 20\text{mm}$

MONTH	N_n (No)	R_n (mm)	MONTH	N_n (No)	R_n (mm)
January	2.1	97.1	July	0.6	13.6
February	1.9	70.2	August	0.3	15.5
March	3.1	82.4	September	1	52.2
April	1.1	35.9	October	2.6	75.5
May	0.6	21.1	November	3	98.4
June	0.4	9.6	December	2.8	96

PS10.7 Quality plans and control

The Contractor shall maintain an effective quality system which meets the ISO 9000 Series or equivalent standard, to ensure and demonstrate that material or services provided conform to the specified requirements.

It is a requirement of the contractor to provide the Engineer within 21 days of contract award a detailed Quality Control Plan for prior approval before construction commences. The Quality Plan should include a responsibility matrix for each construction activity showing and identifying all actions, processes, frequencies and test types required.

The above should also include all hold, witness, surveillance, approval, testing and verification points required.

PS10.7.1 Soil testing on site

All soil testing shall be carried out in accordance with TMH.1 and only by an accredited soil testing laboratory.

Quality tests must be conducted on all the materials that are to be used for the earthworks and or layer works and these test results must be submitted to the Engineer for prior approval before the materials can be used.

During construction quality tests shall be carried out by the contractor in accordance with the test frequencies stated in PSD 7.5 and these tests will be deemed to be included in the contractor's rates for each item priced in the Schedule of Quantities.

PS10.8 Environment

The contractor will be responsible for construction according to an Environmental Management Plan in terms of Part C of the project specifications.

The contractor must take the utmost care to minimise the impact of his establishment and other construction activities on the environment and must adhere to the requirements as set out in Part C of the project specifications.

PS10.9 Accommodation of traffic on public roads occupied by the contractor

READ WITH SANS 1921 - 2: 2004

General

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

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

The Contractor shall ensure that all roads adjacent to or crossing the site and which are affected by the Works and/or Temporary Works and by the Contractor's activities at the borrow area, are kept in a safe condition for pedestrians and vehicular traffic.

Accommodation of vehicular and pedestrian traffic shall perform in accordance with SANS 1200. The Contractor shall organize his work so as to reduce the inconvenience to traffic to a minimum, and no public road shall be completely closed without prior approval by the Engineer. The Contractor shall provide and maintain in proper condition all necessary barricades, lights, warning signals and all direction signs necessary to enable traffic to follow the routes of diversion throughout their length. The Contractor shall provide flagmen at all deviations and/or obstructions, all signs shall be in two languages as may be advised by the Employer, and all traffic signs and control of traffic shall be in accordance with the South African Road Traffic Signs Manual. The Contractor shall provide temporary bypasses where necessary to provide access for vehicular and pedestrian traffic.

PS10.10 Other contractors on site

No other contractors will be on site.

PS10.11 Recording of weather

The contractor shall erect a rain gauge and record the rainfall. This information together with other details of the prevailing weather conditions shall be recorded in the daily site diary.

PS10.12 Management meetings

Management meetings are to be held weekly at a time convenient to all concerned, to discuss planning and health and safety amongst other things. Attendance by the contractor's and the employer's representative on site is mandatory and other interested parties will be by invitation.

PS10.13 Forms for contract administration

The employer's representative will make available standard forms for 'Site Diary', 'Site Instructions', should he deem this to be necessary during the contract.

PS10.14 Electronic payments

Approved payment claims will be made electronically into the contractor's bank account.

PS10.15 Guarantees

Contractor to provide a guarantee in accordance with the Condition of Contract in accordance with the provisions of the Form of Guarantee in a sum equal to the amount stated in the Contract Data.

PS10.16 Payment certificates

Payment certificates to be submitted by the contractor to the Engineer by the 20th of the each month. The RE to verify and approve certificate which he will then submit for approval to the Project Leader for final approval. The target date for submission of payment certificates to King Cetshwayo District Municipality will be the 10th of the following month. There are no financial cut off dates for payment submission to King Cetshwayo District Municipality and payment will be made by the Employer 30 days after submission of an approved, original and signed invoice.

The payment process in brief will consist of the following steps:

- Contractor submits certificate to RE for approval.
- Contractor makes final adjustments if any and prepares invoice.
- Certificate issued to Employers Agent for final certification and submission to King Cetshwayo District Municipality PM.
- PM approves payment and, then issues instruction to the financial department to process payment.

Details of measurements, proof of payment for items contained in provisional sums, proof of ownership of materials on site and documentation pertaining to contract price adjustment and special materials, are required as substantiation of claims for payment.

PS10.17 Retention

An amount equal to 10% (ten percent) up to a limit of 5% (five percent) of the value of each certificate (with a maximum as per the Appendix to Tender) will be withheld by the Employer until the issue of the Certificate of Completion where after 50% will be released and 50% will be held until the issue of the Final Certificate.

A guarantee will be acceptable in lieu of retention money.

PS10.18 Insurance provided by the employer

Insurance of "The Works"

The Employer will be responsible for insurance of the works in terms of Sub-Clause 8.6 of the General Conditions of Contract.

PS11 HEALTH AND SAFETY

Health and safety requirements and procedures

PS11.1 General statement

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

For the purpose of this contract the Contractor is required to confirm his status as mandatory and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of the Occupational Health and Safety Act in the form as included in Part C1 (C1.4.2)

PS11.2 Health and Safety Specifications and Plans

(a) Employer's Health and Safety Specification

The Employer's Health and Safety Specification is included in the tender documents in Part B2 (PI)

(b) Tenderer's Health and Safety Plan

The Tenderer shall submit with his tender his own documented Health and Safety Plan he proposes to implement for the execution of the work under the contract. His Health and Safety Plan must at least cover the following:

- (i) a proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 7 to 28;
- (ii) pro-active identification of potential hazards and unsafe working conditions;
- (iii) provision of a safe working environment and equipment;
- (iv) statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (*Regulation 5*);
- (v) monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
- (vi) details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 6 and other applicable regulations; and
- (vii) details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014
- (viii) .The Contractor's Health and Safety Plan will be subject to approval by the Employer, or amendment if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan.

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

PS11.3 Cost of compliance with the OHSA Construction Regulations

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to

the requirements of the Act, the Construction Regulations and the Employer's Health and Safety Specification as applicable to this contract.

Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided in the Construction Regulations and in the Employer's Health and Safety Specification.

PS12 PRIME COST SUMS (PC)

PS12.1 Definition

Prime Cost Sums (PC or PC Sums) is a sum provided for material, work and or services to be executed by a nominated sub-contractor, a statutory authority or a public undertaking or for materials or goods to be obtained from an approved supplier.

PS12.2 Mark up

The Contractor is eligible to mark up for profit, administration, supervision of works, etc. on the Prime Cost Sums and allowance is made in the schedule of quantities for mark up in the form of a percentage (%) on the Prime Cost Sums.

PS12.3 Local Sub-Contractors

On the Prime Cost Sums, the Engineer will provide the Contractor, shortly after appointment of the Contractor, with details, specification and or schedule of quantities for the work to executed under the Prime Cost Sums.

On works identified for the use of emerging local sub-contractors, the Contractor will be required to obtain quotes only from local sub-contractor who is registered on the King Cetshwayo District Municipality supplier database. The Contractor must, during the request for quotation, clearly state to the sub-contractors the proposed scope of work along with all the terms and conditions the Contractor feels necessary to form part of the contract between The Contractor and the sub-contractor after appointment.

In certain circumstances, the Employer may request that more than one sub-contractor be appointed to execute the work on the Prime Cost Sums.

Upon receiving the bid proposals from the sub-contractors, the Contractor, the Employer and the Engineer, will collectively evaluate each bid and will determine which bid or bids are successful to be appointed as sub-contractor or sub-contractors for the Prime Cost Sums.

PS12.4 Specialist sub-contractors and or suppliers

On the Prime Cost Sums, the Engineer will provide the Contractor, shortly after appointment of the Contractor, with details, specification and or schedule of quantities for the work to executed under the Prime Cost Sums.

On works requiring the use of specialist sub-contractors and or suppliers, the Contractor will be required to obtain at least three quotes. Where possible, the Contractor must try to obtain quotes from sub-contractors and or suppliers located within the boundaries of the King Cetshwayo District Municipality. The Contractor must, during the request for quotation, clearly state to the specialist sub-contractors and or suppliers the proposed scope of work along with all the terms and conditions the Contractor feels necessary to form part of the contract between The Contractor and the specialist sub-contractors and or suppliers after appointment.

In certain circumstances more than one specialist sub-contractors and or suppliers will be required to execute the work on the Prime Cost Sums.

Upon receiving the bid proposals from the specialist sub-contractors and or suppliers, the Contractor, the Employer and the Engineer, will collectively evaluate each bid and will determine which bid or bids are successful to be appointed as specialist sub-contractors and or suppliers for the Prime Cost Sums.

PS12.5 Nominated sub-contractors and or suppliers

On the Prime Cost Sums, the Engineer will provide the Contractor, shortly after appointment of the Contractor, with details, specification and or schedule of quantities for the work to executed under the Prime Cost Sums.

On works requiring the use of nominated sub-contractor and or supplier, the Contractor will be required to obtain a quote from the nominated sub-contractor and or suppliers. The Contractor must, during the request for quotation, clearly state to the nominated sub-contractor and or supplier the proposed scope of work along with all the terms and conditions the Contractor feels necessary to form part of the contract between The Contractor and the nominated sub-contractor and or supplier after appointment.

Upon receiving the bid proposal from the nominated sub-contractor and or supplier, the Contractor, the Employer and the Engineer, will collectively evaluate the bid and finalize the appointment of the nominated sub-contractor and or supplier.

PS13 PROVISIONAL SUMS (Prov Sum)

PS13.1 Definition

Provisional sum is an allowance inserted for a specific element of the works that is not yet defined in enough detail for tenderers to accurately price.

PS13.2 Mark up

The Contractor is eligible to mark up for profit, administration, supervision of works, etc. on the Provisional Sums and allowance is made in the schedule of quantities for mark up in the form of a percentage (%) on the Provisional Sums.

PS13.3 Final Pricing of Provisional Sums

On the Provisional Sums, the Engineer will provide the Contractor, shortly after appointment of the Contractor, with details, specification and or schedule of quantities for the work to executed under the Provisional Sums.

The Contractor to price the schedule of quantities and submit to the Employer and the Engineer for evaluation and approval prior to commencement of work. Rates of items already priced in the contract must be used where applicable. Rates for items not scheduled in the contract must be accompanied by supporting documentation clearly describing the cost associated to each item.

**PART B: AMENDMENTS TO THE STANDARD SPECIFICATION AND OTHER
ADDITIONAL SPECIFICATIONS**

In certain clauses in the Standard Specifications, allowance is made for a choice to be specified in the Project Specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternatives or additional requirements applicable to this contract are contained in this part of the Project Specifications. It also contains the necessary additional specifications required for this contract.

The clauses and payment items dealt with in this part of the Project Specifications are prefixed "PS" and numbered sequentially. The number corresponding to the relevant clause or item number in the Standard Specifications is given in parenthesis.

New clauses and payment items not covered by clauses or items in the Standard Specifications have also been included here.

Additional specifications where applicable are prefixed "P" and numbered alphabetically.

PART B1 VARIATIONS AND ADDITIONS TO THE STANDARDIZED SPECIFICATIONS

SUB-CLAUSE REFERENCE

The sub clause in brackets refers to the sub-clause in the particular in the standardized specifications of SANS 1200.

PSA GENERAL (SANS 1200 A)

PSA1 SABS MARK (Clause 3.1)

All materials, where applicable, shall carry the SANS mark.

PSA2 TESTS (Clause 7)

The contractor shall be responsible for the execution of all concrete quality control and compaction tests, where necessary. The contractor may use his own laboratory, if approved, or an approved independent laboratory for the execution of the abovementioned tests.

All quality control tests to ensure that work is done according to specifications, will be for the contractor's account. It is assumed that these costs are included in the rates of items that are subjected to quality control tests.

All tests results shall as soon as available immediately be given to the Engineer for approval.

PSA3 ACCOMMODATION OF TRAFFIC

The temporary deviation of the public traffic together with providing access to persons occupying properties that fall within or adjoining the area over which the contractor is working, shall be the responsibility of the Contractor.

The Contractor to ensure safe and easy passage of public traffic over sections of roads which he occupies. If for any reason, such access has to be closed for a certain period arrangement have to be made with the persons affected and be given reasonable notice in writing of each period.

In addition to complying with the requirements of sub-clause 5.1.1.1 the Contractor shall provide erect and maintain traffic signs that conform to the South African Road and Traffic manual in positions approved by the Engineer for the temporary deviation of traffic during construction.

The Contractor shall make all arrangements for the provision and installation of traffic signage and shall co-operate with the local authority to ensure approval in each case.

PSA4 PLANT FOR CONSTRUCTION PURPOSES (No reference)

The Contractor's plant for construction purposes shall be of modern design, adaptable for the purpose for which it is required, in sound condition, and ample in capacity for carrying out the Works expeditiously.

Should the Engineer be of the opinion that the plant in use is in any way unsuitable for carrying out the Works in a manner or at a rate commensurate with the requirements of the Contract, they shall have the right to call on the Contractor at any time during the progress of the works to provide additional or improved plant and tools as may be necessary to meet these requirements.

PSAB ENGINEERS OFFICE (SANS 1200 AB)

PSAB1 NAME BOARDS (Clause 3.1)

Notwithstanding sub clause 3.1 of the Standard Specification, the name board shall be according to the attached pro-forma.

PSAB2 SITE OFFICE FURNITURE (Clause 3.2)

A site office for the exclusive use of the Engineer is not required. An equipped office with a table, 6 chairs, filing cabinet and plan table must however be made available for the Engineer and his representative in the event that this is required, normally for site meetings. One set of drawings must be kept on site at all times.

PSAB3 SITE INSTRUCTION BOOK (Additional Clause)

Throughout the construction period the Contractor shall supply a carbon triplicate book as a Site instruction book.

This book shall be kept on Site and shall be accessible to both the Contractor and the Engineer's Representative at all times. It shall be used as follows:

3.1 by the Contractor for:

- providing the Engineer's Representative with any information regarding the construction of the works which may be requested,

and

- giving notification in writing as required by any of the relevant clauses of the General Conditions of Contract,

3.2 by the Engineer's Representative for the purpose of writing day to day instructions and confirming any verbal information or instructions given to the Contractor.

One copy of each site instruction issued by either party shall remain in the book.

PSC SITE CLEARANCE (SANS 1200 C)

PSC1 OWNERSHIP OF CUT WOOD (Additional Clause)

All wood and/or trees cut whilst cleaning site will remain the property of the Tribal Authority / State Forest Authorities and must be placed next to the servitude, and shall not be removed by the Contractor or his employees or Sub-contractors unless written permission has been granted by the relevant Authority.

PSC2 DISPOSAL OF MATERIAL (Additional Clause)

Suitable spoil sites will be located on site by the Engineer and confirmed by the issue of a site instruction. The Contractor may not make his own arrangements in this regard without the written approval of the Engineer.

PSC3 AREA TO BE CLEARED AND GRUBBED (Additional Clause)

Any areas requiring particular clearing and grubbing must be agreed with the Engineer prior to any such clearing taking place. Any area cleared without the consent of the Engineer will not be measured in terms of this Clause and may result in further action being taken against the Contractor in terms of any contravention with the Environmental Management Plan. Where the Engineer has instructed that clearing must take place or is required, it shall be measured as a strip 1.5m wide.

PSD EARTHWORKS (SANS 1200 D)

PSD1 CLASSIFICATION FOR EXCAVATION (Clause 3.1.2)

Machine excavation

Notwithstanding Clause 3.1 of SANS 1200D, no classification will be made for either intermediate or boulder excavation. The classification for excavation will be as follows:

- 1.1 Rock excavation : All material that cannot be removed otherwise than using compressors and jack hammers, or alternatively by blasting.
- 1.2 Soft excavation : All material that is not classified as rock excavation under Clause 1.1 above.

Payment for rock excavation will only be approved if the Engineer has classified the excavation as such in writing before commencement of the excavation.

Hand excavation

Notwithstanding Clause 3.1 of SANS 1200D, the classification for hand excavatable material will be made in terms of the Particular Specification D: Generic Labour-Intensive Specification which classification will be in accordance with the Guidelines provided in D3.

PSD2 TRANSPORT OF EARTHWORKS (Clause 5.2.5)

PSD2.1 Freehaul (Clause 5.2.5.1)

The freehaul distance applicable will be 5 km.

PSD2.2 Overhaul (Clause 5.2.5.2)

PSD2.2.1 Limited Overhaul

No allowance will be made for limited overhaul.

PSD2.2.2 Long Overhaul

Long overhaul will be payable beyond the freehaul distance of 5km.

PSD3 CONSIDERATION OF TOPSOIL (Clause 5.2.4.2)

Topsoil stripping shall be to a depth of 150mm and the material shall be conserved separately for re-use as specified in the Environmental Management Plan.

PSD4 DISPOSAL (Clause 5.2.2.3)

All excess material shall be disposed off at the designated spoil sites and levelled in layers not exceeding 300mm and compacted to 90% MOD AASHTO density.

PSD5 EROSION CONTROL BERMS (Additional Clause)

Where instructed by the Engineer, earth berms shall be constructed to the dimensions shown on the drawings or to the detail instructed by the Engineer. The berms shall comprise excess fill material from the trench, shall be hauled by wheelbarrow, placed and shall be hand stamped in layers not exceeding 150mm. The berms shall be slightly overfilled before being shaped to the detail shown on the drawings. The material shall wherever possible be sourced within the freehaul distance. After completion, the Engineer may instruct the contractor to construct un-grouted, hand-picked and packed stoned pitching along the upstream edge of the berm.

PSDB EARTHWORKS (Pipe trenches) (SANS 1200 DB)

PSDB1 CLASSIFICATION FOR EXCAVATION (Clause 3.1)

Notwithstanding Clause 3.1 of SABS 1200D, no classification will be made for either intermediate or boulder excavation. The classification for excavation will be as follows:

- 1.1 Rock excavation : All material that cannot be removed otherwise than using compressors and jack hammers, or alternatively by blasting.
- 1.2 Soft excavation : All material that is not classified as rock excavation under Clause 1.1 above.

Payment for rock excavation will only be approved if the Engineer has classified the excavation as such in writing before commencement of the excavation.

PSDB2 SOILCRETE (Additional Clause)

Above is defined as approved backfill material to which 5% cement by volume has been added and thoroughly mixed. Each such prepared quantity will be placed within 1 hour after having been mixed.

PSDB3 EXCAVATION IN ROCK (Clause 5.4)

When excavating in rock (as classified in PSDB1), the level shall be reduced by 100mm below the required level. Selected fine material will be replaced in the trench bottom and compacted to 93% mod. AASHTO to return to the required level. A vertical overbreak of 100mm only shall be measured and paid for at the bottom of the trench.

PSDB4 OVER EXCAVATIONS (Clause 5.4)

All over excavations will be backfilled to prescribed levels with granular material and compacted to 93% mod. AASHTO at the Contractors own expense.

PSDB5 OPEN TRENCHES (Clause 5.4)

The length of open trenches at any time shall by no means exceed 200m in length per service. Should this happen, the Engineer shall have the right to intervene and stop the excavation process until such time as may be deemed necessary for the pipe laying team and backfilling team to meet the prescribed open trench lengths. The following partial payments shall apply:

- **On excavation and backfill:**
 - trench excavation - 70%
 - backfill completed - 30%
- **On pipe laying**
 - pipe installed before testing - 80%
 - testing of pipes - 20%

PSDB6 FREEHAUL (Clause 5.4)

The following freehaul distances must be included in the applicable tender rates:

- Spoil : 5,0 km
- Imported gravel : 5,0 km

PSDB7 WIDTH OF TRENCH (Clause 5.4)

The minimum trench width will be in accordance with the trench detail drawing. Minimum cover to be 1 000mm under roads and in road reserves, while a minimum cover of 800mm will be accepted elsewhere. Base widths shall be as detail on the construction drawings.

PSDB8 TRENCH EXCAVATION (Clause 5.4)

Excavation for pipe trenches in all materials by means of machine or hand excavation should allow for collapsing and saturated soil conditions. The Contractor shall properly deal with and dispose of water to ensure that the Works are kept sufficiently dry for their proper execution. Allowance for the above should be made and will be deemed inclusive in the bid rates for excavations.

PSDB9 EXCESSIVE WATER CONDITIONS (Clause 5.1.2)

In excessive water conditions, over excavation of 100mm will be allowed and backfilled with 13mm single diameter stone. The Engineer to specifically instruct in each of these instances.

PSDB10 CONTROL OF WATER (Clause 5.1.2)

Under no circumstances will any claim be entertained for dewatering, or water logged conditions. The Contractor will control all surface and sub-surface water during construction, and the cost of such, will be deemed to be included in the rates for excavations.

PSG CONCRETE (STRUCTURAL) (SANS 1200 G)

PSG1 MATERIALS (Clause 3)

PSG1.1 Cement: (Clause 3.2)

All cement to comply with SANS EN197.

Only the following cements may be used:

CEM I; CEM II A - V 42,5; CEM II B - V 42,5; CEM A - D 42,5; CEM B - D 42,5.

PSG1.2 Aggregates: (Clause 3.4)

All aggregates used must be certified suitable for the particular applications by an approved independent laboratory.

PSG1.3 Reinforcement: (Clause 3.6)

PSG1.3.1 Reinforcement marked "Y" on the schedule shall be High Yield (characteristic strength 450 Mpa) deformed bars, complying with SANS 920.

Reinforcement marked "R" on the schedule shall be mild steel (characteristic strength 250 Mpa) deformed bars, complying with SANS 920.

PSG2 PLANT (Clause 4)

PSG2.1 Mixing Plant: (Clause 4.3)

The Contractor shall maintain a standby concrete mixing machine on the construction site for that period of the contract during which concreting operations are being carried out to watertight concrete.

PSG2.2 Ties: (Clause 4.5.3)

Ties used to secure and align the formwork must not pass completely through any part of the structure, which is liquid retaining unless effective measures are taken to ensure water tightness after removal. The ends of any embedded ties must have cover equal to that required for the reinforcement. The gap left from the end of the tie to the face of the concrete must be effectively sealed.

PSG2.3 Vibrators: (Clause 4.4)

The Contractor shall maintain a minimum of two standby vibrators on the construction site for that period of the contract during which concreting operations are being carried out to watertight concrete.

PSG3 CONSTRUCTION (Clause 5)

PSG3.1 Formwork: (Clause 5.2)

PSG3.1.1 Smooth Rubbed Finish:

Where smooth formwork is indicated on the drawings, a smooth rubbed finish shall be produced on freshly hardened concrete.

All necessary patching shall have been done immediately after the forms have been removed and rubbing shall be completed not later than the following day. Surfaces shall be wetted and rubbed, first with a coarse carborundum stone, or other similar abrasive until a uniform colour and texture is produced. No cement grout or slurry shall be used other than the cement paste drawn from the green concrete by rubbing process.

The character of the materials used and the care with which forms are constructed and concrete placed are factors in determining the amount of rubbing required. If the proper use of materials and workmanship leads to a concrete surface of high quality, the Engineer may entirely or in part relieve the Contractor of the rubbing requirements.

No separate payment will be made for this operation. The costs must be included in the rates for concrete and shuttering.

PSG3.1.2 Add the following sub-clause:

Lost Shutters (Clause 5.2.6)

Where lost shutters are indicated on the drawings the Contractor must provide a shutter which is sufficiently strong to carry the load of wet concrete and construction traffic and not disintegrate or produce toxic or tainting effluent in the potable water.

Pressed fibre cement sheet will be acceptable.

PSG3.1.3 Removal of Formwork (Clause 5.2.5)

Formwork to walls of watertight concrete shall remain in place for a minimum period of 1,5 days after completion of placing concrete to that formwork.

PSG3.2 Concrete (Clause 5.5)

PSG3.2.1 Strength (Clause 5.5.1.7)

The cured concrete in the structure must have a strength (when core tested or by some other method) equivalent to the specified strength of the mix.

PSG3.2.2 Prescribed Concrete: (Clause 5.5.1.6)

PSG3.2.2.1 No-fines concrete

- (i) Mix Proportions: No fines concrete of a mix of 1 sack cement and 0,30m³ of aggregate with a water cement ratio of approximately 0,46. The aggregate shall be graded in such a way that not more than 10% of its mass is retained on a 19mm sieve and not more than 5% of its mass is passing a 6.7mm sieve.
- (ii) Quantity of Water: The quantity of water used shall be just sufficient to form a smooth grout to completely coat all surfaces of the aggregate. The use of excessive water results in a thin grout which does not properly bond the aggregate together and which clogs the voids.
- (iii) Determining of Water/Cement Ratio: This will be determined on site by the Engineer from results of a maximum of 4 test mixes which shall be made by the Contractor on request.
- (iv) Mixing: The no-fines concrete shall be mixed for at least 2½ minutes in a mechanical mixer. The aggregate shall be first mixed with half the quantity of water to wet it thoroughly before adding the cement and remaining water.
- (v) Placing: The no-fines concrete shall be placed in continuous horizontal layers within 30 minutes of mixing. It shall be worked sufficiently to completely fill the shutter but tamping and ramming shall not be permitted.
- (vi) The no-fines concrete layer under the floor slab is to receive a 10mm plaster skin on its top surface.

PSG3.2.2.2 Strength Concrete: (Clause 5.5.1.7)

DESIGNATION	30/19WT	SP40/12	B15/19
Position in Works	Structural Concrete including Watertight Concrete	Watertight infill around puddle flanges	Blinding
Max. nominal size of coarse aggregate	19mm	12mm	19mm
Minimum Cement Content	300 kg/m ³	400 kg/m ³	-
28 day Strength	30 Mpa	40 Mpa	15 Mpa
Special Properties		Expanding Agent & Super Plasticiser to flow into confined spaces & bond with existing concrete	
Water/Cement Ratio	Not greater than 0,52	Not greater than 0,49	

PSG3.2.3 Non-Formed Concrete Surfaces:**PSG3.2.3.1 Class 1: Screeded Finish**

Immediately after being poured the concrete shall be screeded with a straight edge working between templates set accurately to line and level. No mortar shall be added to overcome surface irregularities. These shall be made good by re-screeding or by the addition of concrete.

PSG3.2.3.2 Class 2: Wood Floated Finish

After screeding to line and level and when the water sheen has disappeared, the concrete surface shall be trowelled by hand with a wood float to a uniform consolidated surface free from any trowel marks and uniform in texture and appearance.

PSG3.2.3.3 Class 3: Steel Floated Finish

Commence as for Class 2 and finish with a steel float. The final finish shall be done at the correct time, for example, while the concrete is still sufficiently plastic to take a polish but when it has hardened sufficient to prevent drawing water and fine materials to the surface. Any adherence of mortar to the steel float indicates that the correct stage has yet not been reached.

PSG3.2.3.4 Ready-mixed Concrete: (Clause 5.5.3)

If concrete is produced at a central concrete production facility other than that on the construction site, only test cubes made on site will be accepted.

PSG3.2.3.5 Curing and Protection: (Clause 5.5.8)

If the use of curing compound is accepted all exposed concrete shall be cured by coating surfaces with a fugitive dyed resin based curing compound. The curing compound shall be in accordance with ASTM C309 Type 1. Minimum application ration shall be 0,2 litres/m².

PSG3.3 Concreting Walls:**PSG3.3.1 Compaction: (Clause 5.5.6)**

The mix proportions of the first 250mm depth of concrete placed in contact with the horizontal joint may be adjusted with the approval of the Engineer, by reducing the amount of coarse aggregate. The Engineer's representative may instruct the use of trunking, in placing the concrete to avoid losses of fines due to adherence to the reinforcement and formwork. The concrete shall be placed evenly over the surface to be covered without using vibration to transport it horizontally. Special care must be given to compaction of the concrete around water stops.

PSG4 TOLERANCES (Clause 6)

PSG4.1 Permissible Deviations (Clause 6.2)

PSG4.1.1 Concrete Surfaces (Clause 6.2.2)

Add the following:-

Generally, P.D. from dimensions, levels, etc. shown on the drawings shall be to Degree of Accuracy II.

PSG5 MEASUREMENT AND PAYMENT (Clause 8)

PSG5.1 Short lengths of pipe cast-in shall be measured by number and included under Measurement of Pipelines. This must allow for setting out, shaping and sealing the shutter around the pipe, and providing end covers for keeping the pipes clean.

PSG5.2 Formwork (Clause 8.1.1.3c)

Delete: “..... and for different prop heights for beams and slabs” and replace with:

The elements of the various structures requiring propped shuttering are not scheduled separately and the rates bid for shuttering to soffits of beams, slabs, etc., shall include for all heights under the different sections of the Schedule of Quantities.

PSL MEDIUM PRESSURE PIPELINES (SANS 1200 L)

PSL1 MATERIALS (Clause 3)

PSL1.1 Steel pipes fittings and specials (Clause 3.4)

PSL1.1.1 Pipes of nominal bore up to 150mm (Clause 3.4.2)

AMEND to read: -

Unless otherwise scheduled, steel pipes and fittings of nominal bore up to 150mm shall be of heavy duty, shall be screwed or plain ended for welded fittings or connecting with flexible couplings and shall comply with the applicable requirements of SANS 62.

PSL1.1.2 Pipes of nominal bore over 150mm (Clause 3.4.3)

Unless otherwise scheduled, steel pipes and fittings of nominal bore over 150mm shall be manufactured to conform to SANS 719/1971 from grade 300WA steel and shall have a minimum wall thickness of 4,5mm.

PSL1.1.3 Steel pipes specials and fittings (Clause 3.4.4)

Steel specials shall be fabricated from straight steel pipe as specified in PSL1.1.1 and PSL1.1.2 and shall be manufactured and tested in accordance with BS 534 - Clause 4.

Where specified on the drawings or Schedule of Quantities, JIS curvature bends, tees and reducers shall be used.

PSL1.2 Other types of pipes (Clause 3.7)

PSL1.2.1 uPVC Pipes

Where uPVC bends are specified, they shall have a minimum pressure rating of 16 bar irrespective of the rating of the pipe to which they are attached.

PSL1.2.2 Polyethylene pipes (Clause 3.7.2)

ADD the following: -

All HDPE piping on this contract shall be manufactured to the latest SANS ISO 4427 specification in an ISO 9002 listed factory belonging to a company which is a member of SAPPMA. Pipes from manufacturers who are non-SAPPMA members will not be accepted. Random samples will be taken to check the MFI and OIT index of the material.

All HDPE piping is to be SANS ISO 4427: 1996E PE100.

The contractor will be required to submit certified proof of the above prior to bringing any pipe material to site. The Engineer may also call for certificates of compliance to be submitted to substantiate the origin of raw material used in the manufacture of the pipes.

Pipes shall be supplied in rolls of lengths of either 100m or 50m.

PSL2 JOINTING MATERIALS (Clause 3.8)

PSL2.1 Flexible couplings (Clause 3.8.2)

HDPE compression fittings, including both the coupling and the thread, shall be rated as being suitable for operating pressures of 25 bar and shall be manufactured of the following materials:

- Body: Virgin polypropylene in master batch UV, high stability copolymer (PP-B) with UV protection;
- Seal: Nitrile rubber (NBR);
- Bush ring: Polypropylene, high stability copolymer (PP-B) with UV protection;
- Clamping ring: Acetalic resin (POM); and
- Body nut: Polypropylene, high stability copolymer (PP-B) with UV protection.

Clamp saddles must comply with the following minimum specification:

- They must have a pressure rating of minimum 25 Bar;
- The parallel thread may not exceed 2"BSP;
- They must be reinforced with a stainless steel reinforcing ring; and
- They must have a minimum of 4 x galvanized steel bolts.

PSL2.2 Flanges and accessories (Clause 3.8.3)

Unless otherwise indicated on the drawings or Schedule of Quantities, dimensions and drilling of flanges shall be in accordance with the requirements of SANS 1123 Table 1600/3, 2500/3 or 4000/3 as specified.

All flanges shall be truly angling to the axis of the pipe fittings and shall be drilled with bolt holes off-centre.

Flanges for normal working pressures up to 4000 kPa shall be flat-faced with full-faced gaskets. **All gaskets shall be of the "Klinker" type.**

Nuts and bolts for flanges shall comply with SANS 135 or SANS 136 as applicable.

All bolts, nuts and washers shall be mild steel, hot dip, galvanized in accordance with SANS ISO 1461.

The length of each bolt shall be such that after tightening at least one thread in addition to the thread run out and not more than the bolt diameter shall project. The threaded portion of bolts shall be clear of the shear plane.

All nuts and studs shall be fitted with two, steel, flat washers under the bolt head and under the nut.

Any bolts not complying with this requirement shall be removed and replaced at the expense of the Contractor.

PSL3 CORROSION PROTECTION (Clause 3.9)

PSL3.1 Steel pipes of nominal bore up to 150mm (Clause 3.9.2.1)

These pipes, fittings, specials etc. shall all be internally and externally hot-dip galvanized. All galvanizing shall be done in accordance with SANS 121 (ISO 1461:2009). The minimum amount of zinc deposited shall be 760g/m². The Contractor shall submit certificates certifying that all galvanized pipes have been manufactured in a certified facility and meet the specifications noted above. Retention will not be released until such certificates are delivered to the Engineer.

All internal flanges and bolts shall be wrapped with a "Denso" mastic blanket applied in accordance with the manufacturer's instructions.

PSL3.2 Steel pipes of nominal bore over 150mm (Clause 3.9.2.2)

These pipes, fittings, specials etc. shall all be internally and externally hot-dip galvanized. All galvanizing shall be done in accordance with SANS 121 (ISO 1461:2009). The minimum amount of zinc deposited shall be 760g/m². The Contractor shall submit certificates certifying that all galvanized pipes have been manufactured in a certified facility and meet the specifications noted above. Retention will not be released until such certificates are delivered to the Engineer.

All internal flanges and bolts shall be wrapped with a “Denso” mastic blanker applied in accordance with the manufacturer’s instructions.

PSL3.3 Protection against electrolytic corrosion (Clause 3.9.3)

Where applicable, electrical continuity wires shall be provided at all joints, whether a coupling, flanged joint, adapter joint and whether connecting valves, fittings or pipes, but excluding isolating and welded joints.

The two adjacent pipes or pipe and valve, pipe and fittings, or as the case may be, shall be bonded together to provide electrical continuity by means of two separate lengths of 12mm diameter stranded copper cable with PVC sheathing. Each cable shall be bonded to the top of the pipe, valve or fitting by means of two Bo 15 Cadweld exothermic powder charges or similar approved.

The area of surface of the pipe, valve or fitting to which each cable is to be bonded shall be cleaned down to bare metal prior to application of the powder charges.

PSL3.4 Protection against corrosive soils (Clause 3.9.6)

External protection to all steel pipes, fittings and joints against corrosive soils shall be by means of an approved petroleum impregnated tape packing and prime coat applied to at least 150mm above final ground level and wrapped in an adhesive plastic tape.

All soil shall be deemed corrosive and provision is made in the schedule for all underground pipes to be wrapped. Wrapping is to extend a minimum of 50mm into the concrete thrust for puddle flanges as detailed on the drawings.

Flanges, VJ couplings, short/long collar couplings or other steel or cast iron mechanical couplings shall be protected by priming with “Denso S105” paste or similar approved before encasing the nuts and bolts and the filling of all voids with “Densofil” cork filled mastic or similar approved to give a smooth surface which shall be over wrapped with two complete layers of “Densyl” tape or similar approved, smoothed and free from voids. For external, buried joints only, the entire wrapping shall be covered with “Densotherm” bitumen outer wrap or similar approved. Internal joints shall not require the outer wrap.

PSL4 VALVES (Clause 3.10)

PSL4.1 General

Lifting lugs are to be fitted to all valves that have a mass in excess of 100kg, to be hot dip galvanized to SANS 1461.

PSL4.2 Resilient seal gate valves

Resilient seal gate valves (RSV) shall comply with SANS 664 (latest amendment) with classes and flange drillings as detailed or scheduled elsewhere.

The typical application of resilient seal valves is for valves in “normally open” locations (eg air valves, isolating valves, in-line valves <250NB where the maximum differential pressure across the valve is not likely to exceed 16 Bar under normal operating conditions. Resilient seal valves shall not be used in terminal positions (eg as scour valves) without the approval of the Engineer.

In addition they shall comply with the following:

a) General

Gate valves shall be double flanged and be resilient seated and shall be on the non-rising spindle type.

The valves shall be capable of sealing drip tight bi-directionally over the full range of pressures from zero to maximum working pressure.

b) Gate design

The gate shall be fully rubber encapsulated inside and out to ensure drip tight sealing and to avoid corrosion and shall be provided with a 10 year replacement warrantee. The gate shall further have a drain hole, preventing stagnant water or impurities from collecting.

Rubber utilized in the coating of the wedge shall be inert and shall not impart odour, taste and colour and shall be suitable for drinking water applications. The gate nut shall not be fixed to the wedge, thereby reducing opening torques.

c) Gate and body design

The gate shall have optimally placed guides of wear resistant plastic so as to reduce the torques as well as to reduce wear between the rubber and the coating on the body. The bore of the body shall be straight through design in order to allow cleaning with a badger.

d) Valve bonnet

The valve shall utilize 3 independent bonnet seals which shall include a set of stem steels embedded in non-corrosive material, a back seal to prevent leakage when changing seals and a wiper ring to protect against debris entering the valve.

Two friction washers (sizes 50mm to 200mm) and thrust ball bearings (250mm to 600mm) shall be incorporated to ensure smooth spindle operation as well as to reduce opening and closing torques.

e) Spindle

Spindles shall be made of stainless steel. The stem threads shall be rolled to maintain steel structure and increase strength and to ensure smooth thread edges and consequently a low operating torque. The spindle seat consist of 2 nitrile rubber O rings located in a corrosion resistant housing. A wiper ring shall also be provided.

f) Body and assembly

The rubber bonnet gasket shall fit in the recess in the valve bonnet preventing blow out of the seal under surge conditions. The bonnet bolts shall pass through the gasket and be sunk into the bonnet and be sealed for corrosion protection.

An edge protecting ring shall permanently be fitted around the body of the bonnet joint in order to protect the coating during transportation and installation. The body of the valve shall be fusion bonded epoxy coated to a minimum D. F. T. of 250 microns.

Unless otherwise specified caps for key operation will be required for buried valves and hand wheels on valves situated in accessible chambers. Extension spindles and brackets shall be provided where detailed and hand wheels shall be clearly marked with the direction of opening.

All valves shall be clockwise closing when viewed from above.

PSL4.3 Wedge gate valves

Gate valves shall comply with the requirements of SANS 664 (latest amendment) with classes and ends as elsewhere specified.

The typical application for wedge gate seal valves is for valves in "normally closed" locations (eg scour valves) and for valves in the normally open position (eg in-line valves <250NB) where the maximum differential pressure across the valve is likely to exceed 16 Bar under normal operating conditions.

Channel-guides and shoes shall be fitted to valves falling within the following pressure and size ranges:

PRESSURE	VALVE SIZE
Class 10	600mm and above
Class 16	350mm and above
Class 25	350mm and above
Class 40	All sizes
Class 100	All sizes

The spindles shall be of the non-rising type and shall be manufactured of solid stainless steel.

All valves shall be clockwise closing when viewed from above.

Gearing shall be chosen to limit the total effort at the hand wheel or valve key to 400 Newtons.

The valves shall be capable of being easily operated by one man against the maximum unbalanced pressure and the total effort required to operate the valve shall not exceed 400 Newtons (i.e. a simultaneous push-pull of 200 Newtons each) on the ends of tee key 900mm long resulting in a maximum torque of 180Nm.

In order to comply with the above requirements it has been found that the following are normally necessary for larger sizes of valves:

- a) Class 16 (PN 16) valves in sizes 80mm, 150mm and 300mm should be fitted with ball thrust collars; and
- b) Class 25 (PN 25) valves in size 80mm, 150mm should be fitted with either ball thrust collars or spur gears, while 250mm and 300mm sizes should be fitted with ball thrust collars and 3 to 1 gears.
- c) Class 40 (PN 40) valves in sizes 80mm, 150mm and 200mm should be fitted with either ball thrust collars or spur gears, while 250mm and 300mm sizes should be fitted with ball thrust collars and 3 to 1 gears.

While other forms of anti-friction devices may be acceptable it is the Contractor's responsibility to ensure that the required torque is not exceeded.

Unless otherwise specified buried valves shall be provided with caps for key operation and valves in chambers with hand wheels.

The valves shall be provided with Type B (Gunmetal) trim with pinned seat rings. The gate shall be full length. The body of the valve shall be epoxy coated to a minimum D. F. T. of 250 microns inside and out.

The gland packing shall be of the "Maxmech Style M57", Chesterton 1724" or similar approved.

The valves are to be drop tight at working pressure.

Each valve so supplied shall be provided with a pressure test certificate.

PSL4.4 **Butterfly valves**

These shall be solid body cast iron type for bolting to flanges and shall be of perfect closure. The valves shall be fitted with gearbox operated hand wheels or ratchet locating hand-levers, stainless steel shafts and discs and natural rubber or neoprene seals and shaft seals.

The valves shall conform to the requirements of BS 5155:1984. The class of valve shall be as specified. Specifications and test certificates shall be provided.

PSL4.5 **Air release valves**

Air valves shall be the double purpose air release valves / vacuum break type.

The air release and vacuum break valve shall be of a compact single chamber design with solid cylindrical High Density Polyethylene control floats housed in a tubular stainless steel or corrosion protected body with epoxy powder coated cast iron, or s/steel ends secured by means of stainless steel tie rods.

Ball type air valves are not acceptable.

The valve shall have an integral surge alleviation mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure due to high velocity air discharge or the subsequent rejoining of separated water columns. The limitation of pressure rise must be achieved by deceleration of approaching water prior to valve closure. Relief mechanisms that act subsequent to valve closure cannot reach in the low millisecond time span required and are therefore unacceptable.

Large orifice sealing shall be affected by the flat face of the control float seating against a nitrile rubber 'O' Ring housed in a dovetail groove circumferentially surrounding the large orifice. Discharge of pressurized air shall be controlled by the seating and unseating of a small orifice on a natural rubber seal affixed to the control float.

The intake / discharge orifice area shall be equal to the nominal size of the valve i.e., and 150mm (6") valve shall have a 150mm (6") intake / discharge orifice.

The valve construction shall be proportioned with regard to material strength characteristics, so that deformation, leaking or damage of any kind does not occur by submission to twice the designated working pressure.

The valve design shall incorporate an over pressure safety feature that will fail without an explosive effect, such as normally the case when highly compressed air is released suddenly. This feature shall consist of easily replaceable components such as gaskets, seals or the like.

PSL4.6 Control Valves

Control valves shall comprise a centre guided diaphragm actuated globe valve of either oblique (Y) or angle pattern design. The body and cover shall be SG iron with bronze seat. The internal and external surfaces of the valve body shall be fusion bonded epoxy coated. End connections shall comply with the drilling pattern indicated on the drawings. The body shall have a replaceable non-threaded seat ring that is held in place by a set of screws, which tighten into a body groove. This seat should be accessible and serviceable without removing the valve from the pipeline. The seat area shall have a flow opening with no stem guides, bearings or supporting.

The actuator assembly shall be of the double chamber design with a separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly consisting of the seal disk, valve shaft, bearing, diaphragm assembly, separating partition and top cover must be removable from the valve as a single unit.

The actuator assembly must be capable of accepting a V-port throttling plug by simply bolting the device to the seal disk.

The main valve, solenoid pilot, limit switch, check valve, control tubing, filter and isolation valves shall be factory assembled and tested. The valve manufacturer must be completely certified in accordance with the ISO 9002 Quality Assurance Standard.

The settings and operation of the valves shall be as described herein or alternatively as indicated on the drawings.

Prior to any valve being ordered or delivered to site, the Contractor shall deliver to the Engineer a sample of a typical control valve that he proposes to use and which complies with this specification.

The Engineer will then investigate whether the valve is compliant with the specification before authorizing the use of such valve. If the valve does not comply with the specification in all respects, the Engineer may reject such valve in which case the Contractor will have to source valves of the required quality and all costs associated therewith will be for the Contractor's account.

The sample shall be accompanied by the following control sheet:

Item	
Name of valve supply company:	
Overview of company with particular emphasis on service capabilities, calibration facilities and their track record in South Africa:	(To be attached)
Valve specification sheets (detailing compliance with this specification):	(To be attached)
Test certificate:	(To be attached)

PSL4.7 Water meters and strainers

Water meters and associated in-line strainers shall be those manufactured by either Meinecke suitable for data logging where applicable and complying with the description given on the drawings, or similar.

a) Bulk meters (NB 40mm up to NB 300mm)

Water meters tendered for under this category must be of the in-line through-flow Woltman type, mechanical turbine flanged bulk water meters and must conform to the following dimensions and specifications:

Nominal Bore	Body Lengths	Flange Specs	Working Pressure Maximum	Temp Maximum
40mm	220mm	BS4504 Table 25	2500kPa	50°C
50mm	200mm	BS4504 Table 25	2500kPa	50°C
80mm	225mm	BS4504 Table 25	2500kPa	50°C
100mm	250mm	BS4504 Table 25	2500kPa	50°C
150mm	300mm	BS4504 Table 25	2500kPa	50°C
200mm	350mm	BS4504 Table 25	2500kPa	50°C
250mm	450mm	BS4504 Table 25	2500kPa	50°C
300mm	500mm	BS4504 Table 25	2500kPa	50°C

- All Woltman type mechanical meters supplied in terms of this contract shall perform to an accuracy of better than $\pm 2\%$ error over the meter's operating range; i.e. between Q_t and Q_p (Q_n). The performance characteristics of the meters offered must be equal to or better than the values listed below:

Size DN	Q_{start} m^3/h	Q_{min} m^3/h	Q_t m^3/h	Q_n (Q_p) m^3/h	Q_{max} (Q_s) m^3/h
40mm	0,15	0,3	0,8	40	60
50mm	0,15	0,3	0,7	50	90
80mm	0,25	0,5	0,8	120	200
100mm	0,25	0,8	1,8	230	300
150mm	1,0	1,8	4	450	600
200mm	1,5	4	6	800	1200
250mm	3,0	6	11	1250	1600
300mm	8,0	12	15	1400	2000

- Meters must be fitted with robust glass/copper dry dial registers, which comprise 6-digit cyclometer-type totalisers, registering in kiloliters (kl) or m^3 . These registers must be sealed to IP68 to prevent ingress of dirt or moisture, and must function under water, in the event of

manholes flooding. The registers, which are to be fitted as standard, must be able to provide one high frequency opto-type pulse output function and two low frequency reed-type pulse output functions. Only meters which allow for very easy fitment and removal of the reed-and opto-type pulsars, normally associated with data logging, without having to break the verification seals, will be acceptable;

- No consideration will be given to meter types, which necessitate the use of special tools or fitment of any form of gland in the process of connecting pulser units, or meters which require a register-change to switch from one volume unit per pulse to another;
- Meters must preferably offer an upgrade path to AMR (Automatic meter reading), which facilitates the fitment of "intelligent" registers at a later stage. The Contractor is to provide full details of the meter capability in this regard and furnish examples of systems already operating successfully in South Africa.
- Meters must be data logger compatible with loggers which have a proven track record and have a purpose-written software, to be used in conjunction with their bulk water meters, for network management;
- Cover bolts must be of stainless-steel material to facilitate easy removal of mechanisms. Meter bodies must be coated with a high-quality sintered epoxy powder coating, both internally and externally, with a minimum coating thickness of between 200 and 300 microns.
- Although most of the meters will be install horizontally, it must be possible to install the meters vertically (with flow in the upward direction) or in an inclined position (with flow in the upward direction), should site conditions make this necessary;
- The performance of the meters offered shall not be affected by outside magnetic influences;
- A place must be provided for on the meter body, which can be drilled and tapped, for connecting a pressure transducer, for data logging, should the need arise; and
- Ability for meter mechanisms to be exchanged – or to fit new, calibrated mechanisms into used or existing meter bodies, without loss of measuring accuracy to be substantiated. This is of particular importance to facilitate cost effective ease of maintenance to the meters in the future, without the need to remove meter bodies from the pipeline.

Prior to any meter being ordered or delivered to site, the Contractor shall deliver to the Engineer a sample of a typical bulk meter that he proposes to use and which complies with this specification. The Engineer will then investigate whether the meter is compliant with the specification before authorizing the use of such meters. If the meter does not comply with the specification in all respects, the Engineer may reject such meter in which case the Contractor will have to source meters of the required quality and all costs associated therewith will be for the Contractor's account.

The sample shall be accompanied by the following control sheet:

Item	
Name of official meter distribution company:	
Overview of company with particular emphasis on service capabilities, calibration facilities and their track record in South Africa:	(To be attached)
Meter specification sheets (including head loss across meter, minimum upstream/downstream straight pipe lengths and compliance with this specification):	(To be attached)
Test certificate:	(To be attached)

b) Domestic (Plastic bodied, wet dial water meters)

Water Meters used in this application must comply with the South African Bureau of Standards Specification No. 1529-1:1994 and must be approved in terms of Section 18 of the Trade Metrology Act No.77 of 1973 and Regulation 80 of Part II of the Trade Metrology Regulations.

All meters must be tested and sealed by an authorized official in a SANAS, (SANS 0259) accredited laboratory, situated within the borders of the Republic of South Africa. The seal must include the Trade Metrology Authorization number and copies of the test certificate must be made available free of charge on request by the Engineer.

Meters tendered for under this category must be the plastic bodied, wet dial, domestic water meters, and must conform to the following dimensions and specifications:

METER SIZE	15mm	20mm	25mm
Maximum Flow rate $q_s \pm 2\%$ (m ³ /h)	3	5	7
Permanent flow rate $q_p \pm 2\%$ (m ³ /h)	1,5	2,5	3,5
Transitional Flow rate $q_t \pm 2\%$ (m ³ /h)	22,5	37,5	52,5
Minimum Flow rate $q_{min} \pm 5\%$ (l/h)	15	25	35
Starting Flow (l/h)	5,7	5,7	10
Maximum Working Pressure (kPa)	1600	1600	1600
Body length (mm)	165	165	198
Alternate Body length (mm)	114	-	-
Pulse output (l)	0,5	0,5	5,0

- Counter must be of a wet dial type to prevent condensation under the lens;
- Counter window of minimum 7mm thickness that cannot be penetrated, by means of a needle or similar sharp instrument in order to stop the counter from operating, without destroying the unit and allowing an uncontrollable discharge of water;
- The meter must be approved by Trade and Metrology for vertical and horizontal installation;
- The meter must be suitable for rhythmic pulsating flows with a pulse output;
- The meter must be suitable for use with water temperatures up to 50°C and a maximum working pressure of 1 600 kPa;
- The maximum rate of flow (Qs) must be achieved at a pressure drop not in excess of 100 kPa across the inlet/outlet of the meter;
- All internal plastic components to be constructed of virgin materials and may not contain any materials of scrap value;
- Each meter must be backed with a 3 year guarantee against faulty workmanship and/or materials.
- The meter supplier and/or manufacturer must have an SANS 0259 accredited laboratory and each meter unit is to be tested and sealed by an authorized official;
- Meters are to comply with a Class "C" accuracy determination;
- Meters shall have built-in non-return valves to prevent reverse flow;
- The serial number of the meter cartridge must be clearly visible from the position that the meters are normally read;
- Meters offered shall not be affected by outside magnetic influences; and
- The local meter distribution company supplying the meters to the Contractor must have a proven track record for the supply of plastic bodied, domestic meters.

Prior to any meter being ordered or delivered to site, the Contractor shall deliver to the Engineer a sample of a typical meter that he proposes to use and which complies with this specification. The Engineer will then investigate whether the meter is compliant with the specification before

authorizing the use of such meters. If the meter does not comply with the specification in all respects, The Engineer may reject such meter in which case the Contractor will have to source meters of the required quality and all costs associated therewith will be for the Contractor's account.

The sample shall be accompanied by the following control sheet:

Item	
Name of the official, local. Meter distribution company	
Overview of company with particular emphasis on service capabilities, calibration facilities and their track record in South Africa:	(To be attached)
Meter specification sheets (including head loss across meter, minimum upstream/downstream straight pipe lengths and compliance with this specification):	(To be attached)
Test certificate:	(To be attached)

In spite of the requirements of SANS1529-1:2003, the Contractor must be prepared to perform the following tests in the presence of the engineer, is so required by him:

- Witness testing of a random sample of 5 meters in the test laboratory of the local meter distribution company, on the test rig normally used for the testing and calibration of these meters. Special attention will be given by the engineer to the actual performances of the meters offered, rather than the minimum performance as laid down by SANS1529-1:2003 for Class B specifications; and
- All costs associated with the above tests will be borne by the Contractor. The Employer will carry traveling costs to and from the laboratory of the official local meter distributor.

PSL4.8 Flow control device

The device shall comply with the following:

- The device must be IP68 rated;
- The device must be capable of being interrogated, tested and re-programmed in the field using an appropriate electronic device which can be linked to a desktop and data downloaded to "Excell" for analyses;
- The device must be capable of delivering a minimum flow rate of 10l/min;
- The device must have a minimum battery life in excess of 5 years;
- The device must be capable of delivering a preset volume of water (daily, monthly or as required) at full pressure;
- Daily and monthly allocation must be adjustable in field to higher/lower amounts without the need to replace any parts
- The maximum daily amount must be guaranteed (therefore must not be dependent on pressure fluctuations in the network);
- The device must be capable of withstanding a pressure of up to 10 bar;
- The device must be capable of logging the hourly consumption – over a minimum 3 month period;
- The device must have a built in safety function which shuts off the flow in the event of the reed switch cable being tampered with or cut; and
- The device must have a built in safety function which shuts off the flow in the event of the reed switch cable being tampered with or cut; and

- The device must have an option to carry-over the unused daily allocation within a month;
- The device must have security seals which prevent the uncoupling of the sensor cable from the meter pulse output;
- The device must be constructed from materials which have a very limited or no scrap value;
- The device must be able to be installed underground and to be mounted either horizontally or vertically; and
- The device must allow full bore flow (full pressure, no trickle flow)

The flow limiter must also be capable of being supplied with a field service terminal and communication cable/probe with the following features:

- Small, robust, hand held device with high quality screen and superior battery performance.
- Associated software with various operator levels to manage field usage with confidence and have security restrictions for adjusting of flow limiter settings:
- Adjustable security settings for various operator levels;
- Ability to configure flow limiters to administer predefined usage settings;
- Ability to configure flow limiter in-field to variable settings;
- Ability to read and store flow limiter summary and detail data and download to database;
- Allow manual meter reading recordings; and
- Run flow limiter tests functions

PSL4.9 Coatings and resistance to corrosion

All new valves are to be epoxy coated internally and out. Coating may be either by an approved solvent based epoxy system or an approved fusion bonded epoxy system as specified below:

Contractors will be required to submit details of their proposed suppliers, coating specification and the coating system to be applied to the Engineer for approval, before ordering the valves.

a) Solvent Based Epoxy Coating System

The epoxy shall be of the type Carboline 891; Plascogard KSIR 88; Sigmaguard EHB; AEBECOTE 330 or similar approved.

The dry film thickness (D.F.T) shall be as follows:

- Coating: 350 microns $\pm$ 50 microns; and
- Lining: 250 microns $\pm$ 50 microns

The applied coating and lining shall comply with the requirements of the following table:

No	Property	Requirements	Test Method	Frequency

1	Visual	The lining shall be smooth, free from excessive runs, sags, orange peel, occlusion or other visible defects.	Use an experienced observer.	Each Valve
2	Coating Thickness	Minimum: 200 microns Maximum: 500 microns	SANS Method 141	Minimum 6 readings/Valves per batch
3	Electrical Insulation Defects	Nil defects when tested at 90 Volts 2 Mega ohms	SANS Method 1217 – Section 8:12	One Valve per batch
4	Degree of Cure	No softening or discoloration	20 double rubs with cotton wool swab soaked in MEK	One valve per batch
5	Adhesion	Destructive testing not recommended		

b) Fusion Bonded Epoxy Powder Coating System

The Epoxy coating shall be a fusion bonded epoxy powder coating of the type Interpon PCL 331, Vedoc V VPC 2001 or similar approved as per the table below:

No	Property	Requirements	Test Method	Frequency
1	Visual	Smooth glossy or semi glossy finish, free from excessive runs, sags, orange peel, occlusion or other visible defects	Use an experienced observer	Each Valve
2	Coating Thickness	Min. 200 max. 500 microns	SANS Method 141	Minimum 6 readings/valve
3	Electrical Insulation Defects	Nil defects at 3500 Volts. For conditions for repair see Clause 3.3	SANS 1217 section 8.12.2	One Valve per batch
4	Impact Resistance	No defects at 2 joules	SANS 1217 section 8.7	Random 5% of Valves
5	Degree of cure: Dynamic Test	No softening or discolouration	20 double rubs with cotton wool swab soaked in MEK	One Valve per batch

The cured fusion bonded epoxy powder coating shall meet the requirements specified in Table 3 above.

Where extended spindles are used these shall be galvanised.

PSL5 MANHOLES AND SURFACE BOXES (Clause 3.11)**PSL5.1 Manhole covers and frames (Clause 3.11.5)**

Covers and frames as well as locking bars shall be as shown on the drawings.

PSL6 CONSTRUCTION (Clause 5)**PSL6.1 Laying (Clause 5.1)**

Pipe laying personnel

The laying of pipes and ancillary fittings shall be performed only by a qualified person who is registered as an artisan in the plumbing, pipe fitting, or drain laying trade or who is qualified by reason of having attended and passed the course on pipe laying of the Civil Engineering Industry Training Board. The Contractor will be expected to provide proof of this requirement.

PSL6.2 Pipe laid radii (Clause 5.1.4.2)

ADD the following: -

Where rigid pipes have been indicated as being laid to radii the maximum deflection angle at any flexible coupling may be no more than 50% of that permissible deflection as specified by the manufacturer for that diameter and class coupling.

Where uPVC pipes have been indicated as being laid with radii to accommodate changes in grade or horizontal alignment these radii must be taken up over a minimum of 3 pipe lengths for deflection angle less than 9° and one extra pipe length per 3° thereafter.

PSL6.3 Jointing methods

ADD the following: -

PSL6.3.1 Flexible couplings

At all positions where steel pipes or specials are cast into a concrete structure in an underground position the first joint outside the structure and a joint 1m from the structure shall be made by using a Viking-Johnson or similar approved flexible coupling unless otherwise specified.

At flexible couplings the pipe ends shall be at least 10mm apart to accommodate any pipe expansion.

In all isolating, reflux and scour valve chambers at least one pipe/valve connection shall be made by means of a Viking-Johnson or similar approved flexible flange adapter coupling to facilitate the removal of the valve from the line. The coupling shall be an equivalent class to the valve or higher.

PSL6.4 Thrust blocks (Clause 5.5)

PSL6.4.1 Thrust block size

Thrust blocks will be required at all changes of direction, reducers, end caps, tees and where otherwise directed by the Engineer.

The Contractor may not backfill any thrust block until it has been approved by the Engineer in writing.

If there is any doubts regarding the suitability of the insitu materials at any location, the Contractor shall obtain a ruling from the Engineer prior to casting the thrust blocks.

Standard drawings will be issued for anchor blocks in the expected soil conditions. The size may however vary depending on the condition of the soil encountered at each position. Should adverse soil conditions be encountered, it is the responsibility of the Contractor to notify the Engineer. The Engineer will then issue an instruction regarding the size of the anchor block. All anchor blocks to be cured for a minimum of three days before pressuring the pipeline.

The rate for blocks includes all costs to shutter the blocks so that a neat product is produced. Sandbags and other means of shuttering will not be permitted.

PSL6.5 Disinfection of potable water pipelines (Clause 5.10)

The disinfecting of the potable water pipeline shall be as follows:

- (a) The pipeline shall be flushed out with clean water until all sediment and other foreign matter has been removed.
- (b) The pipeline shall then be refilled with potable water containing 10mg/litre calcium hypo chloride. Further hypo chloride shall be put into the pipeline at air valve installations to ensure an even distribution throughout the pipeline should this be necessary.
- (c) The pipeline should be allowed to stand for 24 hours and samples then taken from suitable scour points. These should contain a chlorine residual of at least 1mg/litre. Should this not be attained, further doses of calcium hypo chloride shall be added to the water.

PSL6.6 Markers (no reference)

The contractor shall supply and place in position concrete markers to indicate the position of all sluice valves, air valves and hydrants. These shall be set opposite the fittings whose positions they are to indicate.

The whole marker shall be painted yellow with tow coats of approved yellow road marking paint and the letters "W" above and "V", "AV" or "SV" or "IV" below as appropriate painted in black enamel. The contractor is to submit a sample for approval prior to mass producing the markers.

In addition to the above pipe route markers will also be positioned along supply routes at positions instructed by the Engineer. The marker shall generally be placed 1.5m from the pipe centre line on the LHS as seen in the direction of flow.

PSL6.7 Location

All water pipelines shall be laid according to layout drawings.

PSL6.8 Type of pipe

As indicated on drawings and to comply with SABS ISO 4427 incorporating AS 4130 (INT).

PSL7 TESTING OF WATER PIPELINES

PSL7.1 Testing:

All pipes after completion and before scouring and disinfecting shall be tested to 1,25 x rated working pressure of pipes.

All tests must be carried out in the presence of the Engineer.

The availability of water for testing will be the responsibility of the Contractor and the associated costs are deemed to be included in the tender rates.

PSL7.2 Backfilling:

Backfilling of all pipelines should be carried out in two phases:

- Phase 1 involves partial backfilling to 300mm above the pipeline before pressure testing.
 - Partial backfilling should leave the joints totally exposed and rise at least 300mm above pipes.
 - Mechanical shovels may not be used for placing the partial backfilling in the trench.
- Phase 2 involves completion of backfilling after pressure testing.
 - Backfilling should be compacted at the optimum moisture content to give the maximum density.

PSL8 MEASUREMENT AND PAYMENT (Clause 8)

PSL8.1 Supply, lay and bed pipes complete with couplings (Clause 8.2.1)

ADD the following:-

The rate for laying shall be deemed to include for connecting pipes to existing pipes where necessary.

The rate for testing of pipelines and appurtenances shall be deemed to include for the supply and loan of temporary valves, end caps, blank flanges, isolating-type devices, buffer beams or anything else the Contractor considers necessary to complete a successful test.

PSL8.2 Special wrapping in corrosive soils (Clause 8.2.15)

The rate for wrapping of steel pipes and specials as set out in PSL3.4 shall be deemed to include for the packing with bitumen based mastic and external encasing protection of joints and couplings as well as the outer protective wrap.

PSL8.3 Lay and bed pipes complete with couplings (Clause 8.2.16)

ADD the following:-

The rate shall include the cost for the receipt of the pipes upon delivery, inspection, off-loading, stacking and storage thereof, the subsequent loading, transporting to construction site and off-loading.

The rate for laying shall be deemed to include for connecting pipes to existing pipes where necessary.

The rate for testing of pipelines and appurtenances shall be deemed to include for the supply and load of temporary valves, end caps, blank flanges, isolating-type devices, buffer beams or anything else the Contractor considers necessary to complete a successful test.

PSLB PIPE BEDDING (SANS 1200 LB)

PSLB1 SELECTION

PSLB1.1 Source of Bedding Material

It is anticipated that no bedding cradle material will be obtained from trench excavations and the contractor will have to import a suitable material (river sand). The contractor will where required screen or sieve excavated material so as to conform to the bedding fill material requirements. The Engineer will however instruct the Contractor to import bedding fill material if deemed necessary.

PSLB1.2 Contractor to excavate selectively for bedding materials

(Sub Clause 3.4.1). Notwithstanding the requirements of Sub Clause 3.7 of SANS 1200DB (Earthworks – Pipe trenches) and Sub Clause 3.4.1 of SANS 1200LB regarding the use of selective methods of excavation, the contractor shall use selective methods of excavating and shall provide and use methods that will enable him to avoid burying or contaminating material that is suitable and is required for bedding.

PSLB2 MEASUREMENT AND PAYMENT (Clause 8)

PSLB2.1 Sub clauses 8.2.1 and 8.2.2 are not applicable to this contract

There are separate items for the provision of granular bedding and selected backfill material from excavations.

The rate for granular bedding shall include the provision and placing of material next to pipe trenches as well as the dispose of surplus / unsuitable in situ material. A freehaul of 5km will be applied.

The rate for selected backfill include the selection, placing and compaction thereof.

The cross-sectional area employed in the calculation of bedding shall not include the cross sectional area of the pipe.

PSLD SEWERS (SANS 1200 LD)

PSLD1 MATERIALS

PSLD1.1 Pipes (HDPE – High density polyethylene) (Clause 3.1)

Sewer pipes for rising mains shall comply with SANS ISO 4427:1996 pipe type PE 100 pipe class as indicated.

Sewer pipe replacement shall comply with SANS 150 4427:1996 pipe type PE 80 PN8 unless otherwise indicated.

PSLD1.2 Pipes (uPVC) (Clause 3.1.5)

Multi-layer

Sewer pipe shall be “Maincore” of similar approved pipe stiffness 400KPa and shall comply with SANS 1601. Fitting to comply with SANS 791.

Solid wall

All pipes shall be heavy duty uPVC pipes class 34 and shall comply with the relevant requirements of SANS 791 and shall have suitable approved flexible joints.

PSLD2 MANHOLES, CHAMBERS ETC.

PSLD2.1 Type of manhole (Clause 3.5.2)

Manholes will be constructed from prefabricated reinforced concrete rings with the following diameters:

Regardless of depth : 1,050mm diameter rings

PSLD2.2 Concrete base

The bottom section of the chamber is to be placed into a freshly cast concrete base into which the sewer or drainpipe have been laid.

PSLD2.3 Joints

The joint between manhole rings shall be fitted with Expandite BUTYL 300 with root inhibitor or similar approved and wrapped with approved waterproof tape on the outside.

PSLD2.4 Concrete (Clause 3.5.4)

All concrete sections will be constructed with dolomite aggregate and sand.

PSLD2.5 Cover slab (Clause 3.5.8)

The cover slab is a reinforced concrete slab which provide a seating for the manhole cover.

PSLD2.6 Manhole covers (Clause 3.5.8)

The following covers will be applicable:

- (a) Midblocks : Type A4 Polymer precast concrete cover and frame
- (b) Road reserve and roadway areas : Heavy duty Secures Z - 600 D ductile iron cover and frame

PSLD3 CONSTRUCTION

PSLD3.1 Compacting (Clause 5.1)

The degree of compaction attained for bedding shall be in accordance with the required backfilling specifications indicated on the bedding detailed drawings.

PSLD3.2 SEWERS TO BE KEPT CLEAN (Clause 5.3)

At the end of each working period the pipe ends should be sealed off to keep the pipeline clean and to prevent animals or foreign material from entering.

PSLD3.3 CONNECTIONS TO MANHOLES (Clause 5.4)

A flexible joint in all the pipes connected to the manhole, must be positioned as close to the manhole as practical, but not more than 700mm for differential settlements.

PSLD4 TOLERANCES (Clause 6)

PSLD4.1 SETTING OUT (Clause 6.1)

All sewer pipelines shall be set out in accordance with the co-ordinates provided.

PSLD4.2 MANHOLE INVERT LEVELS (Clause 6.3)

The permissible deviation of the level of invert shall be +- 10mm.

PSLD5 MEASUREMENT AND PAYMENT (Clause 8)

Add the following pay items:

Item	Description	Unit
PSLD8.2	Breaking and repairing of access openings through manhole walls.	The unit of measurement shall be the number of manholes broken into and repaired irrespective of the number of openings. The tendered rates shall include, inter alia, for breaking of openings, removal of rubble from site and reinstatement of manhole walls and all related work. (No)
PSLD8.3	Breaking and repairing of benching and channelling in existing manhole to accommodate new pipe, including caulking of new pipe ends.	The unit of measurement shall be the number of manholes affected and Number repaired irrespective of the number of pipes. The tendered rates shall include for all materials and labour necessary to repair and adjust benching to accommodate the new pipe, as well as to ensure proper bonding with the benching, and to cut open the new pipe if necessary. (No)

PSLE STORMWATER DRAINAGE (SANS 1200 LE)

PSLE1 MATERIALS

PSLE1.1 PRECAST CONCRETE PIPES (Clause 3.1a))

Concrete pipes to be O-Gee joints with external rubber collar across the joint or HD-PE Weholite structured wall HDPE pipe sand tight, male-female coupling, no seal threaded joint to EN 13476-1 SN4.

PSLE1.2 SKEWED ENDS (Clause 3.1d))

Skewed ends shall be permitted to be cut on site; the exposed steel reinforcement shall be painted with an approved epoxy paint.

PSLE2 MANHOLES, CATCHPITS AND ACCESSORIES

PSLE2.1 EROSION PROTECTION

Provision of erosion protection to be made at all stormwater outlets through the construction of galvanised Reno Mattresses. The price should include for excavation and filling with 100 - 200mm diameter stones.

PSLE2.2 SUBSOIL DRAINAGE

The requirements for subsoil drainage will specifically be issued by the Engineer. This is to be constructed in accordance with the details indicated consisting of single graded stone wrapped on both sides into a M80 "GEOPIPE" drainage pipe. (The excavation and backfilling required for this drainage will be deemed inclusive in the rate tendered therefore).

PSLE2.3 CONCRETE CHANNELS

Concrete "trapezoidal" channels are to be constructed as per detail. All concrete to be class 25/19 with construction joints every 4 800c/c and expansion joint 16,000c/c. Joint filler to be Flexell of similar approved with joint sealant Sika Pro 2HP or similar approved.

PSLE3 INVERT LEVELS (Clause 6.1)

The permissible deviation of the level of invert shall be +/- 10mm.

PSM ROADS (GENERAL) (SANS 1200 M)**PSM1 MATERIALS****PSM1.1 QUALITY (Clause 3.1)**

The quality of the material to be utilized for the various layers must be equal to or better than the standardized specifications, or those published in TRH14: Guidelines for Road Construction Material as published by the Department of Transport.

Where a discrepancy between the standardized specification and TRH14 exists, the most stringent specification will prevail.

PSM2 TESTING**PSM2.1 COMPACTION CONTROL (ADDITIONAL REQUIREMENTS) (Clause 7.4)**

Unless otherwise instructed by the Engineer, the following compaction requirements must be complied with:

LAYER	MATERIAL	COMPACTION DENSITY
Base Course	Imported gravel G2	102% mod AASHTO
Sub-base C4	Imported gravel G5	97% mod AASHTO
Selected layer - Upper	Imported gravel G7	93% mod AASHTO
Selected layer - Lower	Insitu/imported gravel G9	93% mod AASHTO for cohesive soil and 100% for non-cohesive soil
Road Bed	Insitu G9	93% mod AASHTO for cohesive soil and 100% for non-cohesive soil
Fill	Insitu G9	93% mod AASHTO for cohesive soil and 100% for non-cohesive soil
Imported fill	Insitu G9	93% mod AASHTO for cohesive soil and 100% for non-cohesive soil

PSME SUBBASE (SANS 1200 ME)

PSME1 MATERIALS

PSME1.1 SUBBASE MATERIAL (CLAUSE 3.2.1)

Add to 3.2.1

The minimum Indirect Tensile Strength ITS-200kPa (SABITA Manual 14 1193)

PSME1.2 STABILIZING AGENT (Clause 3.3)

PSME1.2.1 Type of cement

The Contractor shall only use ordinary Portland cement.

Cement type CEM 11, Strength Class 42,5R

PSME2 CONSTRUCTION

PSME2.1 Cutting of Subbase Layer (Additional clause)

Prior to constructing the subbase layer, all services crossing the roads shall be installed. Under no circumstances will the subbase layer be cut to accommodate any services.

PART B2 PARTICULAR SPECIFICATIONS

PA	Painting and Corrosion Protection
PB	Grassing
PC	Denso HT Petroleum Tape Wrapping System
PD	HDPE Liners
PE	HDPE Butt Fusion Jointing
PF	Pumping Equipment
PG	Electrical Equipment
PH	Generic Labour-Intensive Specification
PI	Occupational Health and Safety Specification (OHSA 1993 Safety Specifications)
PJ	Sluice gate / Penstock

PA PAINTING AND CORROSION PROTECTION**PA1 Scope**

This section of the Contract covers the preparation of surfaces, the application of paints and corrosion protection systems, the testing of the same and the upholding of all the protected surfaces during the Defects Liability Period.

PA2 Materials

Paints shall be of the best quality, of approved manufacture and brand and shall comply with the requirements of the following specifications:

2.1 Blast cleaning abrasive

The abrasive shall comply with the requirements of Clause 2.3.3.3 of SANS 064.

2.2 Primers

Red lead based primer	SANS 312 type II, grade II
Wash primer (metal etch)	SANS 723
Zinc rich primer	SANS 926
Zinc chromate primers	SANS 679, type I
Calcium plumbate primer	SANS 912
Epoxy tar	SANS 801

2.3 Undercoats

Undercoats for paints	SANS 681

2.4 Finishing coats*Steel*

Structural steel paint	SANS 684, type B
High gloss paint	SANS 630, type II
High build chlorinated rubber paint	CSS 13.15
Epoxy enamel	SANS 663, type III
Epoxy tar paints	SANS 801, type I
Water dispersed epoxy paint	Non-toxic odourless two component solvent free water dispersed polyamide cured epoxy

Walls

Acrylic emulsion paint	SANS 634, grade I
Eggshell	SANS 515
High gloss alkyd enamel paints with a non-aqueous solvent base, for interior and exterior use	SANS 630, grade I

PA3 General

All painting is to be undertaken in accordance with the appropriate SANS Standards and the following directives shall be adhered to:

- 3.1 Paint shall not be applied over any surfaces containing traces of grit, grease, oil, loose rust, loose millscale or corrosion products of any kind.
- 3.2 All metal surfaces to which paint is applied shall be moisture free. Paint surfaces which are to be overcoated shall be hard dry before overcoating, unless stated otherwise in the maker's instructions, which the Contractor shall not fail to obtain.

- 3.3 All traces of soluble salts and corrosive airborne contaminants shall be thoroughly washed from the surface prior to painting, and the surfaces dried and painted immediately thereafter.
- 3.4 Unless otherwise stated, no paint shall be applied within 50 mm of areas which are to be welded.
- 3.5 Welds and adjacent parent metal shall be de-slugged, inspected and approved and all spatter shall be removed prior to painting.
- 3.6 The weld areas shall be abrasive blasted and / or ground and all contaminants shall be removed prior to painting. Wire brushing of the weld shall only be allowed if the paint specification calls for wire brushing. The weld area shall then be flushed with fresh water and allowed to dry before receiving the full specified paint system.
- 3.7 Surfaces which are to rest on concrete or other floors shall receive the full paint system prior to erection.
- 3.8 The Contractor shall protect all parts of the Works against disfigurement by spatters, splashes and smirches of paint or of paint materials. The Contractor shall be responsible for any damage, paint or dirt caused by his operations to persons or property, including plants and animals; and he will be required to provide protective measures at his expense to prevent such damage. Any paint stains which may result in an unsightly appearance shall be removed or obliterated by the Contractor at his expense.
- 3.9 Where the shop coat has been allowed to age for a few months before painting, it shall be light sanded or rubbed with steel wool or scrubbed with clean water, using a bristle brush.
- 3.10 Mating of contact surfaces shall be protected from corrosion by ensuring that the two surfaces brought into contact with each other shall be prepared and primed in accordance with the specification. The primed surfaces shall be brought together while the paint is still wet.
- 3.11 Areas which will be inaccessible after erection shall receive the full specified coating system, before erection or assembly.
- 3.12 Unless otherwise specified, steel embedded within concrete shall not be painted except to within 50 mm below the concrete / air interface.
- 3.13 All sharp edges shall be rounded before painting and all cut ends shall receive the specified dry film thickness of paint.
- 3.14 All air used for blast cleaning or spraying shall be free from all traces of water and oil.
- 3.15 When blast-cleaning, a satisfactory blast profile (i.e. anchor pattern) shall be achieved. If the abrasive used for blast cleaning is sand, then it shall be free of clay.
- 3.16 The Painting contractor shall ensure that the manufacturer's recommended thinners are used for any particular paint.
- 3.17 The Painting contractor shall ensure that the final finishing coat shall completely cover the previous coat.
- 3.18 The Painting contractor shall ensure that primed steelwork which is to be delivered to site is stacked on bearers and is clear of the ground. Wherever possible channels, angles, etc, shall be stacked so that water cannot collect on steel.
- 3.19 The paint manufacturer's instructions shall be strictly adhered to.
- 3.20 The compatibility of any specified paint system shall be confirmed by the Contractor prior to ordering of any paint material.

- 3.21 Pipes and fittings which are to be built into concrete shall be left bare externally where it will be in contact with concrete to within 35 mm of the surface of the concrete.
- 3.22 Except where otherwise indicated, all surface preparation and painting shall be executed in the factory. Equipment inadvertently delivered unpainted, shall be returned to the factory at the cost of the Contractor for surface preparation and painting.

PA4 Surface preparation

Before paint is applied to any surface, the relevant surface shall be thoroughly prepared as specified in SANS 064, the standardized specification applicable to the paint system, this Particular Specification and the Project Specification as applicable.

PA5 Application of paint

Unless otherwise specified, paint may be applied either by brush, spray or roller method, or in any combination of these methods.

- 5.1 Brushes, when used, shall have sufficient body and length of bristle to spread and paint in a uniform coat. Paint shall be evenly spread and thoroughly brushed out. If brush marks are visible, it will be considered that the paint has been improperly applied, and will not be acceptable.
- 5.2 On all surfaces which are inaccessible for painting by regular means, the paint shall be applied by sheepskin daubers, bottle brushes, or by any other acceptable method to render the required coating of paint.
- 5.3 If spray methods are used, the operator shall be thoroughly experienced. Runs, sags, thin areas in the paint coat, or skips shall be considered as unsatisfactory, and the Contractor will be required to repaint by brush.
- 5.4 A water trap and air regulating valve acceptable to the Engineer shall be furnished and installed on all equipment used in spray painting.
- 5.5 Mechanical mixers shall be used to mix paint properly when ready mixed paints are not used. Prior to application the paint shall be remixed a sufficient length of time to thoroughly mix the pigment and vehicle together. Paint shall be kept well stirred to keep the pigments in suspension during its application. No skins whatsoever will be tolerated and if it is necessary it should be removed by means of screening and if not successful the paint and paintwork already completed may be condemned at the discretion of the Engineer.
- 5.6 Paint shall not be applied when the ambient air temperature is below 5 °C or when the temperature is expected to drop below 5 °C before the paint has dried.
- 5.7 Paint shall not be applied when the relative humidity is above 85%, in fog or mist, when it is raining or when rain is expected.
- 5.8 The final colours of all paintwork shall be decided by the Engineer.

PA6 Paint systems

6.1 Paint System A

This system applies to ungalvanised steel requiring an enamel finish.

6.1.1 Surface preparation

Steel surfaces shall be abrasive blast cleaned to a Sa 2,5 (near white) finish to Swedish Standard SIS 05/59/00. The surface profile after blasting shall not exceed 50 micron.

6.1.2 *Primer*

Apply one coat zinc chromate primer to a minimum dry film thickness of 20 micron.

6.1.3 *Undercoat*

Apply one coat universal undercoat to a minimum dry film thickness of 40 micron.

6.1.4 *Finishing*

Apply one coat high gloss alkyd enamel to a minimum dry film thickness of 25 micron.

After installation, apply on site a second coat high gloss alkyd enamel to a minimum dry film thickness of 25 micron.

(Total dry film thickness of the system shall not be less than 110 micron).

6.2 **Paint System B**

This system applies to galvanized steel requiring an enamel finish.

6.2.1 *Surface preparation*

As specified for steel to be galvanized.

6.2.2 *Galvanising*

Galvanising shall be of the hot dipped heavy duty grade as specified hereinafter.

6.2.3 *Preparation for painting*

Clean surface thoroughly to remove all traces of manufacturer's storage oil.

6.2.4 *Primer*

Apply one coat calcium plumbate primer to a minimum dry film thickness of 20 micron.

6.2.5 *Undercoat*

Apply one coat universal undercoat to a minimum dry film thickness of 40 micron.

6.2.6 *Finishing*

Apply one coat high gloss alkyd enamel to a minimum dry film thickness of 25 micron.

After installation, apply on site a second coat high gloss alkyd enamel to a minimum dry film thickness of 25 micron.

(Total dry film thickness of the system shall not be less than 110 micron).

6.3 **Paint System C**

This system has a vinyl enamel finish.

6.3.1 *Surface preparation*

Steel surfaces shall be abrasive blast cleaned to a Sa 2,5 (near white) finish to Swedish Standard SIS 05/59/00. The surface profile after blasting shall not exceed 50 micron.

6.3.2 *Primer*

Apply one coat twin pack inorganic zinc silicate primer to a minimum dry film thickness of 70 micron.

6.3.3 *Finishing*

Apply two coats high build vinyl to a minimum dry film thickness of 65 micron per coat (First coat's colour red oxide, second light grey).

After installation, apply on site one finishing coat of vinyl enamel to a minimum dry film thickness of 30 micron.

(Total dry film thickness of system shall not be less than 230 micron).

6.4 **Paint System D**

This system applies to ungalvanized steel surfaces requiring an epoxy tar finish.

6.4.1 *Surface preparation*

Steel surfaces shall be abrasive blast cleaned to a Sa 2,5 (near white) finish to Swedish Standard SIS 05/59/00. The surface profile after blasting shall not exceed 50 micron.

6.4.2 *Primer*

Apply one coat single pack etch primer compatible with epoxy tar compound to a dry film thickness of 25 micron.

6.4.3 *Finishing*

Apply three coats epoxy tar compound to a minimum dry film thickness of 100 micron per coat. The first coat shall be black, the second brown and the third again black. Each coat shall be applied after the previous coat has dried but within 24 hours of the application of the previous coat.

A solvent wipe shall be used between each successive coat to provide good intercoat adhesion.

(Total dry film thickness shall not be less than 325 micron).

6.5 **Paint System E**

This system applies to galvanized steel surfaces requiring an epoxy tar finish.

6.5.1 *Surface preparation*

As specified for steel to be galvanized.

6.5.2 *Galvanising*

Galvanising shall be of the hot-dipped heavy duty grade as specified hereinafter.

6.5.3 *Preparation for painting*

Clean surface thoroughly to remove all traces of manufacturer's storage oil.

6.5.4 *Finishing*

Apply three coats epoxy tar compound to a minimum dry film thickness of 100 micron per coat. The first coat shall be black, the second brown and the third again black.

Each coat shall be applied after the previous coat has dried but within 24 hours of the application of the previous coat.

A solvent wipe shall be used between each successive coat to provide good intercoat adhesion.

(Total dry film thickness shall not be less than 300 micron).

6.6 Paint System F

This system applies to ungalvanised steel surfaces requiring an aluminium epoxy tar finish.

6.6.1 Surface preparation

Steel surfaces shall be abrasive blast cleaned to a Sa 2,5 (near white) finish to Swedish standard SIS 05/59/00. The surface profile after blasting shall not exceed 50 micron.

6.6.2 Primer

Apply one coat single pack etch primer compatible with epoxy compound, to a minimum dry film thickness of 25 micron.

6.6.3 Finishing

Apply two coats epoxy tar compound (first coat black, second coat brown) to a minimum dry film thickness of 100 micron per coat followed by one coat aluminium epoxy tar compound to a minimum dry film thickness of 100 micron.

Each coat shall be applied after the previous coat has dried but within 24 hours of the application of the previous coat. A solvent wipe shall be used between each successive coat to provide good intercoat adhesion.

(Total dry film thickness of the system shall not be less than 325 micron).

6.7 Paint System G

This system applies to galvanized steel surfaces requiring an aluminium epoxy tar finish.

6.7.1 Surface preparation

As specified for steel to be galvanized.

6.7.2 Galvanising

Hot-dipped heavy duty grade as specified hereinafter.

6.7.3 Preparation for painting

Clean surface thoroughly to remove all traces of manufacturer's storage oil.

6.7.4 Finishing

Apply two coats epoxy tar compound to a minimum dry film thickness of 100 micron per coat (first coat black, second coat brown).

Apply one coat aluminium epoxy tar compound to a minimum dry film thickness of 100 micron.

Each coat shall be applied after the previous coat has dried but within 24 hours of the previous coat. A solvent wipe shall be used between each successive coat to provide good intercoat adhesion.

Total dry film thickness of the system shall not be less than 300 micron).

6.8 Paint System H

This system applies to ungalvanised mild steel requiring an epoxy paint finish.

6.8.1 Surface preparation

Steel surfaces shall be abrasive blast cleaned to a Sa 2,5 (near white) finish to Swedish Standard SIS 05/59/00. The surface profile after blasting shall not exceed 50 micron.

6.8.2 Finishing

Apply in multiple coats polyamide cured twin pack epoxy paint (Cupon EP 2300) to a minimum dry film thickness of 75 micron per coat in red (JYA 1) and pale oxide (JYA 2) colours.

Total dry film thickness shall not be less than 250 – 350 micron.

6.9 Paint System I

This system applies to cast iron pipes requiring a bitumen finish.

6.9.1 Surface Preparation

Surfaces shall be thoroughly wire brushed and cleaned immediately before painting.

6.9.2 Finishing

Bitumen coating shall be applied by dipping when all surfaces are to be treated. When only one surface of an item must be treated the bitumen may be brush applied.

6.10 Paint System J

This system applies to cast iron pipes requiring an epoxy coating.

6.10.1 Surface Preparation

Surfaces shall be thoroughly wire brushed and cleaned immediately before painting.

6.10.2 Finishing

Epoxy coating shall be applied by dipping when all surfaces are to be treated. When only one surface must be treated, the epoxy may be brush applied.

6.11 Paint System K

This system applies to external surface painting of exposed cast iron pipes.

6.11.1 Surface Preparation

Wash down with a mild detergent, teepol or equivalent.

6.11.2 Primer

Apply a barrier coat of chemical resistant high build acrylic primer to a minimum dry film thickness of 60 micrometer.

6.11.3 Undercoat

Apply one coat of chemical resistant acrylic paint to a minimum dry film thickness of 60 micrometer.

6.11.4 Finishing coat

Apply a final coat of chemical resistant acrylic paint to a minimum dry film thickness of 60 micrometer to a colour approved by the Engineer.

PA7 Galvanising

- 7.1 All hot dip galvanizing shall be executed in accordance with the SANS No 763 (as amended) specification for Hot Dip (Galvanised) Zinc Coatings, with particular reference to the following requirements.
- 7.2 All hot dipped galvanizing shall be of the heavy duty grade.
- 7.3 Mild steel plate and sections shall be of good commercial quality, or higher grades, best suited for galvanizing. The material shall be free from slag or coarse laminations, fine fissures and rolled-in impurities.
- 7.4 Castings shall be sound, dense and clean and free from distortion, porosity, carbon and slag enclosures, blow-holes and other injurious conditions.
- 7.5 Folded, rivetted or similarly jointed metal constructions are not acceptable.
- 7.6 Welding flux shall be chipped away and all welds wire brushed before galvanizing.
- 7.7 The surfaces to be galvanized shall be free from paint, oil, grease and similar impurities.
- 7.8 All exposed surfaces including welds shall be thoroughly sand blasted prior to galvanizing.
- 7.9 The Engineer shall have the right to inspect all steel components before galvanizing, and to reject or ask for remedial treatment of any material which is considered to be unsuitable. This applies particularly to welds.
- 7.10 The galvanized coating shall be smooth, adherent, continuous and free from black spots or flux stains.
- 7.11 Globular extra heavy deposits of zinc which interfere with the intended use of the material shall not be acceptable. Excessively protuberant lumps and nodules shall be removed by hot wiping or by the skillful application of mechanical means.
- 7.12 However, there shall remain a sufficient minimum thickness of unbroken zinc coating. Flaws on small parts and working surfaces shall be repaired only by stripping and re-dipping. The zinc bath shall contain not less than 98,5 % pure zinc.
- 7.13 The deposits required from galvanized coatings shall be as follows:

MATERIAL THICKNESS	COATING GRAMS PER m2	THICKNESS IN MICRON
5 mm and over	735	105
5 mm to 2 mm	560	80
2 mm to 1,25 mm	385	55
Bolts and nuts	315 - 385	45 - 55

PA8 PROTECTION OF UNPAINTED SURFACES

8.1 Bright machined parts

All bright machined parts shall have a protective treatment applied by the manufacturer before despatch and this treatment shall be kept intact up to the time of handover unless it has to be removed for installation. If the surface is exposed after installation a further protective coating shall be applied in accordance with the manufacturer's requirements.

8.2 Non-ferrous

All exposed copper piping shall be cleaned down, degreased and all adhering materials cleaned off without damage to the installation. Where indicated on drawings or described elsewhere in this specification, exposed copper piping and sanitary fittings (chromium plated) shall be degreased, cleaned down and polished without damage to the installation.

PA9 Repair of paintwork

Areas where the paint coating has been damaged during transportation, erection or by any means whatsoever, shall be repaired as follows:

Rust spots shall be removed by means of a wire brush or emery paper and the surrounding paint which is still intact shall be feathered for a distance of 50 mm beyond the damaged area. Spot priming shall consist of all the coats previously applied, and shall overlap the damaged area by 20 mm.

PA10 Testing of paintwork

Paint dry film thickness shall be measured using a non-destructive thickness gauge such as the "Mikrotest" or equivalent.

The Employer may subject complete paintwork to specialist inspection, the findings of such inspection being binding on the Contractor. The cost of the inspection will be borne by the Employer but the cost of any remedial work resulting from the inspection must be borne by the Contractor.

PA11 Measurement and Payment

No separate payment will be made for painting and corrosion protection and the cost of this work shall be deemed to have been included in the prices tendered for the equipment.

PB GRASSING

PB1 General

Areas to be grassed as well as the type of grass will be indicated by the Engineer on site. Grass removed from pipe trenches prior to excavation must be maintained by the Contractor for replanting. Only where existing grass removed and deemed by the Engineer that the grass cannot be replanted, will a written instruction be given by the Engineer for planting of new grass by means of runners or sods. The Contractor is responsible for all cost related of sections to be grass by means grass removed prior to excavation which the Contractor has failed to maintain for replanting.

The Contractor is to ensure that grass is neatly trimmed and watered regularly as to ensure that establishment of grass cover takes place.

Grassing of pipe trenches and other excavations must be done as soon as practically possible as to ensure early establishment of grass cover.

PB2 Grass

Sods and runners to be planted as indicated by Engineer on site.

The following grass is specified to be supplied, delivered and lay:

- a) Buffalo
- b) Berea
- c) Cynodon

Areas for grassing are to be prepared by removing all existing growth and applying and raking in 4:1:1 fertilizer at 60g per m² into top 50mm of topsoiling. Runners to be planted at a maximum spacing of 200mm c/c.

Grass area is to be rolled with a hand roller and kept moist for a minimum of 7 days or until grass have established. The Contractor shall allow for general maintenance; including watering, weeding and trimming of grassed areas; in the tendered rates for a period until the Engineer is satisfied that grass growth has been established.

Any grass that fails to grow, in newly planted or replanted areas, shall be replaced by the Contractor with new grass runners and/or sods of which the related cost will be the at the Contractors expense.

PC DENSO HT PETROLEUM TAPE WRAPPING SYSTEM

Denso HT Petroleum tape wrapping system shall be used for the wrapping of buried flange and flexible joints and buried galvanized and epoxy paint coated pipes.

PC1 General

Chip off weld scale and remove grease, then wire brush to remove all loose rust, burnt bitumen/coal tar enamel and dirt to a Standard St 2 of SIS 055900 (Swedish Standard).

Chamfer any raised edges or steps in the existing coating.

Apply Denso Priming Solution.

Apply Denso HT Tape of appropriate width uniformly in a spiral fashion to give a 55% overlap on the pipe and for not less than 200mm along the length of the intact factory coating.

Apply uniform tension to ensure the tape is smooth and free from wrinkles. Do not apply excessive tension that will stretch the tape nor insufficient or uneven tension that will give rise to air bubbles and wrinkles.

PC2 Flexible couplings and flanges

Apply Denso Mastic so as to create a smooth profile suitable for over-wrapping. Wrap a suitable width of Denso HT Tape over the coupling. Ensure that there are not air voids under the tape. Apply a double layer of Dense Layflat polyethylene sheeting over the whole length of the repair and for 100mm beyond each end of the repair. Tape the ends of the Layflat with two complete turns of 100mm wide adhesive Denso PVC tape to seal the ends.

Denso fabric backed mastic blanket can be used as an alternative for Dense HT Tape. After priming, pack potential air void areas such as under the bolts with Dense Mastic. Place the mastic Blanket in position and press it into all air voids. Start under the pipe and work upwards. Over wrap the Mastic Blanket with two layers of Dense Layflat sheeting and secure the ends with 100 mm wide adhesive Dense PVC tape.

If the pipe runs through very wet soils it is recommended that Denso 5105 Paste be used in preference to Denso Priming Solution, and the couplings be wrapped with Dense PVC Self Adhesive Tape using a 55% overlap in place of the Layflat Sheeting.

PC3 Welded joints and straight pipe lengths

After completion of Denso HT Tape wrapping and approval by the Engineer, apply 0,3mm adhesive PVC outerwrap with 55% overlap over the whole length of the wrapping and for 100 mm beyond each end.

PC4 Measurement and payment

No separate measurements shall be made for Denso tape wrapping but this work shall be deemed to have been included in the rates bid for the relevant equipment.

PD HDPE LINERS

PD1 SCOPE

This specification covers primary and secondary (or tertiary if required) geomembrane liners in the composite lining systems for hazardous material containment facilities. It is based on SANS 10409 Code of Practice for the Design, Selection and Installation of Geomembranes.

PD2 GENERAL REQUIREMENTS

a) Geomembrane manufacturer and installer

Full detail of the geomembrane manufacturer must be supplied with the tender indicating the manufacture process, raw materials with sources, quality assurance system, quality test results and installation details for the past five years. Only one manufacturer may be used on the project. The geomembrane supplier must be approved in writing by the Engineer.

Similarly full details of the installer must be provided including installation done for the past five years and CV of the key personnel. The installer must be approved / certified by the manufacturer. The certificate / approval must be submitted with the tender.

PD3 SUPPORTING SPECIFICATIONS

The latest edition of the following specifications will be applicable:

- a. SANS 1526 (2003) – Thermoplastics sheeting for use as a geomembrane.
- b. SANS 10409 (2005) – Design, selection and installation of geomembranes.
- c. GRI Standard GM13 – Standard Specification for Test Properties, Test Frequencies and Recommended Warranties for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes.
- d. GRI Standard GM18 – Standard Specification for Test Methods, Test Properties and Testing Frequencies for Flexible Polypropylene (fPP and fPP-R) Nonreinforced and Reinforced Geomembranes.
- e. GRI Standard GM19 – Standard Specification for Seam Strength and Related properties of Thermally Bonded Polyolefin Geomembranes.

PD4 MATERIALS

Smooth high density polyethylene geomembrane with minimum sheet density of 0,95 g/Ml is required. Membrane thickness is specified in the drawings and vary from 2,0 for primary, 1,5 mm for secondary and 1,0 mm for tertiary liners. LLDPE liners in accordance with GRI-GM17 HDPE material to comply with the minimum property specifications of GRI-GM13 for geomembranes. The liners must prevent leakage from the facility containing waste as indicated in the project specifications.

PD5 INSTALLATION

5.1 Earthworks

Earthworks shall be carried out in accordance with SANS 1200D : Earthworks

The surface shall be as specified by the manufacturers.

The surface shall be even and compacted to the specified density.

The Contractor will be required to inspect the earthworks in the presence of the Engineer prior to installation of any sheeting and remove any particles that may be detrimental.

5.2 Rain and moisture

The earthworks shall be hard and dry when the sheeting is installed. The sheeting shall not be installed or jointed in the rain or while the sheeting or supporting surface is wet or moist.

5.3 Geomembrane placement

No panels may be seamed in the field without the Engineer's approval. In addition, panels that significantly change the layout drawing, (e.g. that change the orientation of seams) shall not be installed without the Engineer's prior approval. It is, however, recognised that such a drawing is only a guide and will, in practice, require modification.

No geosynthetics shall be deployed, joined, or tested unless a representative of the Engineer is present to monitor such activities.

The Contractor will be responsible for calculations of required amount of compensation that must be installed in the geomembrane. Such calculations shall be approved by the Engineer.

The Contractor shall insure that:

- The methods used to unroll the panels do not cause excessive scratches or crimps in the geomembrane and do not damage the supporting soil.
- Geomembrane is not allowed to unroll freely down a slope.
- Geomembrane is not placed under tension unless approved by the Engineer.

Individual sheets must be rolled out immediately prior to installation to ensure that the possibility of damage is kept to a minimum and the membrane is exposed to subsequent construction activities for the shortest time.

A final inspection of the surface on which the sheeting is to be placed shall also be conducted immediately prior to placement to ensure that no deterioration of the surface has taken place since preparation.

The contractor in the presence of the Engineer will visually examine each panel, after placement and prior to seaming, for damage. Damaged panels or portions of damaged panels, which have been rejected will be marked and their removal from the work area recorded by the Contractor.

5.4 Temperature effects

Sufficient material shall be allowed for contraction and expansion of the membrane without undue stressing of the sheeting, the welded joints and the joints to structures. Geomembrane placement will not proceed at geomembrane temperatures below -20°C. Geomembrane seaming will not proceed at geomembrane temperatures between 0°C and -20°C or above 75°C unless approved by the Engineer. The Contractor shall have suitable geomembrane temperature measuring equipment available on site.

5.5 Seaming of Liners

The seaming methods shall produce totally homogeneous bonded areas which will be at least as resistant to the effects of the liquid to be handled and at least as resistant to the effects of climatic degradation as the adjacent geomembrane sheets.

In general, seams should be orientated parallel to the line of maximum slope, i.e. orientated up and down, not across the slope. In corners and other geometrically complex locations, the number of seams should be minimized. No base seam or T seam will be less than 2 m of the toe of the slopes, or areas of potential stress concentrations, unless otherwise authorized by the Engineer.

The approved method for field seaming is double wedge welding, Only apparatus that has been specifically approved by make and model will be used. The Contractor will use appropriate measuring equipment to ensure that required temperatures are being achieved. Should alternative seaming methods be required in specific instances, such methods shall first be approved by the Engineer.

The Contractor shall submit records in accordance with his on-site Quality Assurance Plan that contains ambient and geomembrane temperatures and seaming apparatus temperature.

The Contractor shall also ensure that:

- He maintains on-site the number of operable seaming machines agreed with the Engineer.
- Equipment used for seaming does not damage the geomembrane.
- Electric generators are placed on a smooth base such that no damage occurs to the geomembrane.

A smooth insulation plate or fabric is placed beneath the hot seaming apparatus after usage.

The geomembrane is protected against the damage in heavily-trafficked areas.

The Contractor will verify that:

- No solvent or adhesive is used unless the product is approved in writing by the Engineer (samples must be submitted for testing and evaluation)
- Any procedure used to temporarily bond adjacent panels together does not damage the geomembrane. In particular, the temperatures of hot air at the nozzle of any spot seaming apparatus will be controlled such that the geomembrane is not damaged. "Damage" includes a loss in durability.
- Temporary bonds do not interfere with the ability to perform shear and peel tests on the actual production seam.

If protective layers of geomembrane are placed on the barrier layer geomembrane for any purpose, they shall not be tack or spot welded to the barrier layer. They shall be fully welded along the complete periphery of the protective layer or they shall not be welded at all.

The Engineer may, at his discretion, call for welding tests to be conducted prior to contract award.

5.6 Shrinkage

Adequate provision shall be made for the effects of long-term shrinkage of the sheeting, especially around pipes and structures. These measures shall be subject to the approval of the Engineer.

5.7 Anchor Trenches

Anchor trenches shall be backfilled with selected material having a maximum particle size of not more than 10 mm. Backfilling of trenches shall only be commenced once all entrapped air has been freed from under the sheeting. Backfill shall be compacted to 90 % of modified AASHTO density with suitable equipment in 150 mm thick layers. The backfilling and compaction shall be carried out in such a manner that the sheeting will not be scratched or damaged in any way.

Water shall not be allowed to stand, or soften the soil, in the anchor trench. The Contractor shall have responsibility for dewatering of the anchor trench.

There shall be no holes in the geomembrane placed in the anchor trench.

PD6 TESTING

The Contractor shall supply with his tender, a Construction Quality Assurance / Control Plan which clearly indicates documentation ensuring compliance with the necessary material specifications, and control points requiring quality control checking during construction / installation.

The thickness of the liner sheet shall be tested before laying as verified by thickness conformance profiles as supplied by the manufacturers. The thickness of geomembrane liner shall be minimum thickness, as measured in accordance with SANS 1526 (2003) Specification test method.

To ensure proper setting and calibration of welding equipment, a test weld approximately 2 m in length shall be run each day on material not forming part of the main membrane before welding on the main membrane commences.

Three samples will be taken from the test weld and tested by the Contractor using the vacuum test for extrusion / fusion joints and the air pressure test for Electrical Double Wedge Seams.

6.1 Vacuum Testing

This test creates a vacuum on one side of the joint. If a vacuum of minus 75 kPa can be maintained for three minutes the joint shall be considered effective. This test must be done where three sheets are lapped or where patching is done on straight runs at a rate of one test per 5 linear metre of welding.

6.2 Electric Double Wedge Testing

Electric Double Wedge Testing is tested non-destructively by inflating the space between the two wedge welds and maintaining a certain pressure for a predetermined period of time.

6.3 Peel Test

This test determines the effectiveness of the weld by peeling the weld apart at a rate of 50 mm/min on a strip 25 mm wide cut perpendicular to the joint direction.

An increasing force is applied to the two strips of membrane forming the joint. If one of the strips break prior to full separation across the weld, it is considered acceptable. If the weld separates the weld is considered unacceptable.

6.4 Electric Leak Detection Testing

Electric leak detection testing is required on the installed geomembrane liners of the landfill extension. Electric leak detection testing is to be carried out, and repairs made on the installations, until no leaks are determined through the geomembrane liner layer. Electric leak detection testing is to be carried out on the primary 2,0 mm geomembrane liner layer after placement of the overlying leachate drainage layer, to ensure that any construction damage to the liners that occurs during placement of the screened slag drainage material is rectified and does not affect the performance of the facility.

The Contractor is to specify the Sub-contractor identified to undertake electric leak detection surveys, and provide contact details, track record and a method statement for carrying out such surveys.

Should any additional installations be necessary to carry out such leak detection surveys, then the Contractor is to include for such installations in his price to carry out these surveys.

PD7 TOLERANCES

In accordance with the supporting specifications.

PD8 APPLICABLE STANDARDS

ASTM D5886-95	Standard Guide for Selection of Test Methods to Determine Rate of Fluid Permeation Through Geomembranes for Specific Applications
ASTM D5199-98	Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
ASTM D4833-88(1996)	Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
ASTM D5397	Standard Test Method for Single Point Notched Load Test for Geomembranes
ASTM D3895	Standard Test Method for Determining the Minimum Oxidative Induction Time for Geomembranes
ASTM D638	Standard Test Method for Tensile Properties of Plastics
ASTM D792	Standard Test Method for Specific Gravity and Density of Plastics by Displacement
ASTM D1004	Test Method for Initial Tear Resistance of Plastic Film and Sheeting
ASTM D1603	Test Method for Carbon Black in Olefin Plastics

PE HDPE BUTT FUSION JOINTING**PE1 Scope**

Butt-fusion jointing is thermofusion process which involves the simultaneous heating of the ends of two components which are to be joined until a melt start is attained on each contact surface. The two surfaces are then brought together under controlled pressure for a specific cooling time and homogenous fusion is formed upon cooling. The resultant joint is resistant to end thrust and has comparable performance under pressure to the pipe.

Refer to SABS 0269 welding code of practice.

PE2 Jointing Method**2.1 Pre-Welding Checks**

Before commencing a welding operation check that:

- There is sufficient fuel for the generator to complete the joint and that it is functioning correctly before it is connected to the machine.
- The trimming tool and hydraulic pump are in working order.
- The heater plate is clean and residue from previous welds have been removed.
- A tent is available to provide shelter during welding.
- The machine is complete and undamaged.
- You know the correct welding parameters for the machine and pipe being welded.
- The heater plate is at the correct temperature.

(Connect the heater plate to the power supply and retain for at least 20 minutes inside the thermally insulated guard). To remove dirt deposits the heater plate may be washed, when cold, with copious quantities of clean water at the start of the jointing session. Only clean, lint free materials must be used to clean the plate. To remove grease and oily films the plate may be wiped with lint free material dampened by a suitable solvent, e.g. Isopropanol.

- Check that the pipes and/or fittings to be jointed are of the same size, SDR and material.

PE3 Manual Welding**3.1 Procedure**

- Place the pipes in the clamps with the ends against the trimming tool and with the pipe markings aligned.
- Align and level the components using the support rollers.
- Tighten the pipe clamps to grip and re-round the pipes.
- Cover the free ends of the pipes to prevent cooling of the plate by internal draughts.
- Switch on the trimming tool and close the clamps slowly so that the pipe ends are moved against the trimming tool until continuous shavings are cut from each surface.
- Keep the trimming tool turning whilst opening the clamps to avoid steps on the trimmed surfaces.

- Remove the trimming tool taking care not to touch the trimmed ends.
- Remove loose shavings from the machine and component ends.
- Check that both surfaces are completely planed. If they are not then repeat the trimming process.
- Close the clamps and check that there is no visible gap between the trimmed faces.
- The maximum permitted outsider diameter mismatch is:
 - 1.0 mm for pipe sizes 90 mm to 315 mm
 - 2.0 mm for pipe sizes 316 mm to 800 mm
- If the mismatch is greater than these values then the pipe must be realigned and re-trimmed.
- Open and then close the clamps and note the drag pressure needed to move the pipes together using the hydraulic system.
- Remove the heater plate from its protective cover. Check that it is clean and up to temperature.
- Place the heater plate in the machine and close the clamps so that the surfaces to be joined are touching the plate. Using the hydraulic system apply the pressure previously determined.
- Maintain the applied pressure until the pipe begins to melt and a uniform bead of 2-3 mm is formed on each end.
- After the initial bead up, the pressure in the hydraulic system shall be released so that the pressure gauge registers between zero and the drag pressure so as to control the bead growth during the heat soak time. Check that the pipe does not slip in the clamps. The pipe ends must maintain contact with the heater plates.
- When the heat soak time is completed, open the clamps and remove the heater plate ensuring that the plate does not touch the melted surfaces.
- Immediately close the clamps (within 8 to 10 seconds of removing the plate) and bring the melted surfaces together at the previously determined pressure.
- Maintain the required pressure for the minimum cooling time as indicated in the table.
- After this time the assembly can be removed from the machine but should not be handled for a further period equal to the cooling times given on page 17.
- Examine the joint for cleanliness and uniformity and check that the bead width is within the specified limits.
- Remove the external bead and if required the internal beads using suitable debearing tools.

Buttweld time and pressure table

Outside diameter	SDR	Wall Thickness (mm)	Bead up interface stress	Initial bead size (approx)	Soak time	Min soak interface stress	Max plate removal time	Fusion and cooling interface stress	Cooling time in clamps	Cooling time out of clamps	Cooling time for coiled pipe in clamps	Typical final overall bead width	
mm		mm	Mpa	mm	sec	Mpa	sec	Mpa	min	min	min	min	max
90	26	3.5	0.15	2	95	0	10	0.15	10	5	15	8	15
90	17.6	5.1	0.15	2	110	0	10	0.15	10	5	15	8	15
90	11	8.2	0.15	2	140	0	10	0.15	10	5	15	9	16
110	26	4.2	0.15	2	100	0	10	0.15	10	5	15	8	15
110	17.6	6.3	0.15	2	125	0	10	0.15	10	5	15	9	16
110	11	10	0.15	2	160	0	10	0.15	10	5	15	10	17
125	26	4.8	0.15	2	110	0	10	0.15	10	5	15	8	15
125	17.6	7.1	0.15	2	130	0	10	0.15	10	5	15	9	16
125	11	11.4	0.15	2	175	0	10	0.15	10	5	15	10	17
160	26	6.2	0.15	2	120	0	10	0.15	10	5	15	9	16
160	17.6	9.1	0.15	2	150	0	10	0.15	10	5	15	9	16
160	11	14.6	0.15	2	205	0	10	0.15	10	5	15	11	18
180	26	6.9	0.15	2	130	0	10	0.15	10	5	15	9	16
180	17.6	10.2	0.15	2	160	0	10	0.15	10	5	15	10	17
180	11	16.4	0.15	2	225	0	10	0.15	10	5	15	11	18
225	26	8.6	0.15	2	145	0	10	0.15	10	5		9	16
225	17.6	12.8	0.15	2	190	0	10	0.15	10	5		10	17
225	11	20.5	0.15	2	265	0	10	0.15	10	5		12	19
250	26	9.6	0.15	2	155	0	10	0.15	10	5		9	16
250	17.6	14.2	0.15	2	200	0	10	0.15	10	5		10	17
280	26	10.7	0.15	3	170	0	10	0.15	10	5		13	22
280	17.6	15.9	0.15	3	220	0	10	0.15	10	5		14	23
315	26	12.1	0.15	3	180	0	10	0.15	10	5		13	22
315	17.6	17.9	0.15	3	240	0	10	0.15	10	5		14	23
Tolerance			±0.02		±3			±0.02					

Table 1 - Single pressure butt-fusion jointing conditions for PE 63, PE 80 and PE 100

Heater plate surface temperature: 195 °C to 200 °C

PF PUMPING EQUIPMENT

PF1 Scope

This specification covers the supply, delivery, transport, handling, storage, erection, installation, commissioning, testing, adjustment, handing over in complete working order and upholding during the Defects Liability Period of pumping equipment complete with associated pipe work up to the limits specified in the Project Specification.

It shall however not include for any civil works in connection with the pump station, for foundations, building in of pipe work, grouting and for the electrical control board or power supply to the motor.

Any civil works required for the building in of pumping equipment, shall be carried out under the supervision of the pumping equipment contractor who will be completely responsible for the correct setting up of the equipment and the safe-guarding of the same against damage. The contractor shall also ensure, in liaison with the electrical contractor, that the power supply to the motor is correct and motor running at correct speed and direction.

PF2 Materials

2.1 General

All materials used shall be the best of their respective kinds and shall be suitable for working at the pressures and temperatures involved under all working conditions, without distortion or deterioration or the setting up of undue stresses in any part and without impairing the efficiency or reliability of the plant and the strength of its component parts. No welding, burning, filling or plugging of defective castings will be permitted without the Engineer's approval in writing.

Where corrosion of metal may be expected, the Contractor shall supply materials which are resistant to corrosion. Any equipment or material showing signs of corrosion, tuberculation or pitting before the expiry of the Maintenance Period shall be replaced by the Contractor. The tendered price will be held to include the cost of all painting or other surface treatment which is not separately specified or scheduled but which is nevertheless necessary for the protection of surfaces against corrosion.

2.2 Valves and pipe work accessories

All valves and pipework accessories of one type supplied under one contract, shall be of the same manufacturer and supported by a well established SA organization.

Unless otherwise specified, all valves shall be of the same nominal diameter as the pipe in which they are to be installed. Cast iron valves shall not be installed in hot-water lines.

All valves shall be clockwise closing with a clear forged arrow or a brass or bronze nameplate on the handwheel indicating clearly the directions of opening and closing.

Unless prior approval has been obtained, dissimilar materials shall not be allowed to come in contact with each other but shall be properly insulated from each other by means of nylon or teflon spacers or washers.

2.2.1 Flanges

All flanges shall be of cast iron, galvanized mild steel or grade 304 L or 316 L stainless steel and unless otherwise specified, shall be of a pressure class of not less than 1000 kPa.

Flange drilling and flange and bolt sizes shall conform to the requirements of SANS 1123. Flange drilling orientation shall match the requirements of flanges of specials, fittings and valves. All flanges to be drilled SANS 1123 1000/3 unless indicated otherwise.

Flanges shall have flat machined joint faces.

Rubber insertion rings shall comply with the requirements of BS 3063 and shall be of the reinforced full face type.

Each flanged pipe section or fitting shall be supplied with one complete set steel bolts, nuts and washers and one reinforced rubber insertion ring, all as specified.

The bolt lengths shall be compatible with the flange, washer and insertion ring thicknesses to ensure that after the flanges have been connected and the bolts tightened, no bolt protrudes more than three threads from a nut and no bolt is short of the end of a nut.

2.2.2 Bolts, nuts and washers

Bolts, nuts and washers used in conjunction with cast iron or galvanized mild steel pipework shall be hot dipped galvanized. All other bolts nuts and washers shall be of stainless steel. Washers used on pipework shall be of the spring loaded anti-vibration type. All bolts and nuts shall be hexagon ISO metric conforming to the requirements of SANS 135.

Bolts shall project not more than three threads and no bolt shall be short of the end of a nut.

2.2.3 Screw threads

All screw threads shall be standard ISO-7/1 pipe thread. Jointing tape shall be PTFE grade 3M. Tape shall be applied to male ends of fittings.

2.2.4 Flexible joints

Flexible joints and flexible flange adaptors shall be manufactured from cast iron, bronze or stainless steel. Bolts nuts and washers shall be of stainless steel and gasket and sealing and wedge rings shall be suitable for the specified pressures and temperatures of the pipelines in which they are to be installed.

2.2.5 Shut-off, sluice and drain valves

Only gate valves shall be used for this purpose.

The construction of gate valves shall be of the inside screw, screwed or bolted bonnet, solid tapered wedge disc, non-rising stem and hand wheel type.

Gate valves up to 50 mm diameter shall be of bronze or stainless steel with standard threaded connections and bonnet. Stems shall be of copper alloy or stainless steel and discs of bronze or stainless steel.

Gate valves of 65 to 80 mm diameter shall be of cast iron, stainless steel, bronze or brass to SANS 776 with screwed bonnets and flanged ends. Stems shall be of brass, bronze or stainless steel and discs shall be of bronze or stainless steel.

Valves of 100 mm diameter and larger shall be of cast iron or stainless steel with flanged ends and bolted bonnets. Stems shall be of brass, bronze or stainless steel and discs shall be of solid cast iron with bronze seat rings on body and disc. Trim shall be bronze.

Gate valves shall be provided with back-seating on stems to facilitate repacking under pressure.

Mild steel hand wheels shall be treated against corrosion as specified.

2.2.6 Non-return valves

Non-return valves shall be manufactured from cast iron, bronze or stainless steel and shall be of the non-clog ball types. The balls shall be of stainless steel and seats shall be elastic. The valves shall be of the non-slam type.

Valves up to 50 mm diameter shall be screwed and socketed and valves larger than 50 mm shall be flanged.

2.2.7 Air valves

All air valves to be installed shall be the 50mm Vent-O-Mat series RGX air release valve, or similar approved.

2.2.8 Testing and commissioning

All valves shall be checked in operation for water tightness, vibration, ease of operation, etc.

2.3 Installation

All valves and accessories shall be installed with removable and connections or unions for servicing or replacing the valve.

All valves and hand wheels shall be easily accessible.

Reflux valves shall only be installed in horizontal lines.

PF3 Pumps

3.1 General

The pumps shall be of maker's standard and approved design, capable of doing the duty required at a speed preferably not exceeding 2 900rpm and shall be so balanced that there will be no end thrust when the pump is new or after wear has taken place, or alternatively suitable heavy duty thrust bearings must be provided. The pump casing shall be of stainless steel. Impellers and guides shall be made of stainless steel and the shaft of high tensile steel with suitable renewable protecting sleeves, the diameter being sufficient to withstand and transmit without whip and with ample margin of safety all torsional and bending stresses to which it may be subjected. Shaft sleeves shall be of bronze and renewable. Bearings are to be of ample bearing area, dustproof and with suitable provision for continuous lubrication.

The pumps offered are preferably to be of the self-regulating type, the power characteristic curve being such that with increase in the rate of delivery beyond a certain figure, the power demand shall decrease, thereby ensuring that the motor shall not be overloaded in the event of a large reduction in pumping head, due to a burst occurring in the rising main or any other such contingency. Performance particulars and characteristic curves shall be submitted at the time of tendering. The electric motors shall in all cases be sized to cope with the maximum power requirements of the associated pumps.

The pumps and motors shall be capable of efficient operation over the whole range indicated by the system head curves.

3.2 Installation of pumps

The following information must be supplied:

- i. With Tender
 - Delivery periods of each part
 - Installation period
 - Full details of the equipment including pump curves, pump construction details, etc. (if alternative is provided).
- ii. On acceptance of Tender

- Installation requirements
 - Panel wire diagram and equipment details
- iii. On commissioning
- Operation and maintenance manual (3 off)
 - List of spare parts

3.3 Operation and Maintenance Manual

The Tenderer shall hand over the Engineer three sets of the Operation and Maintenance Manual for the installation not later than one month after commissioning of the installation. These Manuals are a prerequisite for the final take-over of the Plant.

The Operation and Maintenance Manual will be printed on durable paper and will consist of two parts.

The first part will contain sections on:

- a) Brief description of the plant installation.
- b) Concise operating instructions.
- c) Routine maintenance instructions.
- d) Precautionary measures, elementary trouble location, rectifying measures and emergency actions.

The second part will contain sections on:

- a) Detailed information on equipment.
- b) List of spare parts including names and addresses of suppliers.
- c) All technical information of the installations.
- d) Detail and ratings of motors.
- e) Layout drawings showing pipe runs.
- f) Drilling for all equipment.

3.3.1 Operating conditions of pumps

Pump Station: Melmoth WWTW - Sludge Drying Area	
1. Installation	Wet well
2. Equipment	One duty
3. Pumping main	90 dia HDPE
4. Length of main	Approximately 50m
5. Discharge rate	6.4 l/s minimum
6. Operation	Pump must deliver a flow of 6.4l/s of effluent
7. Control	A new control system must be installed to control the pump
8. Static (Hs)	5.0 m
9. Total Head	7.0 m

3.3.2 Installation of pumps

The tenderer must fill in the delivery and installation periods of each part at the end of the Schedule of Quantities.

The following information must be supplied:

- a) On acceptance of Tender
 - Panel wiring diagram and equipment details
- b) On Commissioning
 - Operation and maintenance manual (3 off)
 - List of spare parts
 - Electrical compliance certificate

3.4 Requirements

Furnish and install Lowara Domo 15T submersible pump designed for pumping contaminated water. The pump shall be equipped with a close coupled 1.1 kW, submersible electric motor connected for operation on 400 volts, 3-phase, 50 hertz, with 2.5 meter of submersible cable (SUBCAB). The power cable shall be sized according to IEC.

When the pump is running, the minimum pump flow shall be 6.4 l/s at 7.0m TDH.

The pump and the motor shall be produced by the same manufacturer.

3.5 Standards Approval

Each pump shall be tested and approved in accordance with national and international standards (IEC34-1, HI, CSA) and ISO 9906.

3.6 Level Sensor

Level measurement shall be done by a low-maintenance submersible pressure sensor suitable for sewage water applications and for installation in the pump sump. The pressure sensor has to be connected to the RTU and should meet the following demands:

Technical data

Output signal proportional to the level	4 – 20mA
Power supply	10 – 30VDC
Pre-programmed measurement range	0-0.5m, 0-1m or 0-2m
Provided cable length	10m
Operational temperature range	-10 – 60°C
Long term instability	< 0,1% FS per year
Calibration accuracy	< 0,5% FS
Diaphragm	SS 1.4404 AISI 316L
Heavy weight for little affect of turbulence	Yes
Soft cable for straight cable installation	Yes
Suitable for salt water installations	Yes
Part information printed on sensor body	Yes
Large diaphragm protection holes to prevent clogging	Yes

Standards

In accordance with EN 61000-6-1:1999, EN 61000-6-2:1999, EN 61000-6-3:2001, EN 61000-6-4:2001

3.7 Performance and Guarantee

Duty points shall be guaranteed either by ISO 9906 or Hydraulic institute. The use of old standards ISO 2548 or ISO 3555 shall not be allowed.

For closed coupled pumps, total efficiency shall always be guaranteed. (Pump efficiency shall be used only for pumps sold without motors.)

3.8 Testing and commissioning

Each pump shall be tested individually and where pumps are to operate in parallel they shall also be treated as such. The rate of delivery during testing shall be determined by cutting off the inflow to the sump and timing the drop in water level therein. The pumping head shall be determined as the measured static head plus the calculated friction loss in the system or alternatively by the use of temporary pressure gauges provided by the Contractor.

During the tests, the values of voltage, current drawn by the motor and power factor shall be noted and recorded.

The test results shall be compared with the tendered pump characteristics and the following tolerances will be allowed:

Delivery rate : - 0 % to + 10 %
Overall efficiency : - 5 %

In the event of the pumps failing to achieve the tendered performance in regard to discharge or efficiency within the tolerance allowed, then the Employer shall have the right to reject the pumps, to recover all monies paid to the Contractor under the Contractor for such pumps and to confiscate the surety by way of agreed and liquidated damages, whereupon the Contractor at his own expense shall remove all rejected plant when ordered to do so by the Engineer.

Control boards, electric motors and other electrical equipment shall be tested as specified in the applicable Particular Specification.

PF4 Installation

Bends and branches shall not cause cavitating flow conditions and the layout of the pipe work shall be such as to facilitate dismantling and inspection. The pipes are to be properly supported and so arranged that all stresses created in the pipeline by static and dynamic forces, including recoil shock, will be taken up by suitable anchors.

Delivery pipe work and valves shall have the same nominal diameter as the rising main unless otherwise indicated on the drawings.

Where reducers are used on the delivery from pumps they shall be installed directly downstream of the pumps.

PF5 Painting and corrosion protection

Pipe work in wet wells (internal and external) System I

Pipe work and valves in valve chambers (internal) System I

Pipe work and valves in valve chambers (external) System I finished off with one coat bituminous aluminium paint

Bolts not built into concrete System B

Galvanised mild steel grating System E

PG ELECTRICAL EQUIPMENT

PG1 Scope

This specification covers the supply, delivery, installation and upholding during the Defects Liability Period of electrical equipment.

PG2 Equipment specification

2.1 Cables

Low voltage cables shall be for service in a three phase 50 Hz system and shall be PVC insulated, PVC sheathed, steel wire armoured, PVC covered with ECC, 600 / 1000 volt rated, complying with the requirements of SANS 1507-3.

2.2 Isolators

All isolators shall be of the "load-breaking" and "fault making" type and shall comply with the requirements of SANS 152 where applicable.

2.3 Fused switches

All fused switches shall be of the "load-breaking" and "fault making" type complying with BS 5419 where applicable and fitted with HRC cartridge fused links to BSS 88.

2.4 Moulded case circuit breakers

All moulded case circuit breakers shall comply with the requirements of SANS 156 Specification.

These circuit breakers shall be fitted with copper terminal collector bars where more than one cable core has to be terminated on the same terminal.

MCCB terminals shall be appropriately specified to accommodate the receiving cable lug size.

Each individual motor control shall be protected using Motor Protection Circuit Breakers: MPBBs.

Mains supply MCCBs shall be type C.

2.5 Indicating instruments

All indicating instruments shall comply with the requirements laid down in BS 89: Part 1 for instruments of a 2,5 Accuracy Class with exception of the kWh meters which shall comply with BS 37: Part 4. All indicating instruments shall have 50mm square dials.

VOLTMETERS shall be of the flush panel mounting type having a square dial approximately 50 x 50 mm and shall have a quadrant type scale. The scale shall be calibrated to suit the supply voltage.

AMMETERS shall be flush panel mounting type having a square dial approximately 50 x 50 mm and shall have a quadrant scale. The scale shall be calibrated to suit the equipment served. The meters shall be able to withstand overcurrents resulting under starting conditions and the full load current of the relevant motor shall be clearly marked in red on the face of the meter.

The running hour meters shall have cyclometer dials indicating up to 5 digits and two decimals.

All indicating instruments shall be mounted behind and shall protrude through the front panels of the boards.

All instrument and meter wiring shall be minimum 2.5 mm² copper panel wiring. No panel wiring shall spliced. All panel wiring shall be colour coded and numbered.

2.6 Earth leakage protection units

The earth leakage protection units shall be 250mA for motor and motor control circuits

2.7 Labels

All labels shall be of the laminated or screwed-on reverse engraved perspex type using stainless steel or brass screws. Labels shall be in white letters on a black background in both official languages. Small wiring shall be identified by means of a numbered ferrule of an approved type on each end of each wire.

2.8 Level switches

Level control through ultrasonic sensor integrated into MCC.

2.9 Cable racking

All cables and earth conductors shall be installed on appropriate galvanised or aluminium cable racks/ladders which shall be attached to cable duct trenches, walls, roofing or floors where required.

All cable rack/ladder splicing and attachments shall be bonded together using 10mm² copper PVC single core earth cable.

2.10 Control Boards

2.10.1 General

All boards shall be of dust and vermin proof construction and shall require access from the front only.

All control boards shall be subdivided into separate compartments for each incoming or outgoing circuit other than minor services and control circuits with suitable barriers and interlocking to prevent accidental access to live parts.

Unless otherwise specified in the Project Specification every control board shall provide for future connections to a single centralized indicator system for the Works as a whole.

All control boards for motors shall be equipped with thermal over current protection.

2.10.2 Switch/Control Boards for outside erection

These boards shall be constructed of 3CR12 stainless steel or glass fibre. Door hinges, knobs and handle shall be constructed of chromium plated brass.

The boards and doors shall be weather and waterproof.

2.11 Electric motors

Electric motors shall be of the totally enclosed fan cooled type suitable for operation on the electric supply, at the altitude and at the ambient temperature specified in the Project Specification. Motor performance shall comply with BS 2613. The motors will not be started more than 15 times per hour and shall furthermore be rated for continuous operation at full load. Full load speed shall not be in excess of 2 900 rpm unless approved by the Engineer and the rated power shall be the nearest standard rating to the maximum power requirement of the associated equipment, but not less than 10 % in excess thereof.

PG3 Installation

Switch/Control boards shall be installed, plumb and fixed in position.

Where switchboards are installed outside, all fixing bolts shall be of stainless steel.

Fixing of equipment shall be the responsibility of the equipment contractor.

Where bolts or base plates are to be grouted with concrete, the work shall be carried out by the civil contractor under the supervision of the equipment contractor who will remain responsible for any damage to his equipment.

PG4 Painting and corrosion protection

Control boards shall be treated to SANS 064 after manufacture and shall be finished in baked enamel in the colour scheme ordered by the Engineer.

Should the board be scratched during erection, the Engineer shall have the right to order that the board be replaced.

PG5 Testing and commissioning

5.1 Tests at manufacturer's works

5.1.1 Switchgear/Control boards

Each panel shall be subjected to the following tests in the manufacturer's works after manufacture and before delivery to site:

- a) A thorough inspection shall be carried out to ensure compliance with the Specifications and approved drawings and wiring diagrams and to ascertain that all connections are properly made.
- b) A full operating voltage test on all primary connections to check the insulation between phases mutually and between each phase and earth.
- c) The polarities and ratios of all potential and current transformers shall be checked.
- d) Primary and secondary inspection tests shall be carried out on all switching, protection, metering, interlocking and indication circuits.

The manufacturer shall submit copies of test certificates giving details of conditions and results of tests carried out to the Engineer.

The Contractor shall make provision in his bill for the witnessing of Factory Acceptance Testing (FAT) by the Engineer. This shall include air travel between Richards Bay and the place of manufacture, any vehicle hire and accommodation if required.

5.1.2 Electric motors

If the motors do not carry the SANS mark, performance and efficiency tests shall be carried out to prove the guaranteed information submitted with the successful tender.

All motors shall be subjected to routine tests as prescribed in Appendix D to SANS 948.

The manufacturer shall submit to the Engineer two certified copies of the test certificates reflecting the conditions and results of the tests carried out on each motor.

5.2 Tests on site after installation but prior to commissioning of the equipment

5.2.1 Control board

- a) Check all components to ensure that they are free from dust and protective packing material.
- b) Check the operation of all components liable to damage in transit such as meters and protection relays.
- c) The insulation of all primary circuits between phases mutually and between each phase and earth shall be measured.

- d) All fused links shall be checked for electrical continuity.
- e) All control supplies shall be checked.

All adjustable protection devices shall then be set, and the boards and panels commissioned all in consultation with and to the instructions of the Engineer.

5.2.2 Electric motors

- a) Ensure that the bearings are properly lubricated.
- b) Ensure that all power and earth connections are properly made.
- c) Check all ventilation openings for obstruction.
- d) Measure the insulation resistance between phases mutually and between each phase and earth to ensure that the windings are dry.
- e) Spin the motor by briefly switching the supply on to check the correctness of the direction of rotation.
- f) Check whether the motor runs smooth and how long it takes to accelerate up to maximum speed.
- g) Check on the noise level the vibration and temperatures of motor and bearings.

PG6 Motor protection systems

6.1 General

Unless otherwise specified protection shall be as indicated below:

TYPE OF PROTECTION	APPLICATION
Thermal Overcurrent	All motors
Magnetic Overcurrent	As short-circuit protection only when coupled to circuit-breakers.
Earth fault	Only when condensation can occur in motors e.g., standby or direct coupled cooling pump motors or outdoor motors.
Undervoltage	As specified.
Temperature protection mechanisms	Stator starters, resistor starters

6.2 Overcurrent protection

Overcurrent protection of motors shall be provided in accordance with the requirements of BS 587. Overcurrent protection shall comprise thermal trip mechanisms or relays which are coupled to contactors, hand operated starters or circuit breakers. HRC fuses shall not be regarded as overcurrent protection.

In the cases where overcurrent protection forms an integral part of the starter, the protection shall comprise a temperature compensated bi-metal thermal element which is directly heated by separate heating elements in each phase and which is coupled in series with the load. The overcurrent protection shall be adjustable over a range of 75 % to 120 % of the full load current of the motor.

Motors subjected to frequent starting and stopping duties or to inching may be protected against overcurrent with magnetic overcurrent protection with a time delay provided the motor is suitable of this method of operation.

Magnetic overcurrent tripping devices shall not trip starting contactors but shall be coupled to circuit-breakers with suitable breaking capacities.

Adequate protection shall be provided against extended overloads, but, unnecessary tripping during starting shall be prevented. For this condition short-circuiting of the overcurrent protection, increased overcurrent settings or connection of the overcurrent protection to the delta circuit only in start-delta starters is not acceptable.

6.3 Short circuit protection

Refer to Project Specification for requirements of short-circuit protection.

6.4 Control components

The Contractor shall submit performance data on all sensing and control devices supplied and installed under this contract to the engineer for approval with his tender.

The devices shall all be suitable for operation at voltages determined by the Control System TE 380/230 V or control voltage.

Switching devices shall provide for both normally open and normally closed switching configuration for each required operation. The switching contacts shall be a silver to silver or other approved type with a minimum continuous operating current of 6A at the chosen voltage.

Sensing and control devices shall be protected against ingress to at least IP54 to the external environment. All mounting accessories and cable entry / exit points shall be designed to retain the specified rating once equipment is installed and connected.

PG7 Earthing

The Contractor shall install a local earth mat for the entire facility.

The Contractor shall provide the Engineer with the earth test results report.

The earth electrodes and conductor shall be buried at a depth of more than 500mm from ground level.

PG8 Measurement and payment

No separate payment will be made for electrical installations and the work shall be deemed to have been included in the rates tendered for the corresponding main equipment.

However, should cable lengths differ from those specified, the total cost for the supply and installation of extra cable length will be paid at a rate per metre length for each size of cable.

PH GENERIC LABOUR INTENSIVE SPECIFICATION

PH1 SCOPE

This specification establishes general requirements for activities which are to be executed by hand involving the following:

- a) trenches having a depth of less than 1.5 meters
- b) storm water drainage
- c) low-volume roads and sidewalks

PH2 PRECEDENCE

Where this specification is in conflict with any other standard or specification referred to in the Scope of Works to this Contract, the requirements of this specification shall prevail.

PH3 HAND EXCAVATEABLE MATERIAL

Hand excavatable material is material:

a) granular materials:

- i) whose consistency when profiled may in terms of table 1 be classified as very loose, loose, medium dense, or dense; or
- ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 15 blows of a dynamic cone penetrometer is required to penetrate 100mm;

b) cohesive materials:

- i) whose consistency when profiled may in terms of table 1 be classified as very soft, soft, firm, stiff and stiff / very stiff; or
- ii) where the material is a gravel having a maximum particle size of 10mm and contains no cobbles or isolated boulders, no more than 8 blows of a dynamic cone penetrometer is required to penetrate 100mm;

- Note:
- 1) A boulder, a cobble and gravel is material with a particle size greater than 200mm, between 60 and 200mm.
 - 2) A dynamic cone penetrometer is an instrument used to measure the insitu shear resistance of a soil comprising a drop weight of approximately 10kg which falls through a height of 400mm and drives a cone having a maximum diameter of 20mm (cone angle of 60° with respect to the horizontal) into the material being used.

Table 1: Consistency of materials when profiled

GRANULAR MATERIALS		COHESIVE MATERIALS	
CONSISTENCY	DESCRIPTION	CONSISTENCY	DESCRIPTION
Very loose	Crumbles very easily when scraped with a geological pick.	Very soft	Geological pick head can easily be pushed in as far as the shaft of the handle.
Loose	Small resistance to penetration by sharp end of a geological pick.	Soft	Easily dented by thumb; sharp end of a geological pick can be pushed in 30-40 mm; can be moulded by fingers with some pressure.
Medium dense	Considerable resistance to penetration by sharp end of a geological pick.	Firm	Indented by thumb with effort; sharp end of geological pick can be pushed in upto 10 mm; very difficult to mould with fingers; can just be penetrated with an ordinary hand spade.
Dense	Very high resistance to penetration by the sharp end of geological pick; requires many blows for excavation.	Stiff	Can be indented by thumb-nail; slight indentation produced by pushing geological pick point into soil; cannot be moulded by fingers.
Very dense	High resistance to repeated blows of a geological pick.	Very stiff	Indented by thumb-nail with difficulty; slight indentation produced by blow of a geological pick point.

PH4 TRENCH EXCAVATION

All hand excavateable material in trenches having a depth of less than 1,5 metres shall be excavated by hand.

PH5 COMPACTION OF BACKFILLING TO TRENCHES (AREAS NOT SUBJECT TO TRAFFIC)

Backfilling to trenches shall be placed in layers of thickness (before compaction) not exceeding 100mm. Each layer shall be compacted using hand stampers:

- to 93% MOD AASHTO density;
- such that in excess of 5 blows of a dynamic cone penetrometer (DCP) is required to penetrate 100 mm of the backfill, provided that backfill does not comprise more than 10% gravel of size less than 10mm and contains no isolated boulders, or
- such that the density of the compacted trench backfill is not less than that of the surrounding undisturbed soil when tested comparatively with a DCP.

PH6 EXCAVATION

All hand excavatable material including topsoil classified as hand excavatable shall be excavated by hand. Harder material may be loosened by mechanical means prior to excavation by hand.

The excavation of any material which presents the possibility of danger or injury to workers shall not be excavated by hand.

PH7 CLEARING AND GRUBBING

Grass and small bushes shall be cleared by hand.

PH8 SHAPING

All shaping shall be undertaken by hand.

PH9 LOADING

All loading shall be done by hand, regardless of the method of haulage.

PH10 HAUL

Excavation material shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150 m.

PH11 OFFLOADING

All material, however transported, is to be off-loaded by hand, unless tipper-trucks are utilized for haulage

PH12 SPREADING

All material shall be spread by hand.

PH13 COMPACTION

Small areas may be compacted by hand provided that the specified compaction is achieved.

PH14 GRASSING

All grassing shall be undertaken by sprigging, sodding, or seeding by hand.

PH15 MANUFACTURED ELEMENTS

Elements manufactured or designed by the Contractor, such as manhole rings and cover slabs, precast concrete planks and pipes, masonry units and edge beams shall not individually, have a mass of more than 320kg. In addition, the items shall be large enough so that four workers can conveniently and simultaneously acquire a proper hand hold on them.

PH16 STONE PITCHING AND RUBBLE CONCRETE MASONRY

All stone required for stone pitching and rubble concrete masonry, whether grouted or dry, must to be collected, loaded, off loaded and placed by hand.

Sand and stone shall be hauled to its point of placement by means of wheelbarrows where the haul distance is not greater than 150m.

Grout shall be mixed and placed by hand.

PI OHSA 1993 HEALTH AND SAFETY SPECIFICATION

PI1 SCOPE

This specification covers the health and safety requirements to be met by the Contractor to ensure a continued safe and healthy environment for all workers, employees and subcontractors under his control and for all other persons entering the site of works.

This specification shall be read with the Occupational Health and Safety Act (Act No 82 and amendment Act No 181) 1993, and the corresponding Construction Regulations 2014, and all other safety codes and specifications referred to in the said Construction Regulations.

In terms of the OHS Act in Section C1.2.4 of the Contract document, the status of the Contractor as mandatory to the Employer (client) is that of an employer in his own right, responsible to comply with all provisions of OHS Act 1993 and the Construction Regulations 2014.

This safety specification and the Contractor's own Safety Plan as well as the Construction Regulations 2014, shall be displayed on site or made available for inspection by all workers, employees, inspectors and any other persons entering the site of works.

The following are possible risks associated with this project:

- Working high above the ground on top and below the bridge, most of the time in a restricted environment with limited landings (working platforms);
- Working above a continuously flowing river and in a flood plain environment subject to Flooding;
- Lifting and lowering of materials and equipment from ground to the bridge and vice versa, exposed to cross winds;
- Steep and restricted access to the lower flood plain below the bridge;
- Potentially dangerous existing services, i.e. gas lines, water and sewerage mains, electrical high voltage cables, on the bridge, buried and overhead;
- Deep excavations in soils requiring shoring or reducing of slopes;
- Blasting of hard rock or demolition of concrete;
- High pressure during testing of the new rising main, which could result in potentially dangerous situations in the event of the pipeline or fittings failing;
- Potentially harmful gasses when tying into the existing sewer mains;
- Movement of construction vehicles on site, taking into consideration steep slopes, other traffic and existing services;
- Exposure to possible injuries due to mishandling or failure of power and hand tools;
- Falling debris, tools and materials from the bridge;
- Non-conformance to specifications with regards to fasteners and materials;
- Risks related to general safety and security on site.

Additional risks may arise from specific methods of construction selected by the Contractor which are not necessary covered in the above.

PI2 DEFINITIONS

For the purpose of this contract the following shall apply:

Employer” where used in the contract documents and in this specification, means the Employer as defined in the General Conditions of Contract and it shall have the exact same meaning as “Client” as defined in the Construction Regulations 2014. **“Employer”** and **“client”** is therefore interchangeable and shall be read in the context of the relevant document.

- (a) **“Contractor”** wherever used in the contract documents and in this specification, shall have the same meaning as **“Contractor”** as defined in the General Conditions of Contract.

In this specification the terms **“principal contractor”** and **“contractor”** are replaced with **“Contractor”** and **“subcontractor”** respectively.

For the purpose of this contract the **Contractor** will, in terms of OHSA 1993, be the mandatory, without derogating from his status as an employer in his own right.

- (b) **“Engineer”** where used in this specification, means the Engineer as defined in the General Conditions of Contract. In terms of the Construction Regulations the Engineer may act as agent on behalf of the Employer (the client as defined in the Construction Regulations).

PI3 TENDERS

The Contractor shall submit the following with his tender:

- (a) A documented Health and Safety Plan as stipulated in Regulation 5 of the Construction Regulations. The Safety Plan must be based on the Construction Regulations 2014 and will be subject to approval by the Employer;
- (b) A declaration to the effect that he has the competence and necessary resources to carry out the work safely in compliance with the Construction Regulations 2014;
- (c) A declaration to the effect that he made provision in this tender for the cost of the health and safety measures envisaged in the Construction Regulations; and
- (d) Failure to submit the foregoing with his tender, will lead to the conclusion that the Contractor will not be able to carry out the work under the contract safely in accordance with the Construction Regulations.

PI4 NOTIFICATION OF COMMENCEMENT OF CONSTRUCTION WORK

After award of the contract, but before commencement of construction work, the Contractor shall, in terms of Regulation 3, notify the Provincial Director of the Department of Labour in writing if the following work is involved:

- (a) The demolition of structures and dismantling of fixed plant of height of 3,0m or more;
- (b) The use of explosives;
- (c) Construction work that will exceed 30 days or 300 person-days;
- (d) Excavation work deeper than 1,0m; or
- (e) Working at a height greater than 3,0m above ground or landings

The notification must be done in the form of the pro forma included under Section C1.1) (Contract Data) of the tender document.

A copy of the notification form must be kept on site, available for inspection by inspectors, Employer, Engineer, employees and persons on site.

PI5 RISK ASSESSMENT

Before commencement of any construction work during the construction period, the Contractor shall have a risk assessment performed and recorded in writing by a competent person. (Refer Regulation 7 of the Construction Regulations 2014).

The risk assessment shall identify and evaluate the risks and hazards that may be expected during the execution of the work under the contract, and it shall include a documented plan of safe work procedures to mitigate, reduce or control the risks and hazards identified.

The risk assessment shall be available on site for inspection by inspectors, Employer, Engineer, subcontractors, employees, trade unions and health and safety committee members, and must be monitored and reviewed periodically by the Contractor.

PI6 APPOINTMENT OF EMPLOYEES AND SUBCONTRACTORS

6.1 Health and safety plan

The Contractor shall appoint his employees and any subcontractors to be employed on the contract, in writing, and he shall provide them with a copy of his documented Health and Safety Plan, or relevant sections thereof. The Contractor shall ensure that all subcontractors and employees are committed to the implementation of his Safety Plan.

6.2 Health and safety induction training

The Contractor shall ensure that all employees under his control, including subcontractors and their employees, undergo a health and safety induction training course by a competent person before commencement of construction work. No visitor or other person shall be allowed or permitted to enter the site of the works unless such person has undergone a health and safety training pertaining to hazards prevalent on site.

The Contractor shall ensure that every employee on site shall at all times be in possession of proof of the health and safety induction training issued by a competent person prior to commencement of construction work.

PI7 APPOINTMENT OF SAFETY PERSONNEL

7.1 Construction supervisor

The Contractor shall appoint a full-time Construction Supervisor with the duty of supervising the performance of the construction work.

He may also have to appoint one or more competent employees to assist the construction supervisor where justified by the scope and complexity of the works.

7.2 Construction safety officer

Taking into consideration the size of the project and the hazards or dangers that can be expected, the Contractor shall appoint in writing a full-time or part-time **Construction Safety Officer** if so, decided by the Inspector of the Department of Labour.

7.3 Health and safety representatives

In terms of **Section 17 and 18 of the Act (OHSA 1993)** the Contractor, being the employer in terms of the Act for the execution of the contract, shall appoint a **health and safety representative** whenever he has more than 20 employees in his employment on the site of the works. The health and safety representative must be selected from employees who are employed in a full-time capacity at a specific workplace.

The number of health and safety representatives for the workplace shall be at least one for every 100 employees.

The function of health and safety representative(s) will be to review the effectiveness of health and safety measures, to identify potential hazards and major incidents, to examine causes of incidents (in collaboration with his employer, the Contractor), to investigate complaints by employees relating to health and safety at work, to make representations to the employer (Contractor) or inspector on general matters affecting the health and safety of employees, to inspect the workplace, plant, machinery etc. on a regular base, to participate in consultations with inspectors and to attend meetings of the health and safety committee.

7.4 Health and safety committee

In terms of Sections 17 and 18 of the Act (OHSA 1993) the Contractor (as employer), shall establish one or more health and safety committee(s) where there are two or more health and safety representatives at a workplace. The persons selected by the Contractor to serve on the committee shall be designated in writing.

In function of the health and safety committee shall be to hold meetings at regular intervals, but at least once every three months, to review the health and safety measures on the contract, to discuss incidents related to health and safety with the Contractor and to keep record of recommendations and reports made by the committee.

7.5 Competent persons

In accordance with the Construction Regulations the Contractor has to appoint in writing competent persons responsible for supervising construction work on each of the following work situations that may be expected on the site of the works.

- (a) Risk assessment and induction training as described in Regulation 7 of the Construction Regulations;
- (b) Fall protection as described in Regulation 8;
- (c) Formwork and support work as described in Regulation 10;
- (d) Excavation work as described in Regulation 11;
- (e) Demolition work as described in Regulation 12;
- (f) Scaffolding work as described in Regulation 14;
- (g) Suspended platform operations as described in Regulation 15;
- (h) Material hoists as described in Regulation 17
- (i) Batch plant operations as described in Regulation 18
- (j) Explosive powered tools as described in Regulation 19
- (k) Cranes as described in Regulation 20;
- (l) Construction vehicle and mobile plant inspections on a daily basis by a
- (m) Competent person as described in Regulation 21 (1);
- (n) Control of all temporary electrical installation on the construction site as described in Regulation 22;
- (o) Stacking and storage on construction sites as described in Regulation 26; and
- (p) Inspections of fire equipment as described in Regulation 27

A competent person may be appointed for more than one part of the construction work with the understanding that the person must be suitably qualified and able to supervise at the same time the construction work on all the work situations for which he has been appointed.

The appointment of competent person to supervise parts of the construction work does not relieve the Contractor from any of his responsibilities to comply with **all** requirements of the Construction Regulations.

PI8 RECORDS AND REGISTERS

In accordance with the Construction Regulations the Contractor is bound to keep records and registers related to health and safety on site for periodic inspection by inspectors, the Engineer, the Employer, trade union officials and subcontractors and employees. The following records and registers must be kept on site and shall be available for inspection at all times.

- (a) A copy of the OHSA 1993 Construction Regulations 2014;
- (b) A copy of this Health and Safety Specification;
- (c) A copy of the Contractor's Health and Safety Plan (Regulation 4);
- (d) A copy of the notification of construction work (Regulation 3)
- (e) A health and safety file in terms of Regulation 5 (7) with inputs by the Construction Safety Officer (Regulation 6 (7));
- (f) A copy of the risk assessment described in Regulation 7;
- (g) A full protection plan and the corresponding records of evaluation and training of employees working from elevated positions as described in Regulation 8;
- (h) Drawings pertaining to the design of structures (Regulation 9(3)) and formwork and support work structures (Regulation 10(d)) must be kept on site;
- (i) Pronouncement of the safety of excavations must be recorded in a register to be kept on site (Regulation 11 (3) (h));
- (j) A copy of the certificate of the system design for suspended platforms (Regulation 15(3))
- (aa) A notice must be affixed around the base towers of material hoists to indicate the maximum mass load, which may be carried at any one time by material hoists (Regulation 7(5));
- (bb) Maintenance records of material hoists and inspection results must be kept in a record book to be kept on site (Regulation 17(8));
- (cc) A record of any repairs to or maintenance of a batch plant must be kept on site (Regulations 18(9));
- (dd) A warning notice must be displayed in a conspicuous manner when and wherever an explosive powered tool is used (Regulation 19(2));
- (ee) A register for recording of findings by the competent person appointed to inspect construction vehicles and mobile plant (Regulation 21 (1)(j)).

PI9 CONTRACTORS RESPONSIBILITIES

For this contract the Contractor will be the mandatory of the Employer (Client), as defined in the Act (OHSA 1993), which means that the Contractor has the status of employer in his own right in respect of the contract. The Contractor is therefore responsible for all the duties and obligations of an employer as set out in the Act (OHSA 1993) and the Construction Regulations 2014.

Before commencement of work under the contract, the Contractor shall enter into an agreement with the Employer (Client) to confirm his status as mandatory (employer) for the contract under consideration.

The Contractor's duties and responsibilities are clearly set out in the Construction Regulations 2014 and are not repeated in detail but some important aspects are highlighted hereafter, without relieving the Contractor of any of his duties and responsibilities in terms of the Construction Regulations.

(a) Contractor's position in relation to the Employer (client) (Regulation 4)

In accordance with Section 4 of the Regulations, the Contractor shall liaise closely with the Employer or the Engineer on behalf of the Employer, to ensure that all requirements of the Act and the Regulations are met and complied with.

(b) The principal contractor and contractor (Regulation 5)

The Contractor is in terms of the definition in Regulation 2(b) the equivalent of Principle Contractor as defined in the construction Regulations, and he shall comply with all the provisions of Regulation 5.

Any subcontractors employed by the Contractor must be appointed in writing, setting out the terms of the appointment in respect of health and safety. An independent subcontractor shall however provide and demonstrate to the Contractor a suitable, acceptable and sufficiently documented health and safety plan before commencement of the subcontract. In the absence of such a health and safety plan the subcontractor shall undertake in writing that he will comply with the Contractor's Safety plan, the health and safety specifications of the Employer and the Construction Regulations 2014.

(c) Supervision of construction work (Regulation 6)

The Contractor shall appoint the safety and other personnel and employees as required in terms of Regulation 6 and as set out in paragraph 7 above. Appointment of those personnel and employees does not relieve the Contractor from any of the obligations under Regulation 6.

(d) Risk assessment Regulation 7

The Contractor shall have the risk assessment made as set out in paragraph 7 above before commencement of the work and it must be available on site for inspection at all times. The Contractor shall consult with the Health and safety committee or health and safety representative(s) etc. on a regular basis to ensure that all employees, including subcontractors under his control, are informed and trained by a competent person regarding health hazards and related work procedures.

No subcontractor, employee or visitor shall be allowed to enter the site of works without prior health and safety induction training, all as specified in Regulation 7.

(e) Fall protection (Regulation 8)

Fall protection, if applicable to this contract shall comply in all respects with Regulation 8 of the Construction Regulations.

(f) Structures (Regulation 9)

The Contractor will be liable for all claims arising from collapse or failure of structures if he failed to comply with all the specifications, project specifications and drawings related to the structures, unless it can be proved.

That such collapse or failure can be attributed to faulty design or insufficient design standards on which the specifications and the drawings based.

In addition the Contractor shall comply with all aspects of Regulation 9 of the Construction Regulations.

(g) Formwork and support work (Regulation 10)

The Contractor will be responsible for the adequate design of all formwork and support structures by a competent person.

All drawings pertaining to formwork shall be kept on site and all equipment and materials used in formwork, shall be carefully examined and checked for suitability by a competent person.

The provisions of Regulation 10 of the Construction Regulations shall be followed in every detail.

(h) Excavation work (Regulation 11)

It is essential that the Contractor shall follow the instructions and precautions in the Standard Specifications and Project Specifications as well as the provisions of the Construction Regulations to the letter as unsafe excavations can be a major hazard on any construction site. The Contractor shall therefore ensure that excavation work is carried out under the supervision of a competent person, that inspections are carried out by a Professional Engineer or Technologist, and that all work is done in such a manner that no hazards are created by unsafe excavations and working conditions.

Supervision by a competent person will not relieve the Contractor from any of his duties and responsibilities under Regulation 11 of the Construction Regulations.

(i) Demolition work (Regulation 12)

Whenever demolition work is included in a contract, the Contractor shall comply with all the requirements of Regulation 12 of the Construction Regulations. The fact that a competent person has to be appointed by the Contractor does not relieve the Contractor from any of his responsibilities in respect of safety of demolition work.

(j) Tunneling (Regulation 13)

The Contractor shall comply with Regulation 13 wherever tunneling of any kind is involved.

(k) Scaffolding (Regulation 14)

The Contractor shall ensure that all provisions of Regulation 14 of the Construction Regulations are complied with. (Note: Reference in the Regulations to "Section 44 of the Act" should read "Section 43 of the Act").

(l) Suspended platforms (Regulations 15)

Wherever suspended platforms will be necessary on any contract, the Contractor shall ensure that copies of the system design issued by a Professional Engineer are submitted to the Engineer for inspection and approval. The Contractor shall appoint competent persons as supervisors and competent scaffold erectors, operators and inspectors and ensure that all work related to suspended platforms are done in accordance with Regulation 15 of the Construction Regulations.

(m) Boatswain's chain (Regulation 16)

Where boatswain's chains are required on the construction site, the Contractor shall comply with Regulation 16.

(n) Material hoists (Regulation 17)

Wherever applicable, the Contractor shall comply with the provisions of Regulations 17 to the letter.

(o) Batch plants (Regulation 18)

Wherever applicable, the Contractor shall ensure that all lifting machines, lifting tackle, conveyors, etc. used in the operation of a batch plant shall comply with, and that all operators, supervisors and employees are strictly held to the provisions of Regulation 18. The Contractor shall ensure that the General Safety Regulations (Government Notice R 1031 of 30 May 1986), the Driven Machinery Regulations (Government Notice R 2271 of 11/10/1995) are adhered to by all involved.

In terms of the Regulations, records of repairs and maintenance shall be kept on site.

(p) Explosive powered tools (Regulation 19)

The Contractor shall ensure that, wherever explosive-powered tools are required to be used, all safety provisions of Regulation 19 are complied with.

It is especially important that warning notices are displayed and that the issue and return of cartridges and spent cartridges be recorded in a register to be kept on site.

(q) Cranes (Regulation 20)

Wherever the use of tower cranes becomes necessary, the provisions of Regulation 20 shall be complied with.

(r) Construction vehicles and mobile plant (Regulation 21)

The Contractor shall ensure that all construction vehicles and plant are in good working condition and safe for use, and that they are used in accordance with their design and intended use. The vehicles and plant shall only be operated by workers or operators who have received appropriate training, all in accordance with all the requirements of Regulation 21.

All vehicles and plant must be inspected on a daily basis, prior to use, by a competent person and the findings must be recorded in a register to be kept on site.

(s) Electrical installation and machinery on construction sites (Regulation 22)

The Contractor shall comply with the Electrical Installation Regulations (Government Notice R2920 of 23 October 1992) and the Electrical Machinery regulations (Government Notice R1953 of 12 August 1993). Before commencement of construction, the Contractor shall take adequate steps to ascertain the presence of, and guard against dangers and hazards due to electrical cables and apparatus under, over or on the site.

All temporary electrical installations on the site shall be under the control of a competent person, without relieving the Contractor of his responsibility for health and safety of all workers and persons on site in terms of Regulation 22.

(t) Use of temporary storage of flammable liquids on construction (Regulation 23)

The Contractor shall comply with the provisions of the General Safety Regulations (Government Notice R1031 of 30 May 1986) and all the provisions of Regulation 23 of the Construction Regulations to ensure a safe and hazard-free environment to all workers and other persons on site.

(u) Water environments (Regulation 24)

Where construction work is done over or in close proximity to water, the provisions of Regulation 24 shall apply.

(v) Housekeeping on Construction sites (Regulation 25)

Housekeeping on all construction sites shall be in accordance with the provisions of the environment Regulations for workplaces (Government Notice R2281 of 16 October 1987) and all the provisions of Regulation 25 of the Construction Regulations.

(w) Stacking and storage on construction sites (Regulation 26)

The provisions for the stacking of articles contained in the General Safety Regulations (Government Notice R1031 of 30 May 1986) as well as all the provisions Regulation 26 of the Construction Regulations shall apply.

(x) Fire precautions on construction sites (Regulation 27)

The provisions of the Environmental Regulations for Workplaces (Government Notice R2281 of 16 October 1987) shall apply.

In addition the necessary precautions shall be taken to prevent the incidence of fires, to provide adequate and sufficient fire protection equipment, sirens, escape routes etc. all in accordance with Regulation 27 of the Construction Regulations.

(y) Construction welfare facilities (Regulation 28)

The Contractor shall comply with the construction site provisions as in the Facilities Regulations (Government Notice R1593 of 12 August 1988) and the provisions of Regulation 28 of the Construction Regulations.

(z) Non-compliance with the Construction Regulations 2014

The foregoing is a summary of parts of the Construction Regulations applicable to all construction projects.

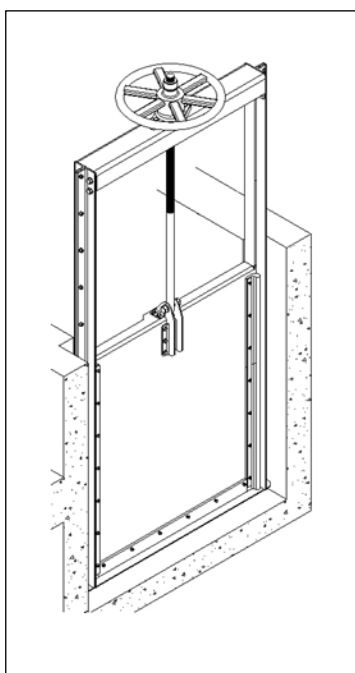
The contractor, as employer for the execution of the contract, shall ensure that all provisions of the Construction Regulations applicable to the contract under consideration are complied with to the letter.

The purpose of the sluice gate is to increase or decrease the flow to the downstream chambers by opening or closing the sluice gate. The sluice gate to be stainless steel and to be designed to withstand the pressure due to water pressing on the gate.

The sluice gate to include the following:

- Stainless steel frame to be bolted to existing concrete walls with chemical anchors.
- Penstock with stainless steel shaft responsible for pulling and pushing the sluice gate into place of operation.
- Penstock to be controlled by manual hand wheel which rotates around the penstock along the threads causing the penstock to pull or push the sluice gate.

Typical Example:



PART C4: SITE INFORMATION

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SITE INFORMATION

1. SITE AND ACCESS

The project site is situated within the King Cetshwayo District Municipality, KZN and located within Mthonjaneni Local Municipality. The central co-ordinates of the area are approximately S 28°34'17.99" Latitude and E 31°24'31.20" Longitude.

Access to the site of the works can be obtained from the R66 provincial road via Arbor Street, Flight Street and a gravel road teeing off from Flight Street towards the Melmoth WWTW.

The contractor must evaluate the availability of access to the area, evaluate construction space and locate together with any other aspect that may influence his construction activities and or method and allow for it in his tendered rates.

The contractor must evaluate the availability of access to the area, evaluate construction space and locate together with any other aspect that may influence his construction activities and or method and allow for it in his tendered rates.

2. NATURE OF SITE, GROUND AND SUB-SOIL CONDITIONS

No geotechnical assessment of the site was undertaken. Before tendering the Contractor must form his own opinion by his independent enquiry and observation as to the character of the strata through which the excavations are to be made.

Some groundwater seepage through the ground profile should be anticipated after periods of rainfall.

The elevation of groundwater seepage is influenced by the rainfall and during the wet season the elevation of the perched water table can rise particularly after prolonged heavy storm events.

The subsoil conditions in existence must be evaluated by the contractor for any aspect that may influence his construction activities and or methods of construction allowance for de-watering of trenches and excavations so as to make allowance therefore in his tendered rates.

3. SITE FACILITIES AVAILABLE

3.1 Water

There is no water available on site for construction purposes and the Contractor must make his own arrangement with the Mthonjaneni Local Municipality / King Cetshwayo District Municipality for a supply from their network if so required.

3.2 Power

There is no electricity available on site for construction purposes and the Contractor must make his own arrangement with the Mthonjaneni Local Municipality for a supply point from their network if so required.

4. SITE FACILITIES REQUIRED

4.1 Offices

A site office for the exclusive use of the Engineer is not required. An equipped office with a table, eight chairs, filing cabinet and plan table must however be made available for the Engineer and his representative, in the event that this is required, normally for site meetings. One set of drawings must be kept on site at all times.

4.2 Temporary Latrines

The Contractor shall provide adequate chemical toilet facilities for the use of the various workmen in accordance with the Regulations of the Department of Public Health and/or other authority and pay all charges in connection therewith; maintain same in a thoroughly clean and orderly condition; allow for moving the chemical toilets to new locations as necessary during the course of the Contract and finally remove such chemical toilets at completion and make good.

4.3 Personnel

One assistant must be made available to the Engineer, his Representative, or the Clerk of Works, if so required.

4.4 Survey Instruments

Survey instruments including a Dumpy level, staff and 100 m steel tape must be available to the Clerk of Works at all times.

4.5 Telephone / Telefax

The Contractor shall provide his own telephone and/or fax facilities.

4.6 Laboratory Facilities

Facilities for the testing of concrete test cubes and backfilling layers must be provided on site or alternatively through an approved commercial laboratory.

5. FEATURES REQUIRING SPECIAL ATTENTION

5.1 Existing Services

The Contractor must take all precautions against damaging existing structures or services or affecting the operation of the existing works. The municipality and other service owners must be approached to indicate these existing underground services before any works in any area shall commence. The contractor should request 7 days in advance for the indication of existing services.

The Contractor will be held responsible for any damage to these services during the execution of the Works. Damaged services must immediately be reported to the proper authority and repaired to the satisfaction of the Engineer.

5.2 Surveying

The Contractor must use the services of or employ a competent engineering surveyor to set out the Works and to ensure that the specified tolerances are adhered to.

Payment for the setting out will be deemed inclusive in the rates and no additional payment will be made in that regard.

No beacons, reference pegs, corner pegs, etc. may be disturbed or removed without the prior consent of the Engineer.

5.3 Source of Materials

The Contractor will be responsible for locating of all materials complying with the relevant minimum requirements to be used in this contract. No separate payments shall be made for this as all costs related thereto shall be deemed to be covered by the bid rates.

5.4 Environmental Management

A requirement for the approval of the project by the Department of Environmental Affairs is that the contractor must maintain the Environmental Management Plan attached as Annexure C during the construction period to ensure that the environmental impact of the activity is minimized and that all mitigating requirements are met.

No claims to maintain the Environmental Management Plan will be considered. Work required maintaining the Environmental Management Plan is considered to be included in the bid rates bid by the contractor.

5.5 Occupational Health and Safety Act

Separate allowance to be made in the Tender document for the Principal Contractor to comply with the Occupational Health and Safety Act (Construction Regulations).

The project Health and Safety Specifications is attached as Section PL.

Provision therefore is to be made as specified. These items are to be included in the Tender to be submitted.

5.6 Use of local labour

The funds for this project have been made available by The Municipal Infrastructure Grant Programme (MIG) through the **King Cetshwayo District Municipality**, the condition being that as much local labour is used where possible. For this project only the contract manager and key personnel shall be imported. All the other labour shall be from the local community. Special Conditions of Contract which indicate the minimum requirements in terms of employment targets and reporting, must be fully complied with. The rates tendered by the contractor will be assumed to have specifically included for these terms.

The contractor will during the period allowed for site establishment directly after the introductory meeting with the community, set up a meeting with the Labour Desk, which meeting must be scheduled prior to the date of physical commencement of the works. The purpose of this meeting is to maximize the use of local labour force for any task on the project for which local expertise might be available.

To achieve this, the contractor shall at the introductory meeting, having completed his preliminary planning for the project, submit to the Chairman of the Labour Desk a list of possible people that could be utilized on the project.

At the first meeting following the introductory meeting referred to in the first paragraph, the Labour Desk will submit the names and details of labourers from the local community complying to the contractor's requirements. The contractor will during the period of site establishment and before the commencement of any physical work allow for three consecutive meetings with the Labour Desk and local people in order to interview candidates and to negotiate suitable rates. Each meeting must be minuted and an attendance register kept. The contractor must through this exercise prove that he has exhausted all means to maximize the use of local labour.

A specific item for this exercise is allowed for in the fixed cost section of the Preliminary and General section. The contractor must further allow in his construction programme a specific item for this exercise since no construction work will commence prior to completing these. This task may however run concurrent with the time allowed for general site establishment. In programming this task, the contractor must take cognizance of local customs and the speed at which communication in these rural communities takes place. A minimum period of three weeks is recommended for this task, but the contractor must make his own estimate in this regard.

The engineer will certify no payment under the above item unless the minutes of each meeting mentioned above, together with attendance registers, are submitted to the engineer.

The engineer or facilitator or duly authorized representative from either the engineer or the facilitator might attend these meetings as an observer, but will not be involved in any recruitment, negotiations or sub-contract price negotiations whatsoever.

5.7 Community Liaison Officer (CLO)

It may be required of the Contractor to appoint a Community Liaison Officer for the duration of the contract. This person will be a resident of the area and will be sourced in conjunction with and appointed with the approval of the local community structures, the Engineer and the Employer.

The function of the Community Liaison Officer will in brief be to keep residents and consumers fully informed of the extent, programme and duration of the contract at all times, as well as all planned interruptions to supply, whilst all complaints and enquiries by residents, consumers or the public at large are to be directly communicated to him for attendance by the Contractor. Payment will be effected as measured on a monthly basis.

The Ward Councillor shall generally be responsible for the selection of the CLO. The Ward Councillor in whose ward work is to be done will identify a community liaison officer for the project and make that person

known to the contractor within two days of being requested to do so. The selected CLO will be accountable to the Contractor.

The CLO shall be employed on a full day basis, for the duration of the contract. When not undertaking specific CLO duties, the CLO will be expected to undertake any other work allocated by the Contractor.

The minimum skills for a CLO shall include:

- a) An ability to work with others
- b) An ability to communicate in English and Zulu
- c) An ability to communicate in writing
- d) Sound interpersonal skills

Previous experience in community facilitation, knowledge of construction work and relevant labour legislation would be an advantage.

The contractor will be required to enter a written contract with the CLO that specifies:

- a) The hours of work and the wage rate of the CLO (200% of the Civil Engineering Industry minimum wage rate)
- b) The duration of the appointment
- c) The duties to be undertaken by the CLO which could include
 - 1) Assisting in all respects relating to the recruitment of local labour and advising them of their rights.
 - 2) Acting as a source of information for the community and councilors on issues related to the contract.
 - 3) Keeping the contractor advised on community issues and issues pertaining to local security.
 - 4) Assisting in setting up any meeting or negotiations with affected parties.
 - 5) Keeping a site diary of any labour or community issue that may arise.
 - 6) Any other duties that may be allocated by the contractor.
 - 7) Monitoring and reporting on general Health and Safety issues on site.
 - 8) Assisting in AIDS/HIV awareness programmes.
- d) It must be noted that the CLO has no authority to issue any instructions to the Contractor.

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

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

The CLO needs to be seen as neutral by all parties and therefore should endeavour not to take sides should a conflict arise.

5.8 Tender Drawings

The drawings that form part of the Tender documents shall be used for Tender purposes only. The depths, pipe sizes and lengths of pipes as shown on drawings are subject to confirmation on site, and the Contractor shall submit all such information to the Engineer for confirmation before he commences any construction work.

5.9 "As-builts" Drawings

The Contractor shall provide the Engineer with "as-built" drawings at the end of the contract indicating all levels, positions, coordinates, sizes, etc.

For this purpose, an additional set of drawings will be kept in the site office, for the exclusive use of keeping as-built information.

The completion certificate shall only be issued after the Engineer has received a properly completed set of "As-Built" drawings from the Contractor. No separate payment shall be made for this service, as all costs related thereto shall be deemed to be included in the related items.

5.10 Housing for contractor's employees

No housing is available for the Contractor's employees, and the Contractor shall make his own arrangement for housing his employees and transporting them to and from the site. The Contractor is in all respects responsible for the housing and transporting of his employees and for the arrangement thereof, and no claim for extension of time due to any delays resulting from this, will be considered.

5.11 Rain Gauge

An approved rain gauge properly fenced off shall be provided by the Contractor free of charge in order to enable him to claim for extensions of time.

PART C5: ANNEXURES

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DRAWING NO.	DESCRIPTION
R11-024-20-00-001	WWTW SITE DEVELOPMENT PLAN
R11-024-20-00-002	SITE LAYOUT PLAN
R11-024-20-00-L001	SLUDGE DRYING BED LAYOUT
R11-024-20-00-L002	FLOW SPLITTER BOX LAYOUT PLAN
R11-024-20-00-LS01	LONG SECTIONS PLAN 1 OF 6
R11-024-20-00-LS02	LONG SECTIONS PLAN 2 OF 6
R11-024-20-00-LS03	LONG SECTIONS PLAN 3 OF 6
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R11-024-20-00-LS05	LONG SECTIONS PLAN 5 OF 6
R11-024-20-00-LS06	LONG SECTIONS PLAN 6 OF 6
R11-024-20-00-PS01	PUMP CHAMBER DETAIL
R11-024-20-00-R001	FLOW SPLITTER BOX REINFORCING
R11-024-20-00-R002	SLUDGE DRYING BED REINFORCING
R11-024-20-00-R003	SLUDGE DRYING BED REINFORCING
R11-024-20-00-R004	NEW CHAMBER REINFORCEMENT LAYOUT AND SECTIONS
R11-024-20-00-SEC01	SLUDGE PONDS SECTION
R11-024-20-00-SEC02	SECTION WALL C THROUGH SLUDGE DRYING BED
R11-024-20-00-SEC03	TYPICAL SECTION
R11-024-20-DET-01	CONTRACTOR SIGN BOARD
R11-024-20-DET-01A	SIGN SUPPORT STRUCTURE
R11-024-20-DET-02	PIPELINE MARKERS
R11-024-20-DET-03	SEWER MANHOLES
R11-024-20-DET-04	STORMWATER DETAIL
R11-024-20-DET-05	GABION & RENO MATTRESS DETAIL SHEET 1 OF 2
R11-024-20-DET-06	GABION & RENO MATTRESS DETAIL SHEET 2 OF 2
R11-024-20-DET-07	HEADWALL OUTLET
R11-024-20-DET-08	SEWER PIPE BACKFILL DETAIL
R11-024-20-DET-09	STAND TAP DETAIL
R11-024-20-DET-10	SUBSOIL DRAIN DETAIL
R11-024-20-DET-11	STORMWATER GRID INLET DETAIL
R11-024-20-DET-12	FENCING AND GATE DETAILS

ANNEXURE B: PCI POLICY

ANNEXURE C: ENVIRONMENTAL MANAGEMENT PLAN

ANNEXURE D: HEALTH AND SAFETY SPECIFICATION

ANNEXURE E: BASELINE RISK ASSESSMENT

ANNEXURE F: REQUIREMENTS OF THE EXPANDED PUBLIC WORKS PROGRAMME (EPWP)

This section provides specifications with regard to the following:

(a) The Expanded Public Works Programme (EPWP)

The Contractor shall be required to participate in job creation (employment of local labour) by executing various portions of the Works using local labour (unskilled or semi-skilled), recruited from the local community, who are South African Citizens or foreigners in possession of a work visa issued by the Department of Home Affairs (only one such foreigner may be employed on any project). Such local labour shall be the targeted participants in the EPWP programme.

Furthermore, in order to avoid duplication of training programmes and training facilities, all structured training, including the training for Small Contractor Development (SCD), (in those instances where SCD is included in the contract), shall be measured and paid for in terms of the pay items provided in this section.

1. Expanded Public Works Programme (EPWP)

1.1 Labour-Intensive Construction (LIC), supervision and management for the Expanded Public Works Programme (EPWP)

The Expanded Public Works Programme (EPWP) is a multi-sectoral government initiative to create jobs. In the case of the infrastructure sector, existing government expenditure is realigned using labour-intensive technologies to create job opportunities. This involves the use of both labour and plant, where labour is preferred and plant is used appropriately.

All work undertaken in terms of the Expanded Public Works Programme (EPWP) shall be implemented using labour-intensive construction methods to the extent economically feasible, in accordance with the "Guidelines for the Implementation of Labour-Intensive Infrastructure Projects under the Expanded Public Works Programme (EPWP) Third Edition 2015".

The aforementioned guidelines can be downloaded from the EPWP website of the Department of Public Works (<http://www.epwp.gov.za/>).

Items scheduled for labour-intensive construction are marked with the letters "LI" in the schedule of quantities in the manner described in the Pricing Instructions.

Contractors shall note that they shall employ in labour-intensive works only those supervisory and management staff that have completed the required Skills Programme in terms of Appendix C of the aforementioned guidelines:

- Foremen / Supervisors at NQF level 4 "National Certificate: Supervision of Civil Engineering Construction Processes";
- Site Agent / Construction Manager at NQF level 5 "Manage Labour-Intensive Construction Processes" or equivalent Quality Council for Trades and Occupations (QCTO) qualifications at NQF level 5 or 7.

In addition to their normal supervisory and management functions, the aforementioned supervisory and management staff shall also be responsible for setting the workers' daily tasks in accordance with labour-intensive construction principles, and for ensuring that the EPWP job creation reporting data is accurately recorded on a daily basis and compiled and submitted to the Employer each month in accordance with clause 3 of this section.

1.2 Labour laws applicable to the Expanded Public Works Programme (EPWP)

The work to be undertaken on this contract by unskilled or semi-skilled workers under the Expanded Public Works Programme (EPWP) shall be implemented in accordance with:

- the Code of Good Practice for Employment and Conditions of Work for Expanded Public Works Programmes (EPWP), issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in Government Notice No. 129 of 18 February 2011 (Government Gazette No. 34032 of 18 February 2011); and
- Ministerial Determination 4: Expanded Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997 by the Minister of Labour in Government Notice No. R347 of 4 May 2012.

The aforementioned Government Notice No. R347 contains the standard terms and conditions for workers employed in elementary occupations on an Expanded Public Works Programme (EPWP). These terms and conditions do not apply to persons employed in the supervision and management of an Expanded Public Works Programme (EPWP).

The above documents can be downloaded from the EPWP website of the Department of Public Works (<http://www.epwp.gov.za/>).

1.3 Persons to be employed under the Expanded Public Works Programme (EPWP)

All local labour required for the execution of labour-intensive works shall be engaged strictly in accordance with prevailing legislation.

The Contractor shall, through the Project Liaison Committee (PLC) and with the assistance of the Community Liaison Officer (CLO), inform the local community of the labour-intensive works proposed and the employment opportunities thereby presented.

The Contractor shall determine the minimum education level / skills required to undertake the works specified. In consultation with the PLC and the War Room convener for each relevant ward, selection of the local labour shall be made from households on the Operation Sukuma Sakhe (OSS) database profiled through the War Room for each ward. The list obtained from the OSS database must be accompanied by a letter from the War Room convener confirming that all the information provided was sourced from the War Room and that all listed incumbents reside within the relevant ward. The Contractor must maintain records of household profiles as part of the portfolio of evidence for selection. Selection shall be based on the minimum education level / skills required and the most needy households, as determined by the household profiling. Preference shall be given for at least one person from each household in the community to be employed before further persons are considered for selection.

The Contractor shall endeavour to ensure that the number of temporary jobs using local labour (unskilled or semi-skilled), recruited from the local community, who are South African Citizens or foreigners in possession of a work visa issued by the Department of Home Affairs (only one such foreigner may be employed on any project), shall include for a minimum allocation of:

- 55% women;
- 55% youth who are between the ages of 16 and 35; and
- 2% persons with disabilities.

All labour recruitment, employment and associated risks shall remain the sole responsibility of the contractor.

The contractor shall comply with the minimum supervisor to worker ratio stated below, required to ensure the effective supervision of the labour-intensive works for all LI activities undertaken on this project.

Minimum supervisor to worker ratio = 1:12

1.4 Contract of employment with persons employed under the Expanded Public Works Programme (EPWP)

The Contractor shall enter into a formal contract of employment with each person employed under the Expanded Public Works Programme (EPWP), using the pro forma contract of employment attached at the end of this section: Particular Specifications.

The Contractor shall note that all such formal contracts of employment entered into with persons employed under the Expanded Public Works Programme (EPWP) shall expire on 31 March each year, and the Contractor shall therefore be required to enter into new contracts with such persons as of 1 April each year.

1.5 Employment of targeted labour under the Expanded Public Works Programme (EPWP)

The Contractor shall be contractually obliged to:

- (a) brief EPWP workers on the conditions of employment;
- (b) enter into a formal contract of employment with each EPWP worker, which contract will form part of the Employment Agreement;
- (c) keep personnel files for all EPWP workers and make copies available to the Employer if and when requested; and
- (d) ensure that payments to EPWP workers are made in accordance with Government Notice No. R347.

The rate of pay for persons employed under the Expanded Public Works Programme (EPWP) shall be:

R _____ per day (for time-rated workers).

During those periods when an EPWP worker is engaged in formal classroom training (other than in-service training), the rate of pay shall be equal to the minimum wage rate as set on an annual basis in the Ministerial Determination for the Expanded Public Works Programme.

Tasks set by the Contractor shall be such that:

- (a) the average EPWP worker completes 5 tasks per week in 40 hours or less; and
- (b) the weakest EPWP worker completes 5 tasks per week in 55 hours or less.

The Contractor shall revise the time taken to complete a task whenever it is established that the time taken per week to complete the tasks set does not fall within the limits indicated in (a) and (b) above.

1.6 Training of persons employed under the Expanded Public Works Programme (EPWP)

The training of persons employed under the Expanded Public Works Programme (EPWP) is described in clause 4 below.

1.7 Contractor's obligations towards persons employed under the Expanded Public Works Programme (EPWP)

Over and above implementing in accordance with Government Notice Nos. 129 and R347 the EPWP work to be undertaken on this contract, it shall be the responsibility of the Contractor to carry out the following functions with respect to the EPWP workers:

- (a) ensure that all participants are covered by the Compensation for Occupational Injuries and Diseases Act, 1993, for as long as they are contracted to the Contractor, and pay in full to the Compensation Commissioner such amounts as are due in terms of the Act;
- (b) pay in full to the Unemployment Insurance Fund for all participants such UIF contribution amounts as are due in terms of the Unemployment Insurance Act, 2001, as amended, and the Unemployment

Insurance Contributions Act, 2002, as amended, and provide proof of such UIF payments upon request;

- (c) ensure that all participants are paid their wages on time through the pre-agreed payment method as stipulated in the participant contract of employment;
- (d) implement health and safety procedures with respect to the participants, ensuring that the health and safety regulations are adhered to;
- (e) ensure that all participants receive induction on site safety prior to commencing with work on site;
- (f) provide all participants with the necessary protective clothing and equipment as required by law for the specific tasks in which the participants are involved, in addition to the branded overalls stipulated for EPWP workers;
- (g) provide safe on-site storage facilities for apparel and tools issued to the participants;
- (h) assist in the assessment of participants with regard to their competencies;
- (i) provide overall supervision and day-to-day management of participants; and
- (j) implement strict quality control to ensure that the work carried out by the participants is of the required standard, and, where necessary, to train and mentor the participants to assist them in achieving the standards required.

1.8 Apparel and tools for persons employed under the Expanded Public Works Programme (EPWP)

The Contractor shall provide Personal Protective Equipment (PPE) to all EPWP workers in accordance with the requirements arising from Part E: OHSA 1993 Health and Safety Specification and the Contractor's site specific health and safety plan and accompanying risk assessments.

Where indicated below, certain items of the PPE issued by the Contractor to the EPWP workers shall include branded EPWP markings in accordance with the attached branding requirements.

PPE shall comprise the following:

- (a) Compulsory PPE issued to all EPWP workers for use during general work activities:
 - Protective overalls (two sets), green in colour, with EPWP branding;
 - Lime green reflective safety vest with EPWP branding;
 - Protective footwear; and
 - Protective gloves.
- (b) PPE issued to EPWP workers for specific activities where required in terms of the Contractor's site specific health and safety plan and accompanying risk assessments, such as:
 - Protective headwear, green in colour, with EPWP branding;
 - Protective eyewear such as spectacles and goggles;
 - Protective face shields;
 - Protective earplugs and earmuffs;
 - Respiratory masks;
 - Disposable safety apparel;
 - Kidney belts;
 - Safety harnesses; and
 - Any other protective equipment identified.

The Contractor shall replace any item of issued PPE that becomes unserviceable.

The Contractor shall not charge any fee to the EPWP workers for the prescribed PPE issued except under the following circumstances:

- where the employee requests the issue of additional PPE in excess of what is prescribed;

- where the employee has patently abused or neglected the issued PPE leading to early failure; or
- where the employee has lost the issued PPE.

The Contractor shall instruct and train the EPWP workers in the use of all PPE issued, and shall ensure that they use the prescribed equipment.

EPWP workers shall not have the right to refuse to use or wear the equipment prescribed by the Contractor. If it is not possible for an EPWP worker, through health or any other reason, to use or wear the prescribed PPE issued, such employee shall not be allowed to continue working under the hazardous conditions for which the equipment was prescribed. Under such circumstances an alternative solution shall be found, and this may include relocating or discharging the employee.

The Contractor shall provide each EPWP worker with hand tools of adequate quality and of the type required to carry out the assigned tasks safely and efficiently.

The Contractor shall instruct and train the EPWP workers in the safe and efficient use of all hand tools issued.

The Contractor shall maintain the issued tools in a serviceable and safe working condition.

The EPWP workers shall be responsible for the safe on-site storage of all PPE and tools issued to them, using the storage facilities provided on site by the Contractor.

No separate payment shall be made for providing the EPWP workers with PPE, or for providing relevant items of PPE in the specified colours with branded EPWP markings. Furthermore, no separate payment shall be made for providing the EPWP workers with hand tools or for providing them with safe storage facilities on site for PPE and tools. The Contractor shall therefore make provision for all costs related to providing the PPE, tools and safe storage facilities in the tendered rates and prices for the various items of work scheduled throughout the schedule of quantities.

1.9 EPWP contract signboard

The Contractor will be required to erect a contract signboard displaying the EPWP logo, indicating that this project is part of the Expanded Public Works Programme (EPWP). All costs related to the provision, erection and subsequent removal of the contract signboard shall be refunded to the Contractor through the pay item provided in section 1300 of the schedule of quantities for this purpose.

1.10 Payment matters relating to the EPWP work

1.10.1 General

No separate pay items shall be provided in terms of the schedule of quantities for the construction work activities carried out by EPWP participants. Payment for such work activities shall be made only indirectly, in terms of the pay items scheduled for the work activities in which such persons are engaged.

Furthermore, no direct payment will be made to cover the Contractor's costs associated with implementing the on-site work programme for the EPWP participants, for planning, organising, directing, controlling and administering their day to day activities, including the setting of daily tasks, record keeping and any on-site liaison, training and mentoring required, and for the associated job creation reporting, and such costs shall therefore be built into the rates tendered for the various items of work scheduled throughout the schedule of quantities.

1.10.2 Payment for labour-intensive components of the work

Payment will be made for items which are designated for labour-intensive construction in the schedule of quantities only in those instances where such items are constructed using labour-intensive methods.

Any unauthorised use of plant to carry out work which was scheduled to be carried out using labour-intensive methods will not be condoned and any Works so constructed will not be certified for payment. Any non-payment for such Works shall not relieve the Contractor in any way from his obligations either in contract or in delict.

During the course of construction, as a result of unforeseen site conditions or operating conditions encountered, it may happen that an item designated for labour-intensive construction can no longer be

carried out in a safe and economically feasible manner, either in full or in part, using labour-intensive methods. In such instances the Employer's Agent shall, where necessary, order a variation in terms of clause 6.3 of the General Conditions of Contract 2015 with respect to that portion of the item quantity that cannot be carried out using labour-intensive methods.

1.11 Penalty applicable to any shortfall in the local labour content achieved

The amount spent on wages for local labour (excluding VAT) for this project, as certified by the Employer's Agent, shall equal or exceed the specified minimum percentage of the contract amount which is the Contract Price (adjusted to exclude penalties and value added tax).

The Contractor is obliged to commit to or exceed the specified minimum percentage of local labour content stated by the Employer.

In the event that the Contractor fails to substantiate that any failure to achieve the minimum required local labour content for this project is due to quantitative underruns, the elimination of items contracted to local labour, or any other reason beyond the Contractor's control which may be acceptable to the Employer, the Contractor shall be liable for a financial penalty as prescribed in clause SCC 4.1.1 of the Special Conditions of Contract. The financial penalty shall be calculated as follows:

$$P = 0,05 \times [(E - E_0)/100] \times CA$$

where:

- E is the specified minimum percentage for local labour content
- E₀ is the local labour content percentage which the Employer's Agent certifies as being achieved upon completion of the contract
- CA is the contract amount which is the Contract Price (adjusted to exclude penalties and value added tax)
- P is the monetary value of penalty payable

The penalty shall not apply to shortfalls in the allocations to the individual target groups (i.e., Women/Youth/Disabled as per clause 1.3 above), only to shortfalls in the total local labour content achieved.

The evaluation of the Contractor's achievement of the local labour content percentage shall be undertaken monthly by the Employer's Agent, based on the accumulative achievements in comparison to the programmed utilisation of local labour. Failure by the Contractor to achieve the interim target shall result in the Contractor being liable for a financial penalty as prescribed in this clause.

2. JOB CREATION REPORTING FOR EPWP

In order to assist the Employer in complying with the goal of creating EPWP job opportunities, the Contractor must provide the information specified in clause 3.1 below for reporting purposes.

In addition, the Contractor's payment certificates shall be accompanied by the information specified in clause 3.2 below.

2.1 Type of project data required per project

Every EPWP project shall collect and keep specific project data for the purpose of EPWP progress reporting on a monthly basis, using the EPWP Data Collection Tool template (this will be made available to the Contractor in Microsoft Excel format - refer to the pro forma spreadsheets at the end of this section of the Particular Specifications).

The data that is required to be kept, maintained and reported on a monthly basis for each project includes:

2.1.1 Participant (local labour) data

A participant list of the local labour employed must be maintained for every EPWP project. The data required in this participant list is indicated below. This data shall be recorded, checked and signed off by the Contractor, and shall be submitted to the Employer at each monthly site meeting. The participant list shall contain the following data and shall be kept and maintained on site for audit purposes:

- (a) Participant identity – name, surname, initials, date of birth and identity number (or other unique identifier) plus certified copy of ID book.
- (b) Participant profiles – nationality, gender, age, education level and disability status.
- (c) Work data for participants – daily wage to be received, number of calendar days training attended and number of calendar days worked.
- (d) Records of training – as required in terms of the EPWP Data Collection Tool template.

In addition, the signed contracts of employment between the Contractor and each EPWP participant shall be kept and maintained on site for audit purposes.

2.1.2 Project work data

The project work data generally seeks to confirm the number of people at work daily on the project. This data shall be recorded, checked and signed off by the Contractor, and shall be submitted to the Employer at each monthly site meeting. The data shall be maintained on site by the Contractor, in order that it can be provided by the Employer to the National Department of Public Works upon request when the latter is undertaking sample auditing. The data shall include:

- (a) Daily attendance register – register for each day showing all the workers that were registered as being at work on that day. Attendance registers shall be completed on site on a daily basis and signed off by the Contractor on a weekly basis.
- (b) Summary of monthly attendance.

2.1.3 Project payment data

The project payment data generally seeks to confirm what was paid, for how much work and to whom. This data shall be recorded, checked and signed off by the Contractor, and shall be submitted to the Employer at each monthly site meeting.

It is required that the Contractor adopt one of the following methods as standard procedure for recording and maintaining this information:

- (a) Payment register – this is a list of the workers showing the wages paid to each worker, and signed off by each worker as proof of receipt and acceptance of payment. Information on this register must include the name of the worker, either an identity number or other unique identifier, the number of calendar days that the pay period covers, the wage rate and the total wages paid; or
- (b) Bank records showing the transfers to each worker account, signed off by the Contractor as proof of payment – these bank records must specifically show the name of the worker, either an identity number or other unique identifier, the period which the pay covers and the total wages paid.

The project payment data, as recorded and maintained by the Contractor in terms of either (a) or (b) above, must be available and applicable for the entire period for which the Employer claims an incentive reward for person-days of work created in terms of the project.

2.1.4 Employment output data

The Contractor shall submit to the Employer at each monthly site meeting a progress report detailing production output compared to the programme of works, together with the data necessary to enable the Employer to calculate the following employment output data in accordance with the EPWP Data Collection Tool template:

- (a) Number of work opportunities created (where one work opportunity = paid work created for one individual on an EPWP project, for any period of time).
- (b) Number of person-days of work created (where one person-day = one day of work carried out by one individual). The total number of person-days of work created on a particular EPWP project shall be

obtained by summing the total number of person-days worked by each individual employed during the course of that EPWP project.

- (c) Number of Full Time Equivalents (FTE) created (= total number of person-days of work created on the EPWP project divided by 230 working days). In terms of EPWP policy, one year of work created for one individual is assumed to comprise a total of 230 days of paid work carried out by that individual.
- (d) Average duration of work opportunities created (= total number of person-days of work created on the EPWP project divided by the number of work opportunities created on that EPWP project).
- (e) Average daily wage rates paid (= accumulated total of the wages paid to all individuals employed on an EPWP project divided by the total number of person-days of work created on that EPWP project).
- (f) Training information.

2.2 Project data to be submitted with the Contractor's payment certificates

The Contractor's payment certificates shall be accompanied by labour returns providing the labour information for the corresponding period in a format specified by the Employer.

Should the Contractor choose to delay submitting payment certificates, the labour returns shall nevertheless still be submitted as per the frequency and timeframes stipulated by the Employer. The Contractor's payment certificates shall not be paid by the Employer until all pending labour information has been submitted.

The following information shall be maintained on site and submitted with each payment certificate in the format specified by the Employer:

- (a) Copies of the signed contracts between the Contractor and any new EPWP participants (the Contractor shall note that all such formal contracts of employment entered into with persons employed under the Expanded Public Works Programme (EPWP) shall expire on 31 March each year, and the Contractor shall therefore be required to enter into new contracts with such persons as of 01 April each year, and shall be required to submit copies of all such new contracts with the first payment certificate thereafter);
- (b) Certified ID copies of all local labour employed as EPWP participants;
- (c) Attendance registers for the EPWP participants;
- (d) Proof of payment of EPWP participants; and
- (e) Information as required in terms of the EPWP Data Collection Tool template.

3. PROVISION OF STRUCTURED TRAINING

3.1 Scope of structured training

In order to avoid duplication of training programmes and training facilities, all structured training, shall be implemented, measured and paid for in accordance with the requirements of this section: Requirements of the Expanded Public Works Programme (EPWP).

The Employer's objectives include the training of local labour and Targeted Enterprises within a structured programme, in order to equip them with skills that will assist them in gaining future employment, and to facilitate targeted EPWP participants in gaining competencies and unit standard credits towards future full learnership qualifications.

Such training shall contain both theoretical and practical components and shall be conducted in accordance with the various laws and regulations contained in the South African Qualifications Authority (SAQA) statutes.

The following aspects of the structured training to be provided are noted:

The Employer has no service agreement or memorandum of understanding with any Education and Training Quality Assurance (ETQA) body, and therefore does not function as the employer as defined under any three-party learnership agreement between the learner, the training provider and the employer.

The structured training programmes implemented on this contract, although comprising several unit standards, are unlikely to total to sufficient credits for a full learnership qualification. Nevertheless, the competencies and credits achieved should contribute to a full learnership through the later acquisition by the learner of the remaining unit standards required for the full learnership.

The Contractor shall be required to provide a training facility on the Site, or in close proximity thereto, and to provide over the duration of the contract the following structured training for EPWP participants:

- (a) Generic skills training;
- (b) Entrepreneurial skills training;
- (c) Construction skills training; and
- (d) In-service training.

Generic skills training and in-service training shall be provided to all EPWP participants.

Entrepreneurial and construction skills training shall be provided to targeted EPWP participants only.

Entrepreneurial skills training comprises both management skills training and business development skills training.

Construction skills training comprises specific on-task skills training.

3.2 Training provider and trainers

The Contractor shall be required to procure the services of a training provider accredited by the Construction Education and Training Authority (CETA).

The training provider shall have in its employ trainers who are registered as assessors with the Construction Education and Training Authority (CETA), and who shall deliver the training.

Proof of the accreditation of the service provider and the registration of the trainers by the CETA shall be submitted to the Employer's Agent. Such accreditation and registration shall be current and valid, and the proof submitted shall include the NQF levels and unit standards for which each trainer is accredited.

3.3 Skills analysis and selection of targeted EPWP participants

Studying for any learnership requires minimum literacy and numeracy competencies as defined by SAQA. The actual literacy and numeracy levels of the persons employed on the Site shall provide a basis to guide the Contractor and the training provider on how to conduct the selection process.

The Contractor shall therefore conduct a skills analysis of the local labour and Targeted Enterprises employed, in order to determine the formal education qualifications of each employee.

The Contractor, in conjunction with the training provider, shall then identify those persons that display the potential to benefit from such structured entrepreneurial and construction skills training as may be provided for in the contract, and shall make recommendations in this regard to the Employer's Agent.

The final candidates selected for such training shall be decided between the Contractor and the Employer's Agent (or by the Project Management Team (PMT) in the case of training for Targeted Enterprises in terms of Part G: Small Contractor Development, where applicable).

3.4 Structured training programmes

The Contractor, supported by the training provider, shall plan then implement structured training programmes for generic, entrepreneurial and construction skills training.

Training courses shall commence within four months of the Contractor taking possession of the Site, and shall be completed before the Due Completion Date.

All training shall take place within normal working hours, or as otherwise agreed with the learners.

The training provider shall design, compile and deliver the structured training programmes, based on the information obtained from the skills analysis.

The structured training programmes designed by the training provider for the generic skills training shall comprise relevant general courses such as basic hygiene and HIV/AIDS awareness, first aid, road safety, managing personal finance, and other courses that would be useful to workers in the road construction industry or as life skills generally.

The structured training programmes designed by the training provider for the entrepreneurial skills training shall comprise unit standards that contribute towards one or more of the following full learnership qualifications, as appropriate taking into consideration the skills analysis information for the selected candidates (details of the learnership qualifications and the applicable unit standards may be found on the website www.saqa.org.za):

ENTREPRENEURIAL SKILLS TRAINING				
Qualification title	SAQA qualification ID	NQF level	Minimum credits	Purpose of qualification
National Certificate: Supervision of Construction Processes	49053	Level 4	176	Learners found competent against this qualification will be able to execute the supervision of construction processes, with specialisation in a specific context

The structured training programmes designed by the training provider for the construction skills training shall comprise unit standards that contribute towards one or more of the following full learnership qualifications, as appropriate taking into consideration the skills analysis information for the selected candidates (details of the learnership qualifications and the applicable unit standards may be found on the website www.saqa.org.za):

CONSTRUCTION SKILLS TRAINING				
Qualification title	SAQA qualification ID	NQF level	Minimum credits	Purpose of qualification
National Certificate: Supervision of Construction Processes	49053	Level 4	176	Learners found competent against this qualification will be able to execute the supervision of construction processes, with specialisation in a specific context
National Certificate: Construction: Roadworks	24173	Level 3	155	This qualification is for persons who work or intend to work within a construction context on a site, and who seek recognition for essential skills in construction operations in roadworks.
National Certificate: Construction: Roadworks	24133	Level 2	120	This qualification is for persons who work or intend to work within a construction context on a site, and who seek recognition for essential skills in construction operations in roadworks.

National Certificate: Occupational Health, Safety and Environment	74269	Level 2	120	This qualification is to equip learners working in any type of workplace with a broad understanding and knowledge of Occupational Health, Safety and Environmental (HSE) concepts and practices with sufficient detail to enable them to function in a safe and healthy way and to deal with health and safety problems and issues.

The Contractor's proposed training programmes shall be subject to the approval of the Employer's Agent, and the Contractor shall, if so instructed by the Employer's Agent, alter or amend the programmes and the course content to meet any additional needs identified.

The Contractor shall be responsible for everything necessary for the delivery of the training programmes, including:

- (a) the provision of the trainers;
- (b) the provision of a suitable secure venue complete with adequate furniture, lighting, air conditioning, power and ablution facilities;
- (c) the provision of all necessary stationery, consumables and study materials;
- (d) the transportation of the learners to and from the training facility;
- (e) the payment of wages to all learners during the classroom training at a rate equal to the minimum wage rate as set on an annual basis in the Ministerial Determination for the Expanded Public Works Programme;
- (f) the provision of any relevant Personal Protective Equipment (PPE) required for the training; and
- (g) additional supervision of the learners during the practical learning stage of the training carried out by constructing relevant elements of the Works (wages for the learners during this stage of the training will be paid through the rates tendered for the relevant scheduled work items for those elements).

At the successful completion of each course, the Contractor's training provider shall, as proof of attendance and completion, issue each learner with a certificate indicating the course content.

The training provider shall also ensure that each unit standard contributing towards a full learnership qualification and successfully completed by the learner is entered onto the national database.

The Contractor shall keep comprehensive records of the training given to each learner and the certificates issued, and shall provide copies of such records to the Employer's Agent when required.

The Contractor shall also complete and submit to the Employer's Agent each month, in a format acceptable to the Employer (using the EPWP Data Collection Tool template), a return detailing the training provided, both for the month and cumulatively for the contract.

3.5 In-service training

The Contractor shall, from the commencement of the contract, implement an in-service training programme in which the various skills required for the execution and completion of the Works are imparted to the EPWP participants engaged thereon.

Throughout the duration of the contract, the EPWP participants shall be trained progressively through the various stages of each particular type of work in which they are engaged, and their work shall be supervised and monitored and their methods corrected where necessary.

The in-service training programme shall be submitted with the initial Works programme. The Contractor shall record the progress in relation to this programme on a monthly basis, and this progress report shall be incorporated in the monthly site meeting minutes and the payment certificate.

The Contractor shall provide sufficient skilled and competent trainers to train all EPWP participants engaged on the contract in the various skills required to enable them to carry out the required construction activities.

The in-service training of EPWP participants shall take place before commencement of the relevant construction activity, and the Contractor shall take into account in his programme the lead time required for such training. All in-service training shall be deemed to be an element of the relevant construction activity.

All formal in-service training shall be documented in terms of the EPWP Data Collection Tool template, and shall be accompanied by an attendance register of the EPWP participants on the applicable days.

All EPWP participants shall be remunerated at their agreed wage rate in respect of the time spent undergoing in-service training. The cost of the Contractor's in-service training obligations shall be deemed to be covered by the sums and rates tendered for items B13.01(a), (b) and (c) in the schedule of quantities.

On termination of their employment, the Contractor shall provide each EPWP participant engaged on the contract with a certificate of service on which the following information shall be recorded.

- the name of the Contractor;
- the name of the project / contract;
- the name of the employee;
- the nature of the work satisfactorily executed by the EPWP participant and the time spent thereon;
- the nature and extent of training provided to the EPWP participant; and
- the dates of service.

3.6 Training venue facility

The training venue facility to be provided by the Contractor shall be constructed, furnished and fully serviced for the duration of the contract in accordance with section 1400 of the COLTO standard specifications.

In order to minimise the cost of transporting the learners for training, the facility shall be located in secure premises on the Site, or in close proximity thereto.

This facility shall be used to deliver all training.

The facility shall accommodate a class of up to 25 learners and shall comprise the following:

(a) Lecture room (interior area)	= 48 m ²
(b) Ablutions (male)	= 6 m ²
(c) Ablutions (female)	= 6 m ²
(d) Chairs for learners (individual chairs, with backs)	= 25 off
(e) Desk area for 25 learners (500 mm width)	= 12,5 m ²
(f) Chairs for trainers and management (individual chairs, with backs)	= 5 off
(g) Table area for trainers and management	= 3 m ²
(h) 220/250 volt power points	= 6 off
(i) Double 80 watt fluorescent light fittings complete with ballast and tubes	= 6 off
(j) Single incandescent light fittings complete with 100 watt globes	= 4 off
(k) Wash hand basins complete with taps and drains	= 4 off
(l) Fire extinguishers, 9,0 kg, all purpose dry powder type, complete, mounted on wall with brackets	= 2 off
(m) Air conditioning units with 2,2 kW minimum capacity, mounted and with own power connection	= 4 off
(n) Voltage stabilizers	= 2 off
(o) Floodlights complete with poles and 500 Watt minimum globes and controlled by photocells	= 2 off
(p) White boards (3 m x 1,5 m)	= 1 off
(q) Venetian blinds	= 12 m ²

3.7 Construction skills training

The focus of training provided on the contract should be to support the development of the Targeted Enterprise. Construction skills training will be approved by the PMT only when appropriate.

The Targeted Enterprise, their workforce and hired labour that show initiative will be entitled to receive structured training that will improve on-task skills necessary for the execution and successful completion of the works. The Contractor, in conjunction with the Employer's Agent, shall monitor the progress of the hired labour and each Targeted Enterprise closely and shall identify those who, in their collective opinion, will

benefit from structured construction skills training as may be provided for in the contract, and where required by the Employer's Agent shall make recommendations in this regard. The final list of candidates shall be decided between the Contractor and the Employer's Agent, and those selected shall receive formal construction skills training in a programmed and progressive manner throughout the duration of the contract.

The training programme shall offer complete courses that could comprise some or all of the following modules:

- (i) Use and maintenance of hand tools;
- (ii) Operation of equipment;
- (iii) Manufacture and installation of minor precast concrete units;
- (iv) Erect, dismantle and maintain formwork;
- (v) Basic concrete skills;
- (vi) Excavation, backfill and compaction;
- (vii) Bricklaying;
- (viii) Erosion protection using stone pitching, gabions or reinos.

The Contractor shall be responsible for the provision of everything necessary for the delivery of the various training workshops and modules including:

- (i) Provision of a suitable fully serviced training venue facility;
- (ii) Procurement of suitable accredited trainers;
- (iii) Provision, in conjunction with the accredited trainers, of all the necessary training materials, including stationery and study materials; and
- (iv) transportation of the learners to and from the training venue facility (it is therefore in the Contractor's interest that the training venue facility be provided on the site in order to reduce these transportation costs).

In order to avoid duplication of training programmes and training facilities, all structured training, including the training described in this section: Small Contractor Development, shall be measured and paid for in terms of the pay items provided for training in Requirements of the Expanded Public Works Programme (EPWP).

4. COMMUNITY LIAISON

(a) Project Liaison Committee

The process of implementing infrastructure projects will be undertaken by means of structured engagement between those responsible for the delivery of the project and the community.

A Project Liaison Committee (PLC) is a vital means of communication between the parties involved with the project. A PLC may be formed if the project is such that a specific community can be identified.

The PLC comprises representatives of the employer, the engineer and formal structures within the community. The contractor shall make use of these communication channels, and shall appoint from amongst his site personnel a responsible person to participate in the affairs of the PLC, and this representative shall also attend the monthly PLC meetings when so requested.

The PLC shall meet at least once every month until such time as it is of the opinion that it could fulfil its tasks by meeting less frequently.

The PLC deals with local labour on the project, and is tasked with:

- assisting with community liaison and the resolution of community disputes;
- devising fair and transparent procedures that will assist the contractor in the engagement of labour;
- advising on and monitoring labour issues; and
- assisting in the resolution of labour disputes.

All labour recruitment, employment and associated risks shall remain the sole responsibility of the contractor.

4.1 Community Liaison Officer (CLO)

The contractor, after consultation with the Project Liaison Committee (PLC), shall appoint a competent local person as a Community Liaison Officer (CLO). The contractor shall appoint the CLO as part of his site personnel, and shall direct all his liaison efforts with the local community through the appointed CLO.

The period of employment and the remuneration of the CLO shall be determined jointly by the contractor, the engineer and the employer.

The CLO shall:

- (i) represent the community and assist the contractor, the engineer and the employer with communication between them and the community;
- (ii) work an 8-hour day with a total of 40 hours worked per week, and shall be present on site each day except when performing off-site community liaison activities;
- (iii) communicate daily with the contractor on labour related issues such as numbers and skill;
- (iv) assist in the identification and screening of local labourers from the community in accordance with the contractor's requirements;
- (v) inform local labour of their conditions of employment, including their period of employment;
- (vi) attend disciplinary proceedings involving local labour, and ensure that hearings are fair and reasonable;
- (vii) attend all meetings at which the community and/or local labour are present or are required to be represented;
- (viii) attend monthly site meetings to report on community and local labour matters;
- (ix) keep a daily written record of interviews and community liaison;
- (x) submit monthly returns regarding community liaison; and
- (xi) carry out all such other duties as agreed upon between all parties concerned.

A new pay item is included in section 1200 of the schedule of quantities relating to the payment of the CLO on a provisional sum basis. Payment under this item shall be made only for the period for which the duties of the CLO are required, and not necessarily for the full duration of the contract.

5. COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 1993

All labour employed on the site shall be covered by the Compensation for Occupational Injuries and Diseases Act (COIDA), 1993, as amended. The Contractor shall pay in full, including the payment of the necessary levies, such amounts as are due in terms of the Act. These amounts shall not be included in the wage rates and shall be payments allowed for by the contractor in addition to the wages paid to labour. The manner in which compensation in terms of this Act shall be handled shall be resolved by the Contractor at the commencement of the contract.

6. LABOUR

A Project Liaison Committee has been established and is a vital means of communication between all parties involved with the project. The composition of the PLC comprises representatives of the Employer, the Employer's Agent and formal structures within the community.

The Contractor shall make use of these communication channels, and shall appoint from amongst his site personnel a responsible person to participate in the affairs of the PLC, and this representative will be also required to attend the monthly PLC meetings.

It is mandatory that the Contractor shall interact with the community via proactive project liaison and project participation by its leaders and constituted organisations and forums, as well as through the employment of its people, and these activities shall constitute essential facets of the project.

Local labour is to be used and the employment of such labour is to be done in conjunction with the PLC. The PLC has formed a Labour Committee who shall assist the Contractor with the recruitment of local labourers to ensure an equal distribution of people employed between the various Amakosi in the area.

6.1 Labour-intensive construction methods

Labour-intensive construction shall mean the economically efficient employment of as great a portion of local labour as is technically feasible to produce a standard of construction as demanded by the specifications with completion by the Due Completion Date, where local labour is the primary resource, supported by plant for activities that cannot be carried out feasibly by labour only.

Labour-intensive construction activities are to be planned as task-based work as a general rule. A task means a fixed quantity of work, to be performed to a clearly defined quality. Task-based work means work in which a worker is paid a fixed rate for performing a task, which is clearly defined in terms of quantity and quality. Typically a particular task can be completed within a working day.

Appropriate portions of the Works included in the Contract shall be carried out using labour-intensive construction methods.

Except where the use of plant is essential in order, in the opinion of the Employer's Agent, to meet the specified requirements by the Due Completion Date, or where the use of plant is essential as a result of occupational health and safety considerations, the Contractor shall use only hand tools and equipment in the construction of those portions of the Works that are required in terms of these Project Specifications to be constructed using labour-intensive construction methods.

Such portions of the Works shall be constructed utilizing only the local labour of the Contractor and/or the local labour of subcontractors, supplemented by the Contractor's key personnel to the extent necessary and unavoidable, unless otherwise instructed by the Employer's Agent and in accordance with the further provisions of the relevant sections of Part B of the Project Specifications.

Subject to considerations of occupational health and safety, and subject to the nature of the in situ materials being such that they can be excavated efficiently by hand, the portions of the Works to be carried out under supervision using labour-intensive construction methods, designated as LI items in the bill of quantities, include, but are not limited to, the following:

- Erection of the contractor's and engineer's site establishment facilities;
- Provision of domestic services at the site establishment facilities;
- Provision of flagmen and labour for erecting traffic accommodation facilities;
- Clearing of the Site;
- Excavation for structures and open drains up to 1,5 m deep where the depth of the water table permits such excavation to be carried out safely, and the subsequent backfilling thereof;
- Bedding, selected fill, backfilling and compaction of all trenches for prefabricated culverts irrespective of depth, but assisted by mechanical compaction equipment in order to achieve the specified densities;
- Transportation and spoiling of all trench materials, where the disposal site is located within 20 metres of the source;
- Mixing and placing of concrete for valve chambers, scour valve chambers, air valve chambers and anchor thrust blocks;
- Construction of all brickwork required;
- Erection of false work and formwork;
- Fixing of reinforcement;
- Spreading of offloaded earthworks materials to the extent scheduled;
- Excavation for and construction of stone pitching, and subsequent backfilling;
- Excavation for and construction of gabion boxes and mattresses, and subsequent backfilling;
- Dismantling / erection of fences;
- Spreading of topsoil;
- Planting of grass cuttings, grass sodding and hand sowing of grass seeds; and
- Cleaning and tidying up of the Site.

In respect of those portions of the Works which are not listed above, the construction methods adopted and the plant utilized shall be at the discretion of the Contractor, provided always that the construction methods

adopted and the plant utilized by the Contractor are appropriate in respect of the nature of the Works to be executed and the standards to be achieved in terms of the Contract.

7. MATERIAL SOURCES, SPOIL AND STOCKPILE AREAS

Where possible, the contractor shall source material from within 0.1km.

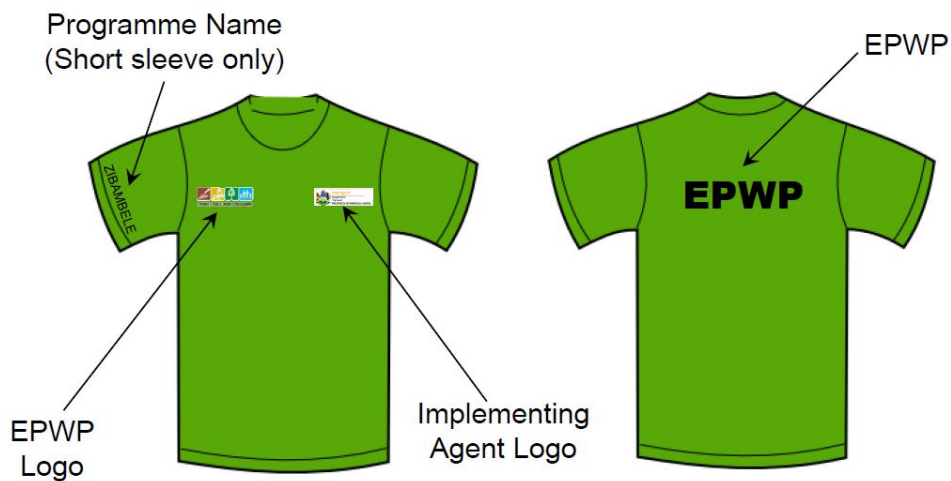
Expanded Public Works Programme:

PPE BRANDING

For EPWP Projects

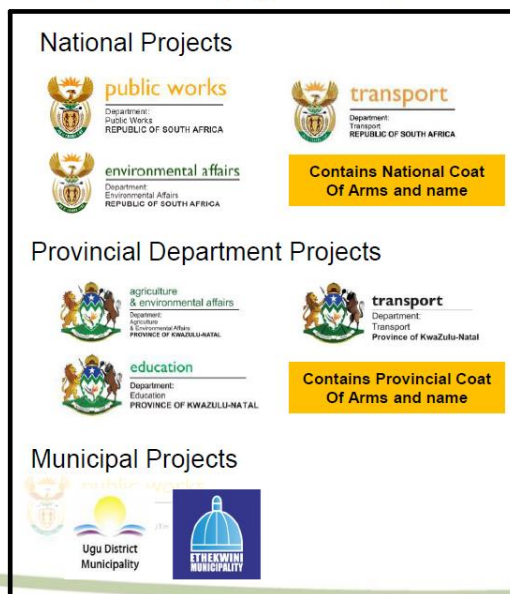


T-Shirt/Overall/Safety Vest Branding



Logo Options

Implementing Agent Examples



PLEASE VERIFY WHICH LOGO NEEDS TO USED

EPWP LOGO



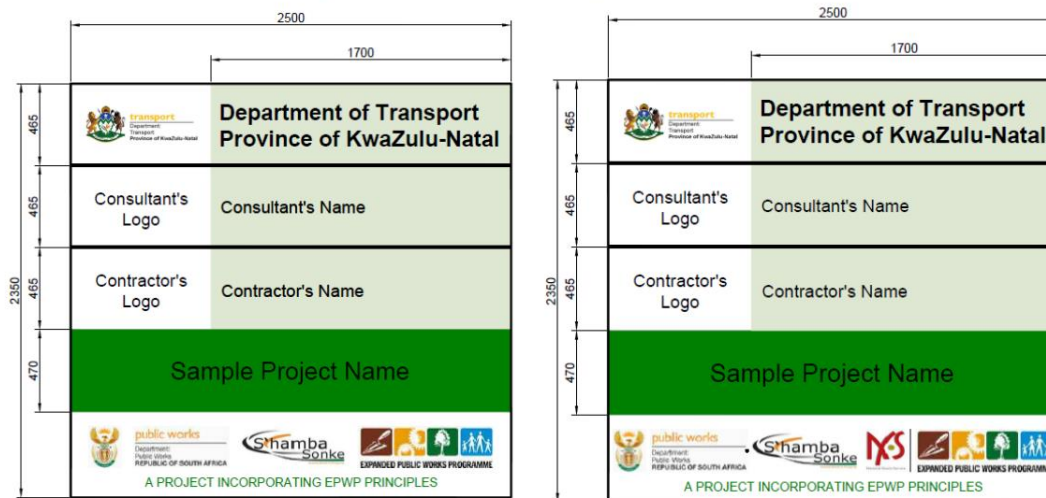
Printing on PPE

PPE (Overalls) shall be Pantone Green with/without reflective tape and shall be branded as follows:

- Implementer's Logo (printed or embroidered) on the left front pocket location ie over the heart position. (full colour)
- EPWP logo on the right front pocket (printed or embroidered) location (full colour)
- The letters EPWP on the back of the PPE in BLACK
- The program name eg Vuk'uphile is to be printed on the right sleeve of short sleeved apparel and need not be placed on long sleeved apparel.
- Where required, lime green safety vests are to be branded with similar specification above. In this instance the Overalls may not necessarily be branded provided that the use of high visibility vests is mandatory.
- All artwork and PPE samples shall be approved and signed off by the consultant prior to printing/embroidering.



Project Signboard



For further information contact:

Petronella Sithebe

Petronella.Sithebe@Kzntransport.gov.za

033-355-8023



PRO FORMA EPWP CONTRACT OF EMPLOYMENT

Contractor's
Logo



EXPANDED PUBLIC WORKS PROGRAMME

This contract must be read in conjunction with the standard terms and conditions of employment on EPWP attached herein.

EPWP CONTRACT OF EMPLOYMENT between

Employer Details

Name	Click or tap here to enter text.	Address	Click or tap here to enter text.
Telephone	Click or tap here to enter text.		
Email	Click or tap here to enter text.		
Contact	Click or tap here to enter text.		

And

Employee Details

Name	Click or tap here to enter text.	Surname	Click or tap here to enter text.
ID:	Click or tap here to enter text.	Cell	Click or tap here to enter text.
Sex (M/F)	Male ☐ Female ☐	Disability	Yes ☐ No ☐
Primary Language	Click or tap here to enter text.	Physical Address	Click or tap here to enter text.
Other Languages	Click or tap here to enter text.		
Highest Education Level Achieved	Click or tap here to enter text.	Local Municipality	Click or tap here to enter text.
Other qualifications	Click or tap here to enter text.	Ward	Click or tap here to enter text.
Grant Received (Y/N)	Yes ☐ No ☐	Grant type:	

Employment Details

Name of project:	Click or tap here to enter text.		
Job Title:	Click or tap here to enter text.		
Duties:	Click or tap here to enter text.		
Contract Start Date	Click or tap here to enter text.	Contract Finish Date	Click or tap here to enter text.
The wage per task/day is:	R Click or tap here to enter text. / Hour/Day/task (Specifier to select correct rate)		

Special Conditions

You must be aware that this employment contract is a limited term contract and not a permanent job. This employment contract may be terminated for any one of the following reasons: a) The contractor does not get additional contracts from the EPWP. b) Funding for the programme in your area comes to an end. c) Underperformance: first offence – final written warning. Second offence – dismissal.	Payment a) You will be paid a fixed amount stipulated above for completing a fixed amount of work. b) The amount of work required for the agreed rate of pay will vary from task to task. You will be informed at the beginning of each task or group of tasks how much work you are expected to complete per day. c) You will only be paid for work completed. d) Payment during classroom training shall be R /day
Personal Protective Clothing will be supplied to the employee by the employer depending on the work to be performed, and will remain the property of the employee provided that the employee has worked for at least 3 months.	

Acceptance

Employer Name:	Employer Signature:	Employee Name:	Employee Signature:
Witness 1 Name:	Witness 1 Signature:	Witness 2 Name:	Witness 2 Signature:

APPENDIX E – Conditions of Service

- 1. Introduction**
 - 1.1. This document contains the standard terms and conditions for workers employed in elementary occupations on an Expanded public Works Programme (EPWP). These terms and conditions do NOT apply to persons employed in the supervision and management of an EPWP.
 - 1.2. In this document –
 - a) "department" means any department of the State, implementing agent or contractor;
 - b) "employer" means any department, implementing agency or contractor that hires workers to work in elementary occupations on an EPWP;
 - c) "worker" means any person working in an elementary occupation on an EPWP;
 - d) "elementary occupation" means any occupation involving unskilled or semi-skilled work;
 - e) "management" means any person employed by a department or implementing agency to administer or execute an EPWP;
 - f) "task" means a fixed quantity of work;
 - g) "task-based work" means work in which a worker is paid a fixed rate for performing a task;
 - h) "task-rated worker" means a worker paid on the basis of the number of tasks completed;
 - i) "time-rated worker" means a worker paid on the basis of the length of time worked.
- 2. Terms of Work**
 - 2.1. Workers on an EPWP are employed on a temporary basis.
 - 2.2. A worker may NOT be employed for longer than 24 months in any five-year cycle on an EPWP.
 - 2.3. Employment on an EPWP does not qualify as employment as a contributor for the purposes of the Unemployment Insurance Act 30 of 1966.
- 3. Normal Hours of Work**
 - 3.1. An employer may not set tasks or hours of work that require a worker to work –
 - a) more than forty hours in any week
 - i. on more than five days in any week; and
 - ii. for more than eight hours on any day.
 - 3.2. An employer and worker may agree that a worker will work four days per week. The worker may then work up to ten hours per day.
 - 3.3. A task-rated worker may not work more than a total of 55 hours in any week to complete the tasks allocated (based on a 40-hour week) to that worker.
- 4. Meal Breaks**
 - 4.1. A worker may not work for more than five hours without taking a meal break of at least thirty minutes duration.
 - 4.2. An employer and worker may agree on longer meal breaks.
 - 4.3. A worker may not work during a meal break. However, an employer may require a worker to perform duties during a meal break if those duties cannot be left unattended and cannot be performed by another worker. An employer must take reasonable steps to ensure that a worker is relieved of his or her duties during the meal break.
 - 4.4. A worker is not entitled to payment for the period of a meal break. However, a worker who is paid on the basis of time worked must be paid if the worker is required to work or to be available for work during the meal break.
- 5. Special Conditions for Security Guards**
 - 5.1. A security guard may work up to 55 hours per week and up to eleven hours per day.
 - 5.2. A security guard who works more than ten hours per day must have a meal break of at least one hour or two breaks of at least 30 minutes each.
- 6. Daily Rest Period**

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

Every worker must have two days off every week. A worker may only work on their day off to perform work which must be done without delay and cannot be performed by workers during their ordinary hours of work ("emergency work").
- 8. Work on Sundays and Public Holidays**
 - 8.1. A worker may only work on a Sunday or public holiday to perform emergency or security work.
 - 8.2. Work on Sundays is paid at the ordinary rate of pay.
 - 8.3. A task-rated worker who works on a public holiday must be paid –
 - a) the worker's daily task rate, if the worker works for less than four hours;
 - b) double the worker's daily task rate, if the worker works for more than four hours.
 - 8.4. A time-rated worker who works on a public holiday must be paid –
 - a) the worker's daily rate of pay, if the worker works for less than four hours on the public holiday;
 - b) double the worker's daily rate of pay, if the worker works for more than four hours on the public holiday.
- 9. Sick Leave**
 - 9.1. Only workers who work four or more days per week have the right to claim sick-pay in terms of this clause.
 - 9.2. A worker who is unable to work on account of illness or injury is entitled to claim one day's paid sick leave for every full month that the worker has worked in terms of a contract.
 - 9.3. A worker may accumulate a maximum of twelve days' sick leave in a year.
 - 9.4. Accumulated sick-leave may not be transferred from one contract to another contract.
 - 9.5. An employer must pay a task-rated worker the worker's daily task rate for a day's sick leave.
 - 9.6. An employer must pay a time-rated worker the worker's daily rate of pay for a day's sick leave.
 - 9.7. An employer must pay a worker sick pay on the worker's usual payday.
 - 9.8. Before paying sick-pay, an employer may require a worker to produce a certificate stating that the worker was unable to work on account of sickness or injury if the worker is –
 - a) absent from work for more than two consecutive days; or
 - b) absent from work on more than two occasions in any eight-week period.
 - 9.9. A medical certificate must be issued and signed by a medical practitioner, a qualified nurse or a clinic staff member authorised to issue medical certificates indicating the duration and reason for incapacity.
 - 9.10. A worker is not entitled to paid sick-leave for a work-related injury or occupational disease for which the worker can claim compensation under the Compensation for Occupational Injuries and Diseases Act.

Employer	Employee

10. Maternity Leave

- 10.1. A worker may take up to four consecutive months' unpaid maternity leave.
- 10.2. A worker is not entitled to any payment or employment-related benefits during maternity leave.
- 10.3. A worker must give her employer reasonable notice of when she will start maternity leave and when she will return to work.
- 10.4. A worker is not required to take the full period of maternity leave. However, a worker may not work for four weeks before the expected date of birth of her child or for six weeks after the birth of her child, unless a medical practitioner, midwife or qualified nurse certifies that she is fit to do so.
- 10.5. A worker may begin maternity leave –
- four weeks before the expected date of birth; or
 - on an earlier date –
- if a medical practitioner, midwife or certified nurse certifies that it is necessary for the health of the worker or that of her unborn child; or
 - if agreed to between employer and worker; or
 - on a later date, if a medical practitioner, midwife or certified nurse has certified that the worker is able to continue to work without endangering her health.
- 10.6. A worker who has a miscarriage during the third trimester of pregnancy or bears a stillborn child may take maternity leave for up to six weeks after the miscarriage or stillbirth.
- 10.7. A worker who returns to work after maternity leave, has the right to start a new cycle of twenty-four months employment, unless the EPWP on which she was employed has ended.

11. Family responsibility leave

- 11.1. Workers, who work for at least four days per week, are entitled to three days paid family responsibility leave each year in the following circumstances –
- when the employee's child is born;
 - when the employee's child is sick;
 - in the event of a death of –
- the employee's spouse or life partner;
 - the employee's parent, adoptive parent, grandparent, child, adopted child, grandchild or sibling.

12. Statement of Conditions

- 12.1. An employer must give a worker a statement containing the following details at the start of employment –
- the employer's name and address and the name of the EPWP;
 - the tasks or job that the worker is to perform; and
 - the period for which the worker is hired or, if this is not certain, the expected duration of the contract;
 - the worker's rate of pay and how this is to be calculated;
 - the training that the worker will receive during the EPWP.
- 12.2. An employer must ensure that these terms are explained in a suitable language to any employee who is unable to read the statement.
- 12.3. An employer must supply each worker with a copy of these conditions of employment.

13. Keeping Records

- 13.1. Every employer must keep a written record of at least the following –
- the worker's name and position;
 - in the case of a task-rated worker, the number of tasks completed by the worker;
 - in the case of a time-rated worker, the time worked by the worker;
 - payments made to each worker.
- 13.2. The employer must keep this record for a period of at least three years after the completion of the EPWP.

14. Payment

- 14.1. An employer must pay all wages at least monthly in cash or by cheque or into a bank account.
- 14.2. A task-rated worker will only be paid for tasks that have been completed.
- 14.3. An employer must pay a task-rated worker within five weeks of the work being completed and the work having been approved by the manager or the contractor having submitted an invoice to the employer.
- 14.4. A time-rated worker will be paid at the end of each month.
- 14.5. Payment must be made in cash, by cheque or by direct deposit into a bank account designated by the worker.
- 14.6. Payment in cash or by cheque must take place –
- at the workplace or at a place agreed to by the worker;
 - during the worker's working hours or within fifteen minutes of the start or finish of work;
 - in a sealed envelope which becomes the property of the worker.
- 14.7. An employer must give a worker the following information in writing –
- the period for which payment is made;
 - the numbers of tasks completed or hours worked;
 - the worker's earnings;
 - any money deducted from the payment;
 - the actual amount paid to the worker.
- 14.8. If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it.
- 14.9. If a worker's employment is terminated, the employer must pay all monies owing to that worker within one month of the termination of employment.

15. Deductions

- 15.1. An employer may not deduct money from a worker's payment unless the deduction is required in terms of a law.
- 15.2. An employer must deduct and pay to the SA Revenue Services any income tax that the worker is required to pay.
- 15.3. An employer who deducts money from a worker's pay for payment to another person must pay the money to that person within the time period and other requirements specified in the agreement law, court order or arbitration award concerned.
- 15.4. An employer may not require or allow a worker to –
- repay any payment except an overpayment previously made by the employer by mistake;
 - state that the worker received a greater amount of money than the employer actually paid to the worker; or
 - pay the employer or any other person for having been employed.

16. Health and Safety

- 16.1. Employers must take all reasonable steps to ensure that the working environment is healthy and safe.
- 16.2. A worker must –
- work in a way that does not endanger his/her health and safety or that of any other person;
 - obey any health and safety instruction;
 - obey all health and safety rules of the EPWP;
 - use any personal protective equipment or clothing issued by the employer;
 - report any accident, near-miss incident or dangerous behaviour by another person to their employer or manager.

17. Compensation for Injuries and Diseases

Employer	Employee

- 17.1. It is the responsibility of the employers (other than a contractor) to arrange for all persons employed on an EPWP to be covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993.
- 17.2. A worker must report any work-related injury or occupational disease to their employer or manager.
- 17.3. The employer must report the accident or disease to the Compensation Commissioner.
- 17.4. An employer must pay a worker who is unable to work because of an injury caused by an accident at work 75% of their earnings for up to three months. The employer will be refunded this amount by the Compensation Commissioner. This does NOT apply to injuries caused by accidents outside the workplace such as road accidents or accidents at home.

18. Termination

- 18.1. The employer may terminate the employment of a worker for good cause after following a fair procedure.
- 18.2. A worker will not receive severance pay on termination.
- 18.3. A worker is not required to give notice to terminate employment. However, a worker who wishes to resign should advise the employer in advance to allow the employer to find a replacement.
- 18.4. A worker who is absent for more than three consecutive days without informing the employer of an intention to return to work will have terminated the contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period.
- 18.5. A worker who does not attend required training events, without good reason, will have terminated the contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period.

19. Certificate of Service

- 19.1. On termination of employment, a worker is entitled to a certificate stating –
 - a) the worker's full name;
 - b) the name and address of the employer;
 - c) the EPWP on which the worker worked;
 - d) the work performed by the worker;
 - e) any training received by the worker as part of the EPWP;
 - f) the period for which the worker worked on the EPWP;
 - g) any other information agreed on by the employer and worker.Either party can terminate this agreement with four weeks written notice. In the case where an employee is illiterate notice may be given by that employee verbally.

Employer	Employee

EPWP DATA COLLECTION TOOL TEMPLATE
(PRO FORMAS OF MICROSOFT EXCEL SPREADSHEETS)

EPWP REGISTRATION FORM		
Field requested	Description if needed	Please complete the sections in white
Project Details		
Profile ID	<i>Generated by the system</i>	
Project Name	<i>The name of the project</i>	
Project Reference Number	<i>Contract number</i>	
Project description	<i>Full description of what is happening in the project (as per the appointment letter) and the community benefiting from the project</i>	
Duration		
Project Start Date	<i>Planned Start date of the particular contract</i>	
Project End Date	<i>Planned End date of the particular contract</i>	
Estimated Budget	<i>Overall Contract budget (excluding professional fees) for Current Financial Year</i>	
Project Location		
Province	<i>In which province is the project implemented?</i>	KZN
District Municipality	<i>Under which District Municipality does this project falls?</i>	
Local Municipality	<i>Under which Local Municipality does this project falls?</i>	
Latitude (in decimal format)	<i>Is generated by the system</i>	
Longitude (in decimal format)	<i>Is generated by the system</i>	
Project Location per site		
Locality name	<i>Where exactly is the project implemented? (Ward name)</i>	
Subplace	<i>Town / Village</i>	
Ward	<i>The project site is located in which ward?</i>	
Government facility	<i>Landmark near the project (Post office/school/clinic/library)</i>	
Spatial Data Type	<i>Geopoint (structure)/ Line (road)/ Polygon(area)</i>	
Site physical address	<i>Physical address of the site office</i>	
Public Body Details		
Public body sphere	<i>In which sphere is the project implemented? (National, Provincial or Municipal)</i>	Provincial
Reporting public body that is the project owner (and will report on the project)	<i>Which Institution or Department that owns / approved this project (Education, Health, City of Tshwane Metro etc.)</i>	KZN Department of Transport
Department in the Public body that is responsible for the project	<i>Which department /unit is responsible for this project? (e.g. Roads & storm water, Education, Community safety etc.)</i>	KZN Department of Transport
Implementing public body type	<i>In which sphere is this project implemented? (Metro,Distr,Mun, National or Provincial Dept.)</i>	Provincial
Public body that will implement the project	<i>Which institution that implements the project?</i>	KZN Department of Transport
Project Implementation		
Is this the project on the municipal IDP	Yes / No	N/A
IDP reference number allocated to the project	<i>The number reflected in your Municipal IDP document</i>	N/A
EPWP Details		
EPWP Sector	<i>The project is implemented in which sector? (Infrastructure, Environment & culture, Non-state or Social)</i>	Infrastructure
EPWP Programme	<i>The project is implemented under which programme?</i>	
EPWP Sub Programme	<i>The project is implemented under which sub-programme?</i>	

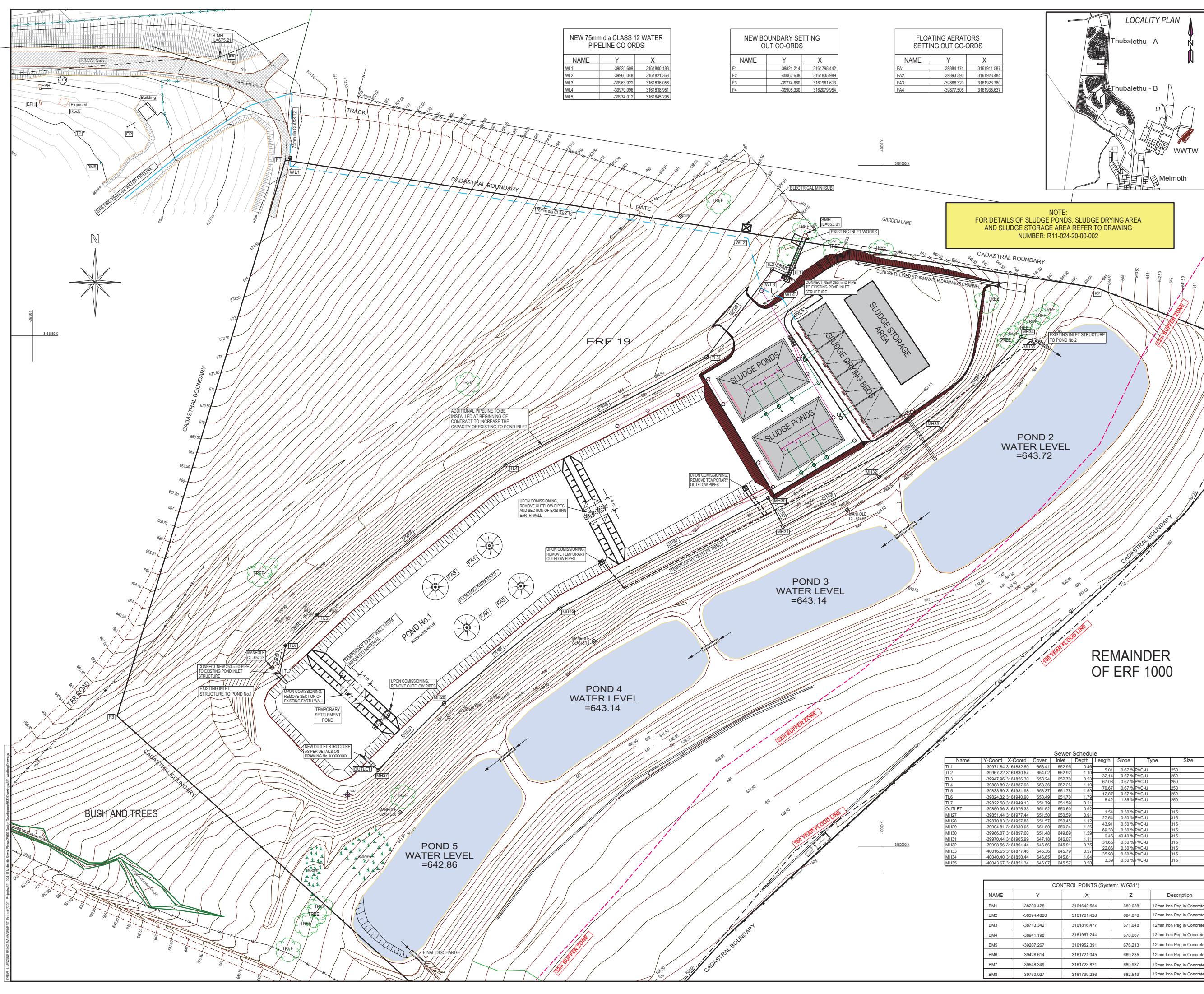
EPWP BUSINESS FORM		
Field requested	Description if needed	Please complete the sections in white
Project Details		
Profile ID	<i>Generated by the system</i>	
Project Name	<i>The name of the project</i>	
Project Reference Number	<i>Contract number</i>	
Project description	<i>Full description of what is happening in the project (as per the appointment letter) and the community benefiting from the project</i>	
Duration		
Project Start Date		
Project End Date		
Estimated Budget	<i>Project Budget</i>	
Project Location		
Province		KZN
District Municipality	<i>Under which District Municipality does this projects falls</i>	
Local Municipality	<i>Under which Local Municipality does this projects falls</i>	
Latitude (in decimal format)	<i>GPS coordinates</i>	
Longitude (in decimal format)		
Public Body Details		
Public body sphere	<i>Such as Municipal or Provincial</i>	Provincial
Reporting public body that is the project owner (and will report on the project)	<i>Which Department approved the project in (education, Health etc.)</i>	KZN Department of Transport
Department / Unit in the Public body that is responsible for the project	<i>Which Department budgeted for the project e.g. Education, Health Directorate</i>	KZN Department of Transport
Implementing public body type	<i>Example(Local Municipality, Distr. Mun or Provincial Dept.</i>	Provincial
Public body that will implement the project	<i>Infrastructure, Environment or Social</i>	KZN Department of Transport
Is this project on the Municipal IDP	<i>Municipal projects</i>	N/A
IDP reference number allocated to the project		N/A

EPWP Details

EPWP Sector	<i>The project is implemented in which sector? (Infrastructure, Environment & culture, Non-state or Social)</i>	Infrastructure
EPWP programme	<i>The project is implemented under which programme?</i>	
EPWP Sub Programme	<i>The project is implemented under which sub-programme?</i>	
Budget Amount-(Allocations for the project duration)		
Funding Body	<i>Which Dept. is funding the project</i>	KZN Department of Transport
Funding Year	<i>Financial year/s for the project</i>	
Total Budget Amount	<i>(Exclude Professional Fees)</i>	
Incentive Grant(e.g. landcare / EPWP grant)	<i>Grant funding received</i>	
Total wages paid for the duration of the projects	<i>What amount will be spent on wages during the duration of the project</i>	
Wage Rate	<i>Daily Wage rate to be paid during productive work</i>	
Stipend Rate	<i>Daily wage rate to be paid during training</i>	
UIF	<i>The amount being paid to UIF (if applicable)</i>	
COIDA	<i>The amount being paid to COIDA(if applicable)</i>	
Training	<i>What amount will be spent on training</i>	
Administration	<i>The Administration costs</i>	
Equipment and materials	<i>Budget for Materials and Equipment</i>	
Other	<i>If other where chosen describe the other Such as Professional fees)</i>	
Describe other		
Project Outputs and Training		
Planned Primary Output	<i>eg walkways, gabions, kerb * channel, km of road constructed</i>	
Description of Planned Primary Output	<i>Describe the project output (end product and not the milestone) (e.g. kms of tar road constructed) Start with the unit of measure such as number of, kms, ha, sqms etc</i>	
Unit of measure of primary output	<i>Eg. m, m², m³, km, no, ha etc</i>	
Planned primary output quantity	<i>Specify the quantity of output planned</i>	
Number of persons to be trained	<i>How many persons are targeted for on job training</i>	

Contact person

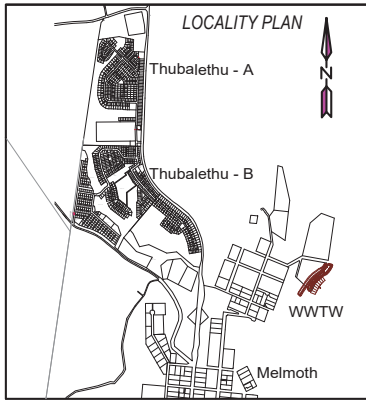
Title	<i>Person responsible for the Project in the Public Body (Project Manager)</i>	
Initials		
First Name		
Surname		
Email		
Tel (Office)		
Fax Number		
Cell Number		
Physical Address 1		
Physical Address 2		
Physical Address 3		
Physical Address 4		
Postal Address 1		
Postal Address 2		
Postal Address 3		
Postal Address 4		
Position of person		



NEW 75mm dia CLASS 12 WATER PIPELINE CO-ORDS			
NAME	Y	X	
WL1	-39825.609	3161800.188	
WL2	-39960.048	3161821.368	
WL3	-39963.922	3161836.056	
WL4	-39970.096	3161839.951	
WL5	-39974.012	3161845.295	

NEW BOUNDARY SETTING OUT CO-ORDS			
NAME	Y	X	
F1	-39824.214	3161798.442	
F2	-40062.608	3161835.989	
F3	-39774.860	3161961.613	
F4	-39965.330	3162079.954	

FLOATING AERATORS SETTING OUT CO-ORDS			
NAME	Y	X	
FA1	-39884.174	3161911.587	
FA2	-39893.390	3161923.484	
FA3	-39898.320	3161933.780	
FA4	-39877.506	3161935.637	



NOTE:
FOR DETAILS OF SLUDGE PONDS, SLUDGE DRYING AREA
AND SLUDGE STORAGE AREA REFER TO DRAWING
NUMBER: R11-024-20-00-002

NOTES:

ALL EXISTING SERVICES WHETHER INDICATED OR NOT, ON THE DRAWINGS ARE TO BE TREATED AS LIVE. THE CONTRACTOR IS TO MAKE THE NECESSARY ALLOWANCES TO DEAL WITH THE SERVICES AFFECTED BY THE PROPOSED WORKS IN ACCORDANCE WITH THE VARIOUS SERVICES AFFECTED BY THE PROPOSED WORK SO THAT THE NECESSARY ALTERATIONS CAN BE MADE TO THE DRAWINGS WITHOUT AFFECTING THE PROGRESS ON THE WORKS.

GENERAL:

1) ALL WORKMANSHIP TO BE IN ACCORDANCE WITH THE RELEVANT PROJECT SPECIFICATIONS AS INCLUDED IN THE CONTRACT DOCUMENT.

2) ALL LEVEL AND DIMENSIONS TO BE CHECKED PRIOR TO COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES ARE TO BE BROUGHT UNDER THE ATTENTION OF THE ENGINEER.

3) ALL EXISTING SERVICES TO BE LOCATED AND IDENTIFIED BY THE CONTRACTOR, PRIOR TO THE COMMENCEMENT OF WORK.

SEWER NOTES:

UPVC SEWER PIPES UNDER GROUND:-
UPVC SEWER PIPES & FITTINGS MUST BE MANUFACTURED TO SANS 1601 HEAVY DUTY PIPE STIFFNESS 400 KPA.

HDPE SEWER PIPES UNDER GROUND:-
ALL HD-PE PIPING SHALL BE MANUFACTURED TO THE LATEST SABS ISO 4427 SPECIFICATION. ALL HD-PE PIPES WILL COMPLY WITH SABS ISO 4427 (1996) PE100 OF CLASS PN12.5 UNLESS OTHERWISE INDICATED.

UPVC SEWER PIPES & FITTINGS ABOVE GROUND:-
UPVC SEWER PIPES & FITTINGS MUST BE MANUFACTURED TO SANS 967 - 1987 (WHITE).

SEWER PIPES TRENCHES BEDDING AND SEWERS
SANS 1200 DB, SANS 1200 CB, SANS 1200 CD SHALL PREVAIL. MANHOLES AND CLEANING EYES TO DETAILS. COMPACTION TO BACKFILLING OF TRENCHES CROSSING BUILDINGS 95% OF MOD. ASHTO DENSITY.

No.	Date	By	Description
A	16-11-2020	D.S.	FOR TENDER

REVISIONS
AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....



Project leader:	Signature:
Date:	

CLIENT DRAWING NUMBER:

ilifa
AFRICA ENGINEERS

PRETORIA
HARRISMITH
VANDERBIJLPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

012- 362 1473
058- 622 1297
016- 981 0591
011- 955 5334
035- 753 1083
017- 634 8895
034- 312 6464

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ASSOCIATED OFFICES:
BRITS; MTUBATUBA; NELSPRUIT; DUNDEE.

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Sewer Schedule									
Name	Y-Coord	X-Coord	Cover	Inlet	Depth	Length	Slope	Type	Size
TL1	-39971.84	3161832.50	653.41	652.98	0.40	5.01	0.67	PVC-U	250
TL2	-39967.23	3161830.57	654.02	652.92	1.10	32.14	0.67	PVC-U	250
TL3	-39947.98	3161856.30	653.24	652.70	0.53	67.03	0.67	PVC-U	250
TL4	-39888.89	3161887.98	653.36	652.26	1.10	70.67	0.67	PVC-U	250
TL5	-39853.58	3161931.98	653.37	651.78	1.59	12.87	0.67	PVC-U	250
TL6	-39824.32	3161940.98	653.48	651.70	1.79	8.42	1.35	PVC-U	250
TL7	-39822.58	3161949.13	651.79	651.59	0.21				
OUTLET	-39850.38	3161976.33	651.52	650.60	0.92	1.54	0.50	PVC-U	315
MH27	-39851.44	3161977.44	651.50	650.59	0.91	27.54	0.50	PVC-U	315
MH28	-39870.83	3161957.88	651.57	650.45	1.12	43.91	0.50	PVC-U	315
MH29	-39904.81	3161930.05	651.50	650.24	1.26	9.46	0.50	PVC-U	315
MH30	-39986.07	3161897.60	651.48	649.88	1.59	69.33	0.50	PVC-U	315
MH31	-39970.44	3161905.99	647.18	646.07	1.11	31.68	0.50	PVC-U	315
MH32	-39998.58	3161891.44	646.66	645.91	0.75	22.88	0.50	PVC-U	315
MH33	-40016.65	3161877.46	646.36	645.79	0.57	35.98	0.50	PVC-U	315
MH34	-40040.43	3161850.44	646.65	645.61	1.04	3.39	0.50	PVC-U	315
MH35	-40043.67	3161851.34	646.07	645.57	0.50				

CONTROL POINTS (System: WG31°)			
NAME	Y	X	Description
BM1	-38200.428	3161642.584	12mm Iron Peg in Concrete
BM2	-38394.4820	3161761.426	12mm Iron Peg in Concrete
BM3	-38713.342	3161816.477	12mm Iron Peg in Concrete
BM4	-38941.198	3161957.244	12mm Iron Peg in Concrete
BM5	-39207.267	3161952.391	12mm Iron Peg in Concrete
BM6	-39428.614	3161721.045	12mm Iron Peg in Concrete
BM7	-39548.349	3161723.821	12mm Iron Peg in Concrete
BM8	-39770.027	3161799.286	12mm Iron Peg in Concrete

MELMOTH SEWER UPGRADE PHASE 2

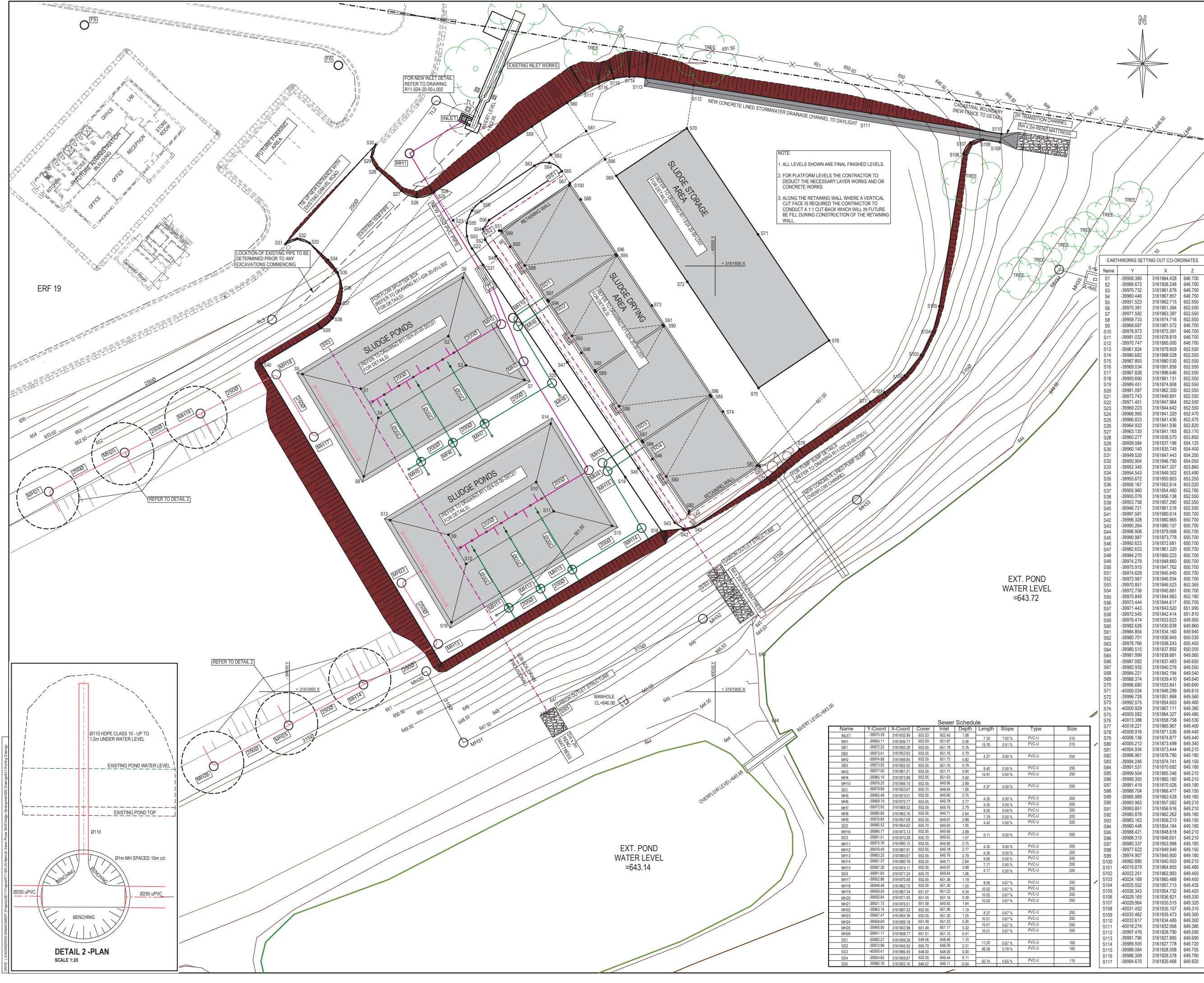
MELMOTH WWTW INTERIM UPGRADE

WWW SITE DEVELOPMENT PLAN

DATE: MAY 2020
SCALE: 1:500
SHEET No: 1 OF 1

PLAN No. R11-024-20-00-001

Rev. A



NOTE:
1. ALL LEVELS SHOWN ARE FINAL FINISHED LEVELS.
2. FOR PLATFORM LEVELS THE CONTRACTOR TO DEDUCT THE NECESSARY LAYER WORKS AND OR CONCRETE WORKS.
3. ALONG THE RETAINING WALL WHERE A VERTICAL CUT FACE IS REQUIRED THE CONTRACTOR TO CONDUCT A 1:1 CUT-BACK WHICH WILL IN FUTURE BE FILL DURING CONSTRUCTION OF THE RETAINING WALL.

EARTHWORKS SETTING OUT CO-ORDINATES			
Name	Y	X	Z
S1	-39958.385	3161864.428	646.700
S2	-39958.672	3161858.246	646.700
S3	-39970.732	3161861.676	646.700
S4	-39960.446	3161867.857	646.700
S5	-39951.523	3161862.715	652.550
S6	-39970.361	3161851.384	652.550
S7	-39977.592	3161863.387	652.550
S8	-39958.733	3161874.716	652.550
S9	-39968.687	3161881.572	646.700
S10	-39978.973	3161875.391	646.700
S11	-39981.032	3161878.819	646.700
S12	-39970.747	3161885.000	646.700
S13	-39961.824	3161879.859	652.550
S14	-39980.682	3161868.528	652.550
S15	-39987.933	3161880.530	652.550
S16	-39969.034	3161891.859	652.550
S17	-39967.828	3161896.646	652.550
S18	-39993.690	3161881.131	652.550
S19	-39989.451	3161874.808	652.550
S20	-39981.097	3161862.350	652.550
S21	-39972.743	3161849.891	652.550
S22	-39971.451	3161847.964	652.550
S23	-39969.223	3161844.642	652.550
S24	-39966.956	3161841.320	652.470
S25	-39966.823	3161841.436	652.470
S26	-39964.933	3161841.936	652.820
S27	-39963.135	3161841.155	653.170
S28	-39960.277	3161838.570	653.880
S29	-39959.584	3161837.196	654.125
S30	-39960.140	3161835.745	654.400
S31	-39949.520	3161847.443	654.250
S32	-39950.904	3161846.730	654.055
S33	-39962.345	3161847.307	653.860
S34	-39954.543	3161849.302	653.490
S35	-39955.672	3161850.803	653.255
S36	-39956.167	3161852.614	653.020
S37	-39955.960	3161854.480	652.785
S38	-39955.079	3161856.138	652.550
S39	-39953.758	3161857.290	652.550
S40	-39946.721	3161861.516	652.550
S41	-39967.581	3161886.614	650.700
S42	-39966.328	3161880.865	650.700
S43	-39955.264	3161880.157	650.700
S44	-39956.906	3161873.058	650.700
S45	-39950.987	3161873.778	650.700
S46	-39962.623	3161872.681	650.700
S47	-39982.633	3161861.320	650.700
S48	-39984.270	3161860.223	650.700
S49	-39974.279	3161848.880	650.700
S50	-39975.915	3161847.762	650.700
S51	-39974.629	3161845.845	650.700
S52	-39972.987	3161846.934	650.700
S53	-39970.851	3161846.633	652.365
S54	-39972.738	3161845.681	650.700
S55	-39970.849	3161844.963	652.180
S56	-39973.444	3161844.617	650.700
S57	-39971.443	3161843.520	651.995
S58	-39972.545	3161842.414	651.810
S59	-39978.474	3161833.623	649.950
S60	-39982.626	3161830.838	649.860
S61	-39984.854	3161834.160	649.940
S62	-39980.701	3161836.545	650.020
S63	-39978.766	3161838.243	650.450
S64	-39980.515	3161837.892	650.005
S65	-39981.999	3161838.881	649.560
S66	-39987.082	3161840.483	649.560
S67	-39982.935	3161840.276	649.550
S68	-39984.214	3161842.194	649.540
S69	-39988.374	3161839.410	649.640
S70	-39996.680	3161832.841	648.690
S71	-40005.034	3161846.289	648.610
S72	-39996.728	3161851.868	649.560
S73	-39992.575	3161854.653	649.460
S74	-40000.929	3161867.111	649.380
S75	-40005.196	3161874.877	649.440
S76	-40013.388	3161858.758	649.530
S77	-40018.221	3161865.967	649.490
S78	-40009.916	3161871.536	649.440
S79	-40006.136	3161871.877	649.440
S80	-40005.912	3161873.499	649.340
S81	-40004.934	3161873.444	649.210
S82	-39996.961	3161878.790	649.180
S83	-39994.246	3161874.741	649.150
S84	-39991.531	3161870.692	649.180
S85	-39999.504	3161865.346	649.210
S86	-39999.393	3161865.180	649.210
S87	-39991.419	3161870.526	649.180
S88	-39988.704	3161866.477	649.150
S89	-39985.989	3161862.428	649.180
S90	-39993.963	3161857.082	649.210
S91	-39993.851	3161856.916	649.210
S92	-39986.978	3161862.282	649.180
S93	-39983.163	3161858.213	649.150
S94	-39980.448	3161854.164	649.180
S95	-39988.421	3161848.818	649.210
S96	-39988.310	3161848.651	649.210
S97	-39980.337	3161853.998	649.180
S98	-39977.622	3161849.949	649.150
S99	-39974.907	3161845.900	649.180
S100	-39982.880	3161840.553	649.210
S101	-40019.979	3161864.855	649.480
S102	-40022.251	3161862.883	649.465
S103	-40024.168	3161860.468	649.450
S104	-40025.552	3161857.713	649.435
S105	-40026.343	3161854.732	649.420
S106	-40029.165	3161836.821	649.330
S107	-40029.964	3161835.515	649.320
S108	-40031.452	3161835.157	649.310
S109	-40033.462	3161835.473	649.300
S110	-40033.617	3161834.485	649.300
S111	-40018.274	3161832.068	649.380
S112	-39997.476	3161828.790	649.590
S113	-39997.796	3161827.895	649.690
S114	-39989.935	3161827.778	649.720
S115	-39988.084	3161828.008	649.755
S116	-39986.309	3161828.578	649.790
S117	-39984.670	3161829.468	649.820

EARTHWORKS GENERAL

- LEVELS INDICATED ON PLAN ARE FINAL ROAD AND FLOOR
- SLOPES TO BANKS MUST BE 1:1
- BANKS TO BE TURFED AND TO BE PLANTED WITH RUNNERS.

EARTHWORKS FOR PLATFORMS:

- REMOVE TOPSOIL TO MINIMUM OF 150mm AND TEMPORARY STOCKPILE FOR RE-USE.
- REMOVE TREES, TREE STUMPS AND ROOTS AND BACKFILL IN LAYER NOT EXCEEDING 150mm TO 93% OF MOD AASHTO DENSITY. APPROVAL MUST BE OBTAINED FROM THE ENVIRONMENTAL CONTROL OFFICER PRIOR TO REMOVAL OF ANY TREES OR VEGETATION.
- CUT TO FILL TO DESIGN LEVELS AS INDICATED. MIN COMPACTION REQUIREMENT 93% OF MOD AASHTO DENSITY.
- CUT FORM STOCKPILE, SPRED & LEVEL TOPSOIL TO BANKS, PLATFORMS AND ROAD SHOULDERS.
- SPOIL EXCESS MATERIAL TO SITE WITHIN FREE HAUL DISTANCE (1km)

LEGEND:-

- 3150 uPVC PIPELINE
- 2500 uPVC PIPELINE
- 2000 uPVC PIPELINE
- 1600 uPVC PIPELINE
- 900 HDPE PUMPING MAIN PIPELINE

No.	Date	By	Description
0	10-03-2020	D.S	FOR CONSTRUCTION

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:	DATE:

CLIENT

KING CETSHWAYO
DISTRICT MUNICIPALITY

ilifa
AFRICA ENGINEERS

PRETORIA 012-362 1473
HARRISMITH 058-622 1297
VANDERBULPARK 016-961 0591
KRUGERSDORP 011-565 5334
RICHARDSBAY 035-753 1083
SECUNDA 017-634 8895
NEWCASTLE 034-312 6464

RICHARDS BAY OFFICE,
21 Kingfish Creek,
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ASSOCIATED OFFICES:
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Designed:	D. Steenkamp	Date:		Signature:	
Drawn:	H. Jooste	Date:		Signature:	
Checked:	J. Scalliet	Date:		Signature:	

Approved: D. Steenkamp
Reg No: 2012/07011

PROJECT TITLE

MELMOTH I ES EU PGAUD2 E
GHD I E N

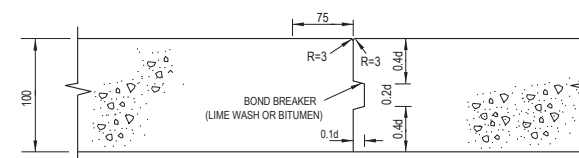
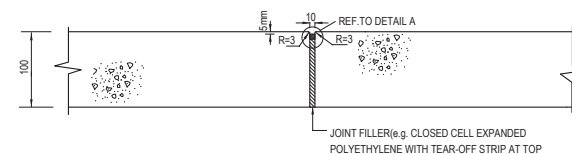
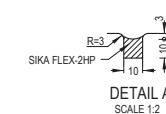
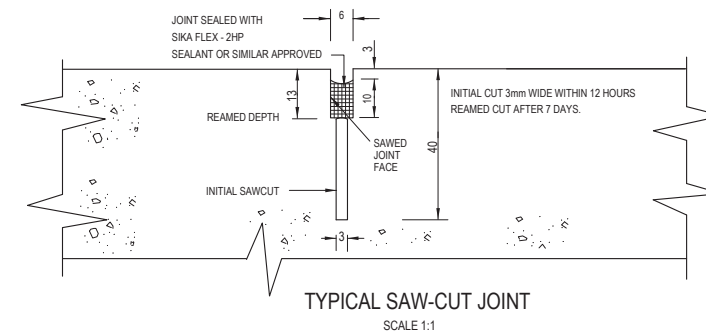
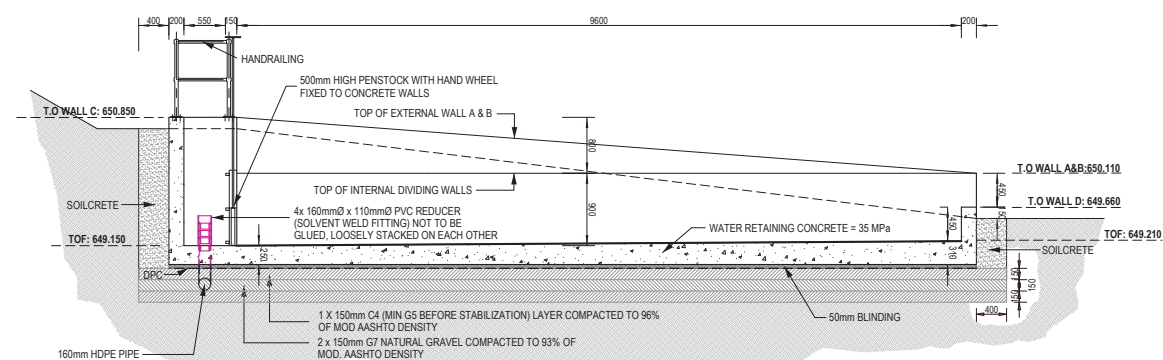
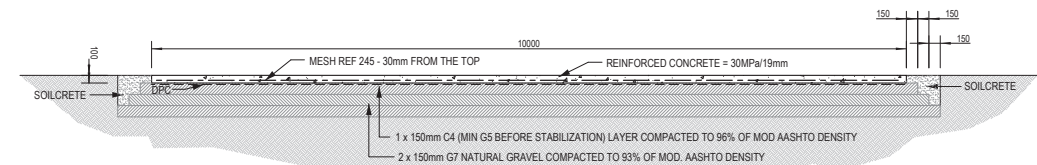
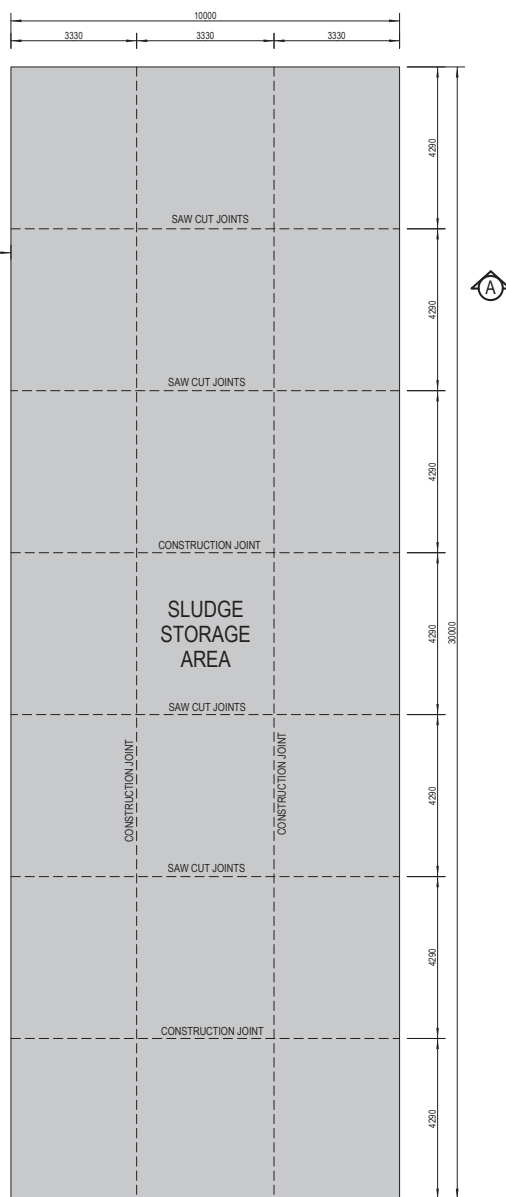
PROJECT DESCRIPTION

MELMOTH S S TS WTEUUM PGAUD2 E

DRAWING TITLE

SITE LAYOUT PLAN

DATE:	MARCH 2020	SCALE:	1:200	A1	SHEET No:	1 OF 1
CONSULTING ENG. DRAWING No:	R11-024-20-00-002	Rev				0



- ## GENERAL NOTES:
1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 30 MPa
MINIMUM CONCRETE COVER = 50mm. EXCEPT FOR
FOUNDATIONS = 50mm; WATER RETAINING = 50mm
CONCRETE SHOULD BE CURED (KEEP PERMANENTLY
WET) FOR 7 DAYS.
FLOORS ARE MAY NOT BE USED TO STORE BUILDING
MATERIALS.
NO CONCRETE MAY BE PLACED BEFORE APPROVAL
OF THE REINFORCING BY THE ENGINEER.
 2. CONCRETE REINFORCING SHALL USE ALTERNATIVE PANELS
AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE
 3. JOINT FILLER TO BE CLOSED CELL-EXPANDED
POLYETHYLENE FOAM OR SIMILAR APPROVED.
JOINT SEALANT TO BE Sika Flex-Pro 3 or Sika
Polyurethane Sealant OR SIMILAR
APPROVED.
 4. ALL CONCRETE EDGES MUST BE NOSED WITH
NOSING
 5. WOOD FLOOR FINISH.
 6. SANS 1200 GA SHAL PREVAIL WITH SPECIAL
REFERENCE TO CLAUSE 5.4 & 3
 7. CONCRETE MUST HAVE A NEAT SMOOTH EVEN
AND UNIFORM FINISH.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS	
AS BUILT DRAWINGS	
TECHNICAL CO-ORDINATOR DATE:.....	ENGINEER DATE:.....



ilifa
AFRICA ENGINEERS

PRETORIA	012-362 1473	RICHARDS BAY OFFICE,
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VANDERBIJLPARK	016-981 0591	MEERENSEE,
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SECUNDA	017-634 8895	
NEWCASTLE	034-312 6454	

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Designed :	D.Steenkamp	Date:	Signature :
Drawn :	H.Jooste	Date:	Signature :
Checked :	J. Scalliet	Date:	Signature :
Approved: D.Steenkamp Reg No.: 201270171		Date:	Signature :

PROJECT TITLE

**MELMOTH I ES EU PGAUD2 E
GHD I E N**

MELMOTH S S TS WTEUW PGAUD2E

DRAWING TITLE

SLUDGE DRYING BED LAYOUT

DATE: JULY 2018	SCALE: 1: 100 / 50	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No: R11-024-20-00-L001			Rev A



- 1. MINIMUM CONCRETE STRENGTH (28 DAYS)
- 2. REINFORCED CONCRETE = 30MPa/28mm
- 3. MASS CONCRETE = 20MPa/19mm
- 4. WATER-RETIENING CONCRETE = 35 MPa
- 5. MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR FOUNDATIONS = 50mm; WATER RETAINING = 50mm
- 6. CONCRETE SHOULD BE CURED (KEEP PERMANENTLY WET) FOR 7 DAYS
- 7. FLOORS ARE NOT TO BE USED TO STORE BUILDING MATERIALS.
- 8. NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER
- 9. JOINTS TO BE PLACED IN ALTERNATE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE
- 10. JOINT FILLER TO BE CLOSED CELL-EXPANDED POLYETHYLENE FOAM OR SIMILAR APPROVED
- 11. JOINT FILLER TO BE 100% POLYURETHANE POLYURETHANE FOAM OR SIMILAR APPROVED
- 12. ALL CONCRETE EDGES MUST BE NOTED WITH NOSE
- 13. WOOD FLOAT FINISH
- 14. SANS 1200 G4 SHALL PREVAIL WITH SPECIAL REFERENCE TO CLAUSE 5.4, 8.3
- 15. CONCRETE TO HAVE A NEAT SMOOTH EVEN & UNIFORM FINISH.

REVISIONS			
AS BUILT DRAWINGS			

	CLIENT

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[illegible]

	PROJECT DESCRIPTION

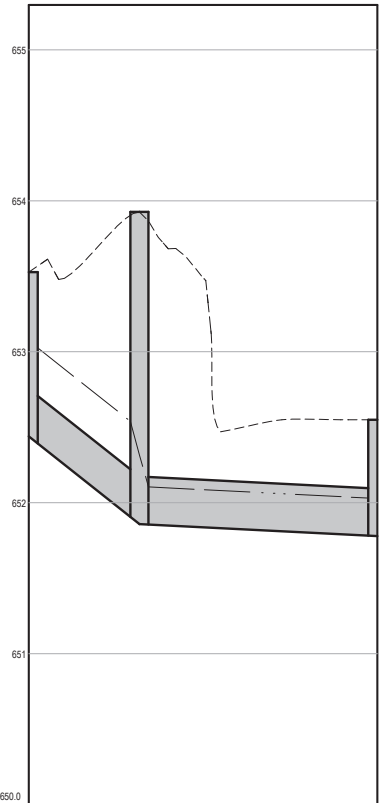
	DRAWING TITLE

PLAN No.			

CONSULTING ENG. DRAWING No:	Rev
R11-024-20-00-L002	A

INLET - SB1

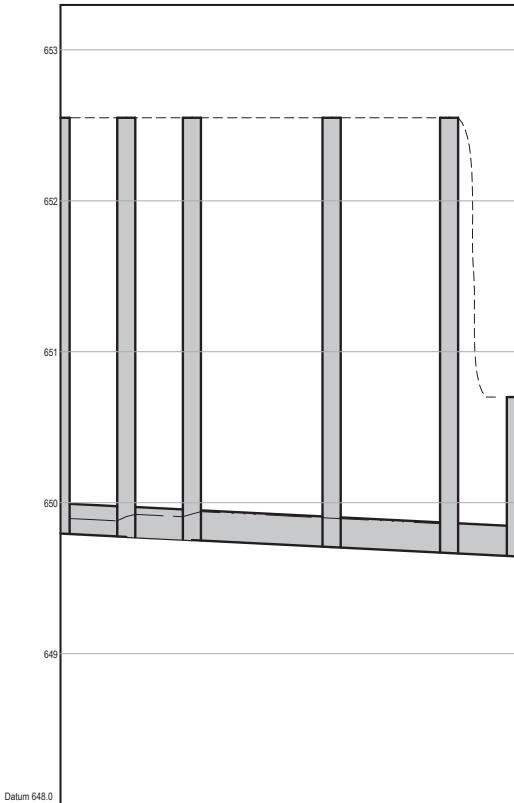
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Vertical Scale :25



Chainage	0.000	7.334	20.931
Ground Level	653.937	653.065	652.550
Manhole Name	INLET	MH1	SB1
Depth	1.031	2.061	0.755
Inlet Level / Outlet Level	652.446	651.865	651.765
Link Type / Link Size	PVC-U 315		
Length / Slope	7.334 m 1:12.623	15.757 m 1:196.962	
Design Flow	48.380 l/s	48.380 l/s	
Capacity (80% Flow)	322.878 l/s	81.739 l/s	
Velocity (Design Flow)	3.280 m/s	1.200 m/s	
Full Bore Velocity	5.220 m/s	1.320 m/s	
Hydraulic Grade	653.073	653.108	653.037

MH5 - SD2

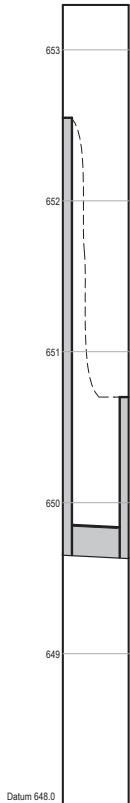
Horizontal Scale: 250
Vertical Scale :25



Chainage	0.000	4.350	8.701	17.853	25.739	30.161
Ground Level	652.950	652.950	652.950	652.950	652.950	650.700
Manhole Name	MH5	MH6	MH7	MH8	MH9	SD2
Depth	2.750	2.772	2.794	2.840	2.879	1.051
Inlet Level / Outlet Level	648.800	648.778	648.756	648.710	648.671	648.649
Link Type / Link Size	HDPE 200	HDPE 200	HDPE 200	HDPE 200	HDPE 200	HDPE 200
Length / Slope	4.350 m 1:200.000	4.351 m 1:200.000	9.252 m 1:200.000	7.786 m 1:200.000	4.422 m 1:200.000	
Design Flow	7.063 l/s	14.126 l/s	21.189 l/s	21.189 l/s	21.189 l/s	
Capacity (80% Flow)	24.029 l/s	24.029 l/s	24.029 l/s	24.029 l/s	24.029 l/s	
Velocity (Design Flow)	0.730 m/s	0.880 m/s	0.950 m/s	0.950 m/s	0.950 m/s	
Full Bore Velocity	0.970 m/s	0.970 m/s	0.970 m/s	0.970 m/s	0.970 m/s	
Hydraulic Grade	648.898	648.926	648.944	648.898	648.899	648.899

MH10 - SD1

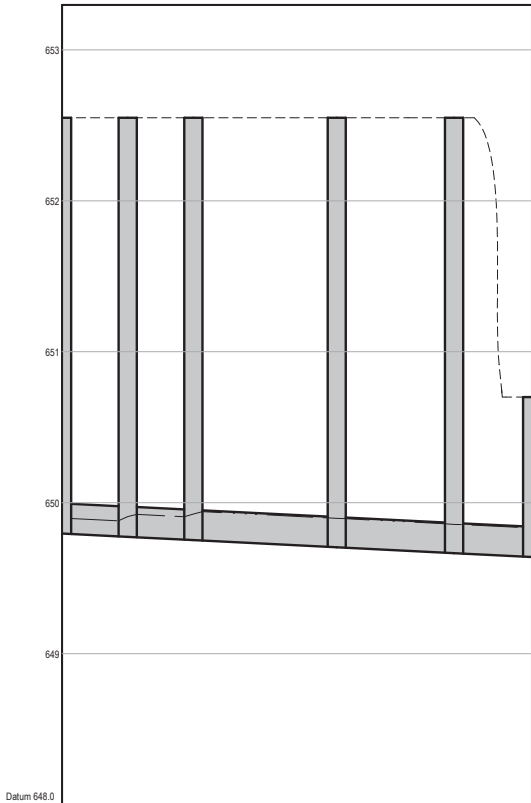
Horizontal Scale: 250
Vertical Scale :25



Chainage	0.000	4.365	
Ground Level	652.950	650.700	
Manhole Name	MH10	SD1	
Depth	2.890	1.052	
Inlet Level / Outlet Level	648.800	648.638	
Link Type / Link Size	HDPE 200		
Length / Slope	4.365 m 1:200.000		
Design Flow	21.189 l/s		
Capacity (80% Flow)	24.029 l/s		
Velocity (Design Flow)	0.950 m/s		
Full Bore Velocity	0.970 m/s		
Hydraulic Grade	648.848	648.826	

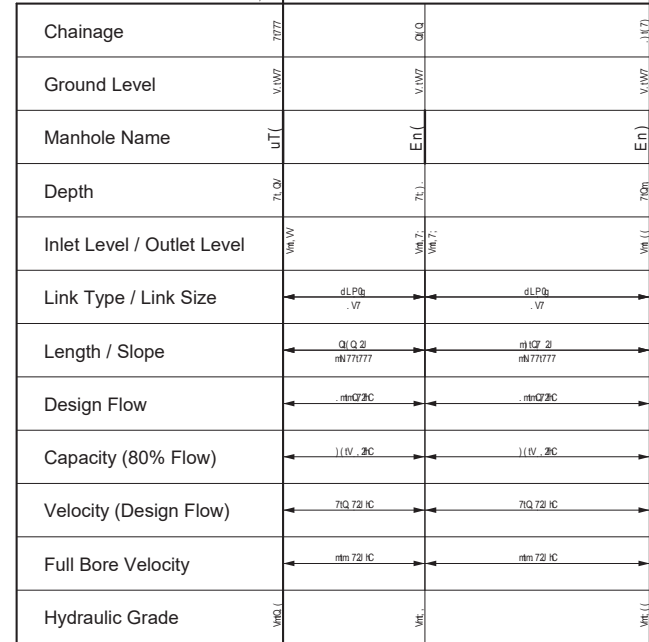
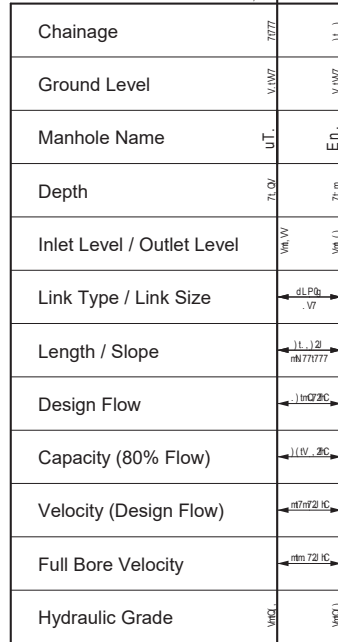
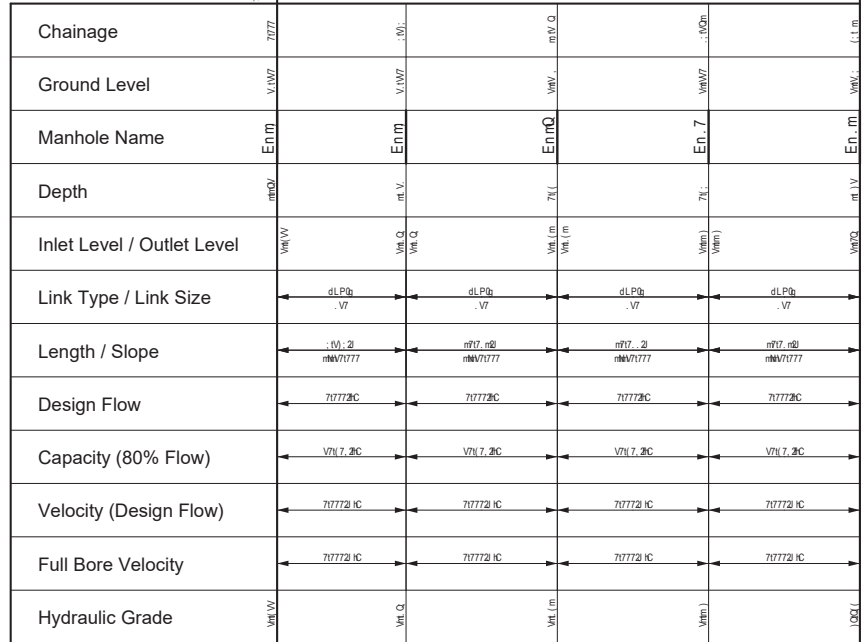
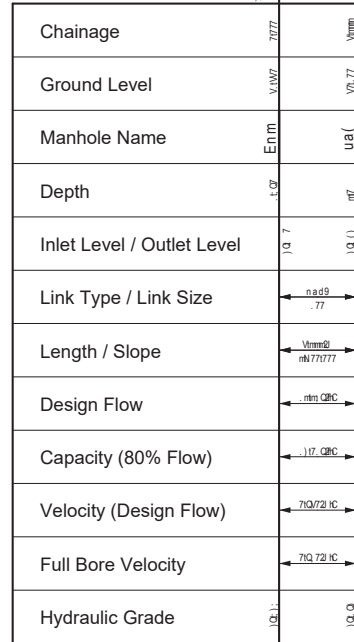
MH11 - SD4

Horizontal Scale: 250
Vertical Scale :25



Chainage	0.000	4.350	8.700	18.199	25.973	31.141
Ground Level	652.950	652.950	652.950	652.950	652.950	650.700
Manhole Name	MH11	MH12	MH13	MH14	MH15	SD4
Depth	2.750	2.772	2.793	2.841	2.890	1.056
Inlet Level / Outlet Level	648.800	648.778	648.756	648.709	648.670	648.644
Link Type / Link Size	HDPE 200	HDPE 200	HDPE 200	HDPE 200	HDPE 200	HDPE 200
Length / Slope	4.350 m 1:200.000	4.350 m 1:200.000	9.499 m 1:200.000	7.774 m 1:200.000	5.168 m 1:200.000	
Design Flow	7.063 l/s	14.126 l/s	21.189 l/s	21.189 l/s	21.189 l/s	
Capacity (80% Flow)	24.029 l/s	24.029 l/s	24.029 l/s	24.029 l/s	24.029 l/s	
Velocity (Design Flow)	0.730 m/s	0.880 m/s	0.950 m/s	0.950 m/s	0.950 m/s	
Full Bore Velocity	0.970 m/s	0.970 m/s	0.970 m/s	0.970 m/s	0.970 m/s	
Hydraulic Grade	648.898	648.926	648.944	648.897	648.898	648.894

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description
REVISIONS			
AS BUILT DRAWINGS			
TECHNICAL CO-ORDINATOR		ENGINEER	
DATE:.....		DATE:.....	
CLIENT			
 			
CLIENT APPROVAL			
Project leader:		Signature :	
Date:			
CLIENT DRAWING NUMBER:			
			
PRETORIA 012- 362 1473 HARRISMITH 056- 622 1297 VANDERSIJLPARK 016- 981 0591 KRUGERSDORP 011- 955 5334 RICHARDSBAY 035- 753 1083 SECUNDA 017- 634 8895 NEWCASTLE 034- 312 6464			
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Designed :	D. Steenkamp	Date:	Signature :
Drawn :	H. Jooste	Date:	Signature :
Checked :	J. Scalliet	Date:	Signature :
Approved: D. Steenkamp Reg No: 2012/0171		Date:	Signature :
PROJECT TITLE			
MELMOTH I ES EU PGAUD2E GHD I E N			
PROJECT DESCRIPTION			
MELMOTH S S TS RTEUW PGAUD2E			
DRAWING TITLE			
LONGSECTIONS PLAN 1 OF 6			
DATE: NOVEMBER 2020	SCALE: 1 : 250	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No: R11-024-20-00-LS01			Rev A



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REVISIONS			
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KING CETSHWAYO DISTRICT MUNICIPALITY			
PBM0326d15LB			
aAY00F1 9N			u F04N
aF9N			
PBM0326 18MHds2g ET41N			
AFRICA ENGINEERS			
PRETORIA HARRISMITH VANDERBIJLPARK KRUGERSDORP RICHARDSBAY SECONDA NEWCASTLE 7m 0 , 2h 1 7V 0 , 2m Q 7m 0Q n7V(Q) 7m0Q/V2() 7V 0 , 1 2M? 7m 0 (12 , Q/ 7V 0(m 2 ,)) RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@iifa.biz Web: www.iifa.biz			
<u>ASSOCIATED OFFICES:</u> T11bu2E3g T83g T82M24Bud1g H9Mg4D441			
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aRW 2N	H.Jooste	aF9N	u U F04N
PQDR 2N	J. Scalliet	aF9N	u U F04N
Approved: D. Steenkamp Reg No.: 201207011			
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MELMOTH I ES EU PGAUD2 E GHD I E N			
d15)4P324uP1H638d			
MELMOTH S S TS RTEUM PGAUD2 E			
a 15)4P324uP1H638d			
LONGSECTIONS PLAN 2 OF 6			
a834N	uPBMN	A1	n6 62N
DL4E4E142 7.7	r02 V7		
PLAN No.			
P50gB8B2505 11H8625N			
R11-024-20-00-LS02			
19			

Horizontal Scale: 250
Vertical Scale :25

Vina700

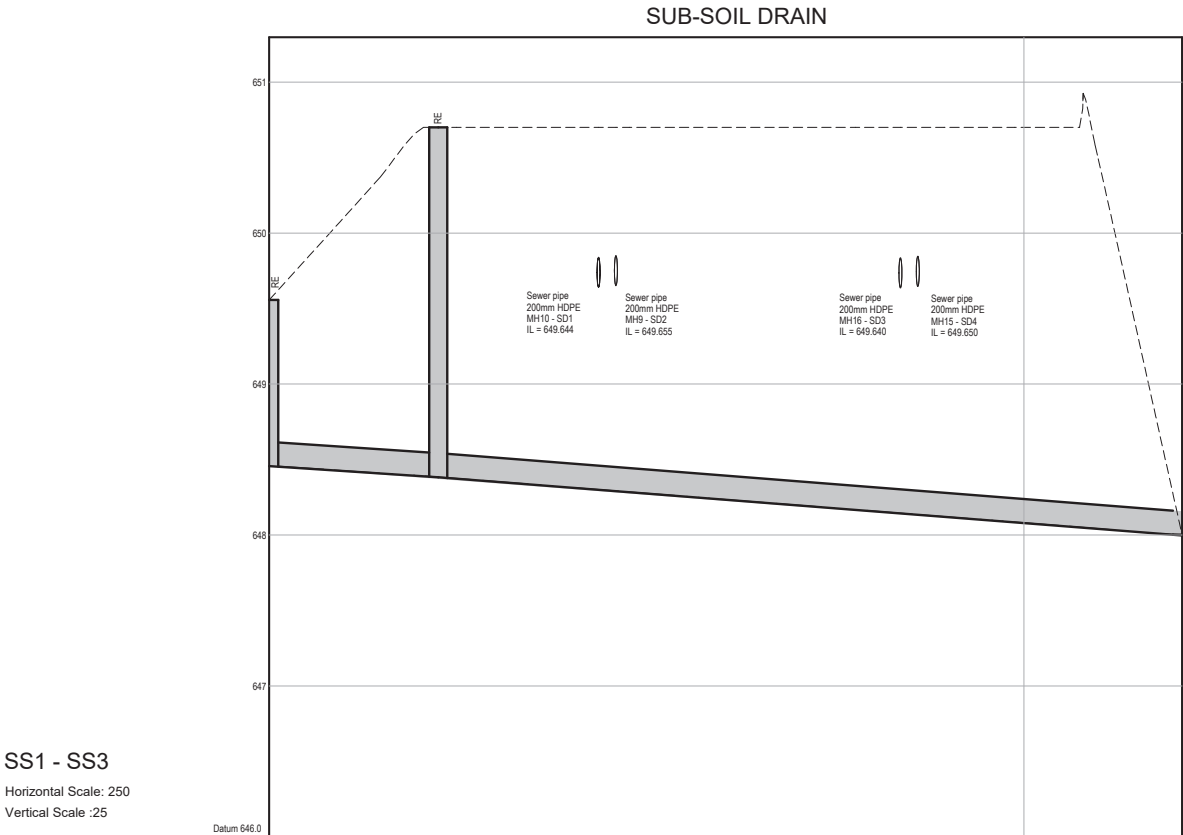
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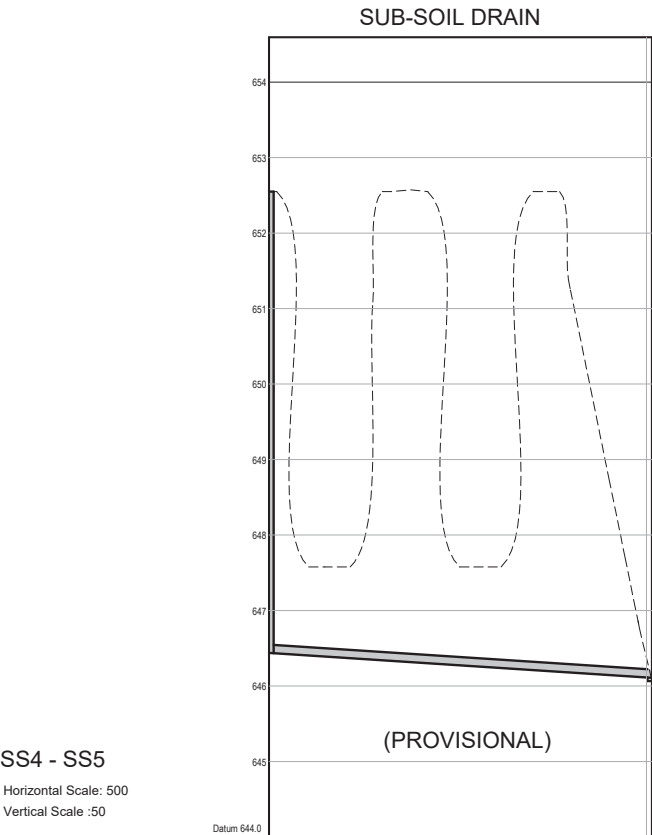
PLAN No. _____



SS1 - SS3

Horizontal Scale: 250
Vertical Scale :25

Chainage	0.000	11.200	21.820	22.970	41.820	42.970	60.480
Ground Level	648.557	650.700					648.002
Manhole Name	SS1	SS2					SS3
Depth	1.997	2.315					0.002
Inlet Level / Outlet Level	648.460	648.385	648.385				648.000
Link Type / Link Size	PVC-U 160		PVC-U 160				
Length / Slope	11.200 m 1:150.000		49.280 m 1:127.889				
Design Flow	0.000 l/s		0.000 l/s				
Capacity (80% Flow)	15.409 l/s		16.688 l/s				
Velocity (Design Flow)	0.000 m/s		0.000 m/s				
Full Bore Velocity	0.000 m/s		0.000 m/s				
Hydraulic Grade	648.460	648.385					648.000



SS4 - SS5

Horizontal Scale: 500
Vertical Scale :50

Chainage	0.000	50.737
Ground Level	652.590	646.000
Manhole Name	SS4	SS5
Depth	6.110	0.043
Inlet Level / Outlet Level	646.440	646.110
Link Type / Link Size	PVC-U 110	
Length / Slope	50.737 m 1:153.748	
Design Flow	0.000 l/s	
Capacity (80% Flow)	5.621 l/s	
Velocity (Design Flow)	0.000 m/s	
Full Bore Velocity	0.000 m/s	
Hydraulic Grade	646.440	646.110

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description
REVISIONS			

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR

DATE:.....

ENGINEER

DATE:.....



Project leader:		Signature :
Date:		
CLIENT DRAWING NUMBER:		

PRETORIA
HARRISMITH
VANDERBIJLPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

012- 362 1473
058- 622 1297
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017- 634 8895
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Checked : J.Scalliet	Date:	Signature :
Approved: D.Steenkamp Reg No: 2012/0171	Date:	Signature :

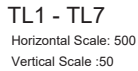
**MELMOTH I ES EU PGAUD2 E
GHDI E N**

MELMOTH S S TS RTEUW PGAUD2 E

DRAWING TITLE

LONGSECTIONS PLAN 4 OF 6

DATE: NOVEMBER 2020	SCALE: 1 : 250	A1	SHEET No: 1 OF 1
PLAN No.			Rev
CONSULTING ENG. DRAWING No: R11-024-20-00-LS04			A



TL1 - TL7
Horizontal Scale: 500
Vertical Scale :50

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O	aBbVQD	mF	I I / & TmT
sOB	m B	ey	mCpdpn

REVISIONS
OF & NVEL 3nV Ov W/GF

LTPHs WOEPI V / m&OL / mOLT	Ts GW/T/ mOLT

PEWIL

KING CETSHWAYO
 DISTRICT MUNICIPALITY

PERS/LESS / BOE Snp/3R dRC m 9C	Fign 0 RBC

PERS/Lby Ov WGB/NMeT/ C

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AFRICA ENGINEERS

PRETORIA
 HARRISMITH
 VANDERBULPARK
 KUGERSDORP
 RICHARDSBAY
 SECUNDA
 NEWCASTLE

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ASSOCIATED OFFICES:
 e/ WFSMLNeOLNeOBz TEPF/ NW/Nb/mT9

LH/Mb Ov WGB/LHT/BS / ST/ LYB / BMB/OCXIC BngnFRF: BSLY/BEB9
 Ov m&P&NTmLL B/LHT TPAWbL B / JBOCQ LWNEB BBN/ ST FT BMLHT
 Ne mT/ FLOmGB/LHOLH/HBRY Ov WGB/HCEB3 / LBH/SP1 SWWb / /
 m&SEWOL/TmBbYbYm&KbB / JMBL / BOFFTM sLB LHT/ BCO LWLF
 m&B/ FTTm&MTPLCYB / BMB/MTPLCYB / B/FTMB / BOYBbN/ ST FT
 / LHT/ &HOB/LHOLB / B/ HWBMBWBP/STP&DEYB N/ sWHTm&BmLL /
 LHTW/FLOEOLW s&BmB / B&WMLTs O/P T8 / B QN&MTs L&B / HWH&BF
 / T/ T/ F

mR/gRbB	D Stenckamp	m 9C	Fign 0 RBC
mR w&C	H Jooste	m 9C	Fign 0 RBC
Ph&R&C	J Scalliet	m 9C	Fign 0 RBC

Approved: D Stenckamp
 Reg No: 201270171

Fign 0 RBC

S/ 1 ZPL&MET

MELMOTH I ES EU PGAUD2E
GNDI E N

S/ 1 ZPL&MET

MELMOTH S S TS WRTUEN PGAUD2E

mR w&C/MET

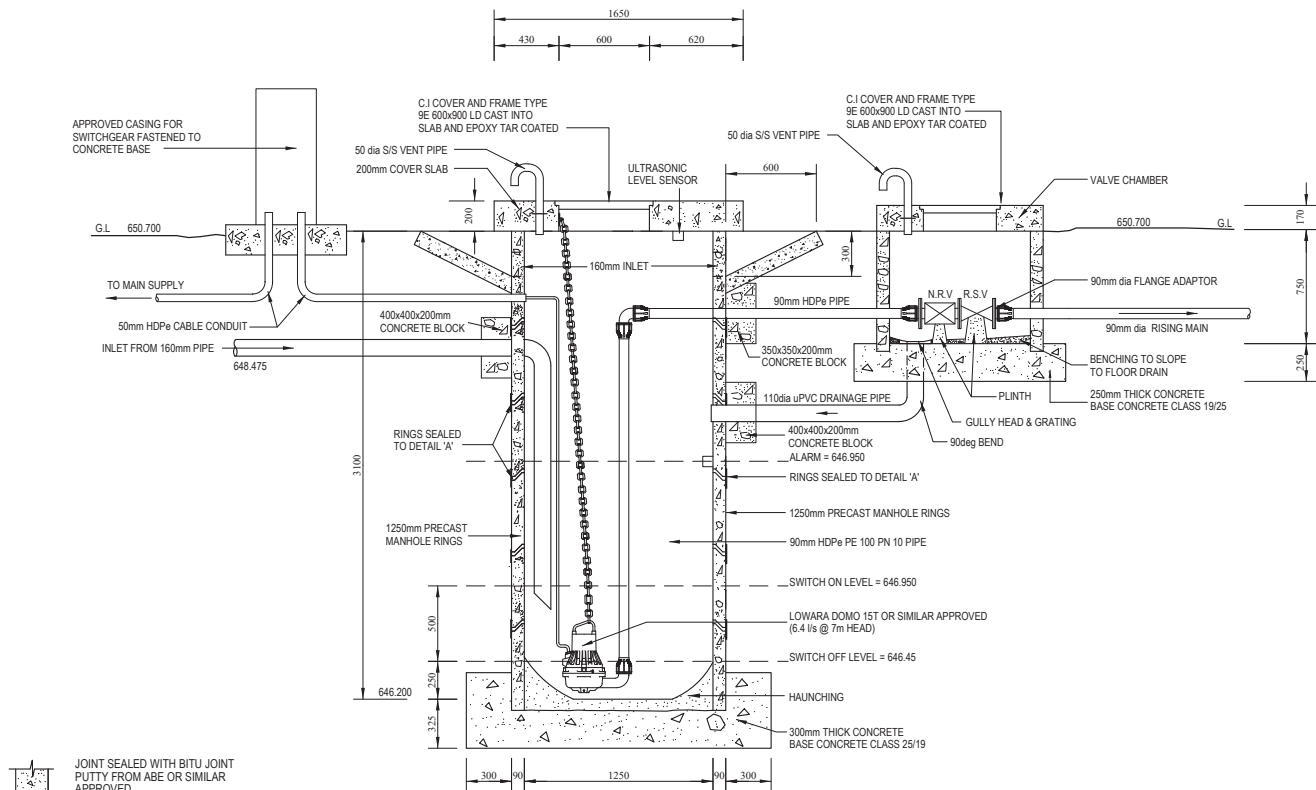
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mOLT s1 BTM&T/ BQD	FP&CT a&B TO	A1	FHTTL&c a&B /

PLAN No.

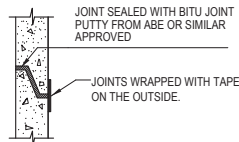
R11-024-20-00-LS00

/ R



TYPICAL SECTION OF PUMPSTATION INSTALLATION

SCALE 1:25



TYPICAL JOINT DETAIL
DETAIL A
N.T.S.

MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING					Eir
200mm Slab	2	10	Y10	1750	20	A01	35	1550					
		10		1750	20	A02	35	1550					
		16		500	32	A03	35	275					
		10		550	20	A04	35	330					
		10		750	20	A05	35	250					
		8		900	16	A06	20						
R	8	10	12	16	20	25	32	40	TOT	Date			
Y		22								Det. by			
TOT		22								Ref Dwg			
ILIFA Africa Engineers (PTY) Ltd.										Revision	0		
21 Kingfish Creek Meerensee, Richards Bay										Schedule No	1		
Tel: 035 753 1083 Fax: 035 753 1094													
http://www.ilifa.biz													

Operational requirements on the pumping system;

General;

Briefly, the sewage pump system comprises of a submersible sewer pump units, MCC panel together with isolating and non-return valves. The pump installation will be designed to run automatically. In short, the operation of the systems is foreseen as follows:

Operating instructions;

- * Gate valves in the valve chamber must be open at all times.
- * The main isolator switch on the control panel is to be on at all times unless maintenance work or other emergency necessitates shutdown.
- * AC Voltmeter should read approximately 230 Volt.
- * Pump selector switches should be in Auto. The pump should operate automatically, controlling the pump level between the two floats switches.

Sump empty level (level at or below "stop" level) If the liquid level is below the stop level the "Pump Stopped" lamps and "Low Level" lamp should be on. The pumps will not operate in Manual or Auto with the level low.

Duty level (second from bottom):

Normally the sump level will fluctuate between the two levels i.e. level rises due to infl and the duty pump operates, dropping the level.

Pump trip light:

Should this light come on it indicates the relevant pump has tripped on overload - the pump must be removed, checked for blockages, faults or other problem and replaced prior to re-setting the overload.

Ammeter & Hour Meter:

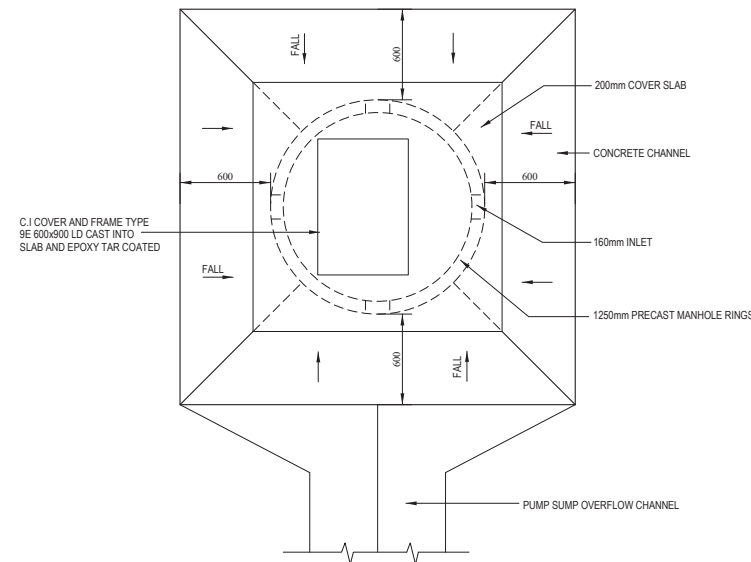
An ammeter (A) and Hour Meter (hrs) meter must be provided for the pump to indicate the electric motor load whilst in operation and operating hours.

Alarm Notification:

System must sound audible alarm when the pump is tripped or power outages occurs.

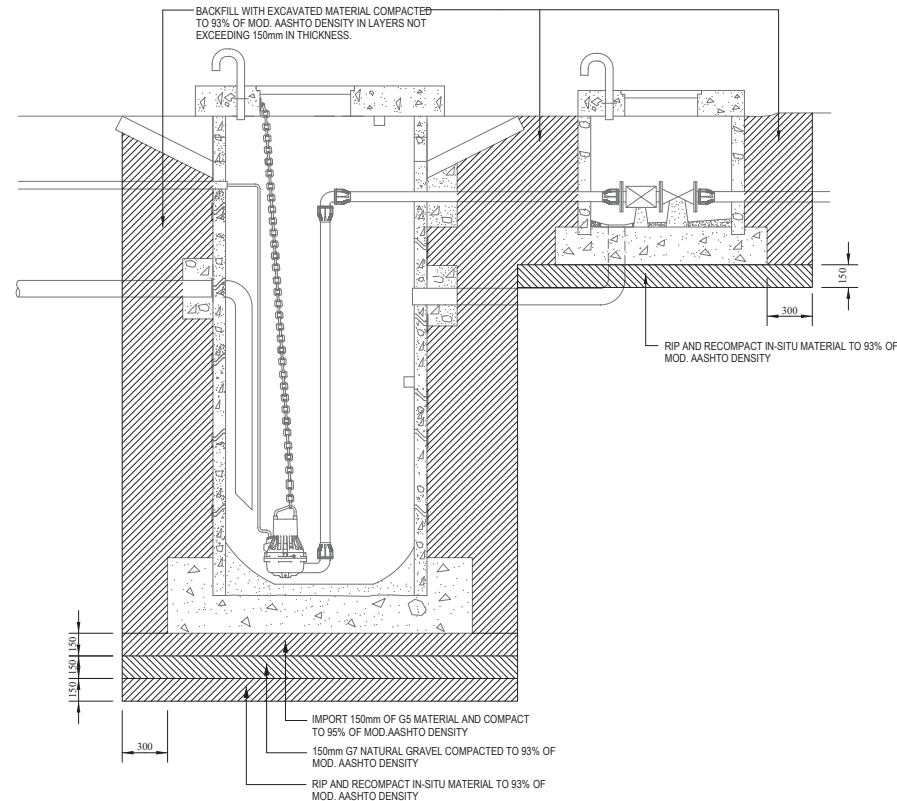
Generator Switch Over:

Control Board must provide plug and switch over switch incase of power failure.



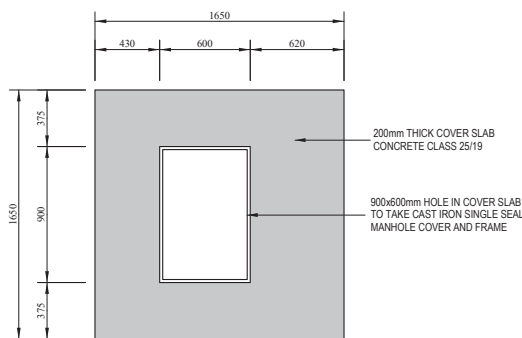
TYPICAL PLAN VIEW OF PUMPSTATION

SCALE 1:25



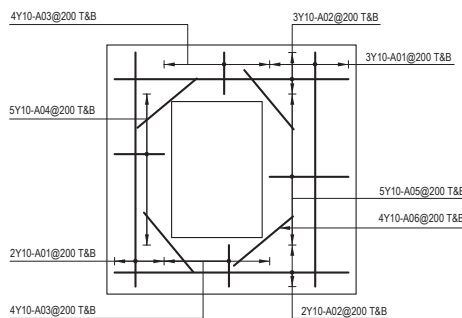
TYPICAL EARTHWORKS LAYOUT FOR PUMPSTATION

SCALE 1:25



SLAB LAYOUT FOR PUMPSTATION (2 OFF)

SCALE 1:25



REINFORCING LAYOUT FOR PUMPSTATION SLAB (2 OFF)

SCALE 1:25

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT

KING CETS HWAYO
DISTRICT MUNICIPALITY

Project leader: _____ Signature: _____

Date: _____

CLIENT DRAWING NUMBER: _____

ilifa
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KRUGERSDORP 011-955 5334
RICHARDSBAY 035-753 1083
SECUNDA 017-634 8895
NEWCASTLE 034-312 6464

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ASSOCIATED OFFICES:
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Designed : D.Steenkamp	Date:	Signature :
Drawn : H.Jooste	Date:	Signature :
Checked : J.Scalet	Date:	Signature :
Approved: D.Steenkamp	Date:	Signature :
Reg No: 2012/7011	Date:	Signature :

PROJECT TITLE

**MELMOTH I ES EU PGAUD2E
GHD I E N**

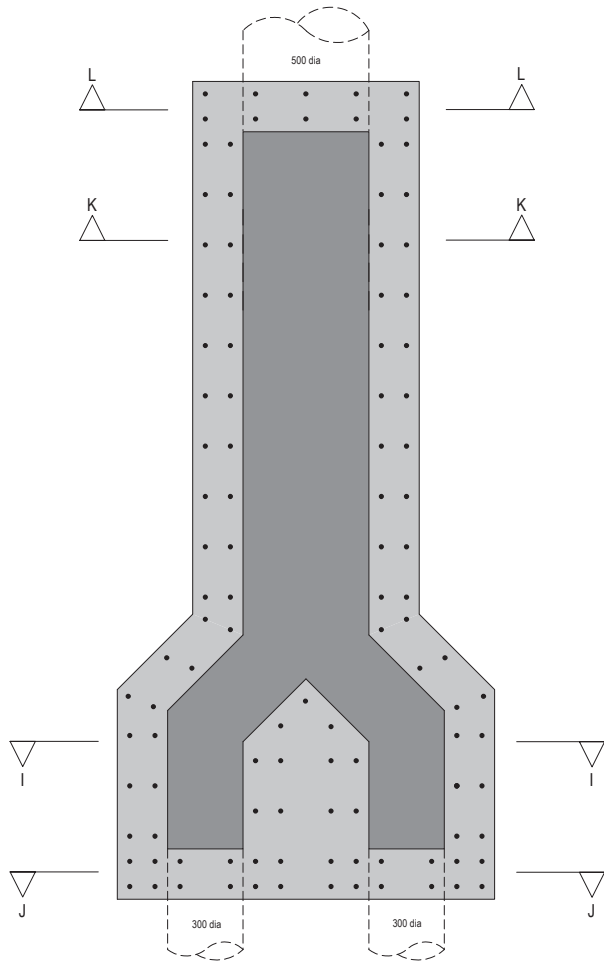
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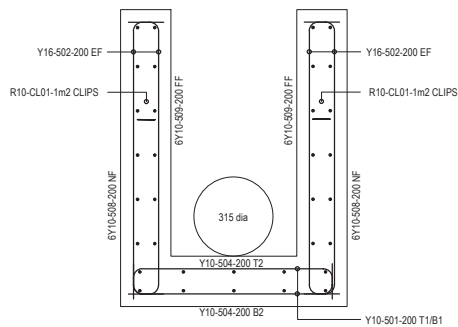
DRAWING TITLE

PUMP CHAMBER DETAIL

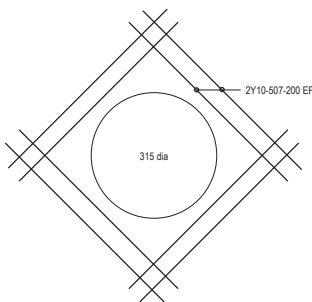
DATE: NOVEMBER 2020	SCALE: 1:25	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. Drawing No: R11-024-20-00-PS01			Rev A



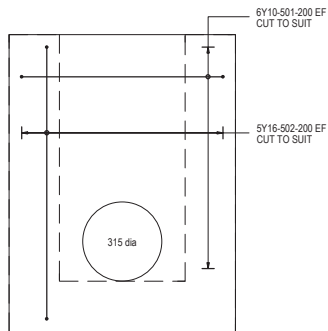
FLOW SPLITTER BOX
LAYOUT PLAN
SCALE 1:15



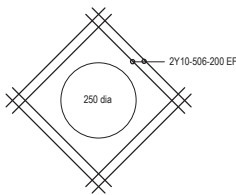
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SCALE 1:15



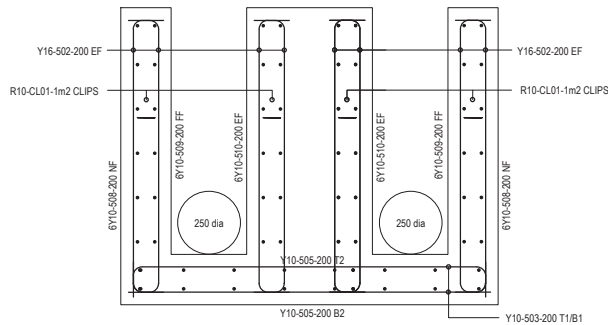
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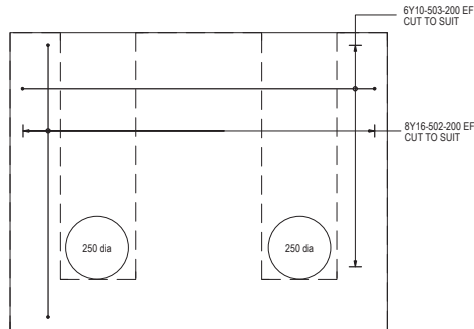
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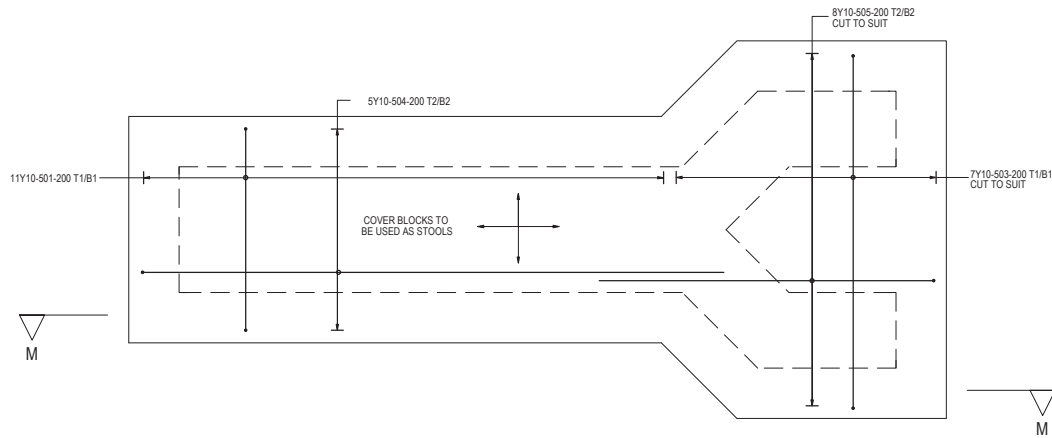
DETAIL 1



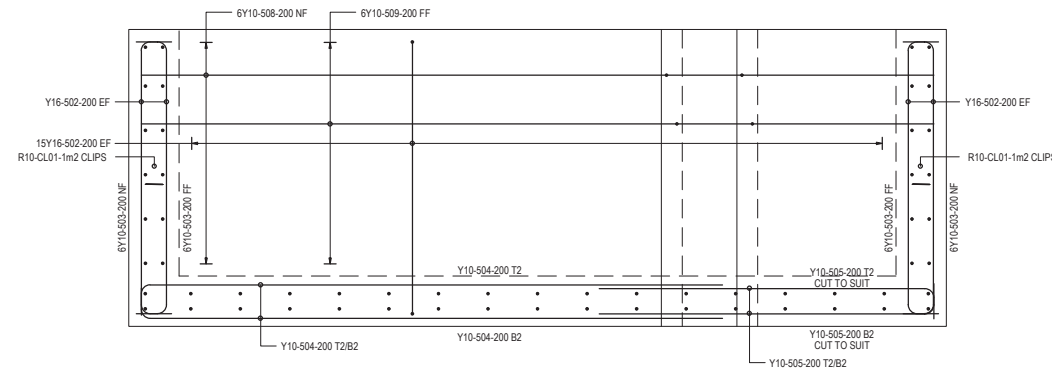
SECTION II
SCALE 1:15



SECTION JJ
SCALE 1:15



BASE REINFORCEMENT
SCALE 1:15



SECTION MM
SCALE 1:15

GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
2. MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR FOUNDATIONS = 50mm. WATER RETAINING = 40mm.
3. CONCRETE SHOULD BE CURED (KEPT PERMANENTLY WET) FOR 7 DAYS MIN.
4. FORMWORK (UNDERNEATH) FOR SLABS MUST STAY IN POSITION FOR AT LEAST 7 DAYS.
5. TEMPORARY PROPS AT SOFFIT OF SLABS MUST STAY IN POSITION FOR AT LEAST 21 DAYS. PROPS @ 1.8m c/c MAX.
6. FLOORS LABS MAY NOT BE USED TO STORE BUILDING MATERIALS.
7. NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
8. WHERE CONCRETE IS SUPPORTED BY BRICKWORK, 2 LAYERS OF PVC ON HORIZONTAL PLANE AND 10mm SOFTBOARD ON VERTICAL PLANE ARE REQUIRED.
9. LINING CONCRETE PLACED IN ALTERNATIVE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:	DATE:

CLIENT	
	
Project leader:	
Date:	
Signature:	
CLIENT DRAWING NUMBER:	



PRETORIA
HARRISMITH
VANDERBIJLPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

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058- 622 1297
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011- 955 5334
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Drawn : H. Jooste	Date:	Signature:
Checked : J. Scalliet	Date:	Signature:
Approved: D. Steenkamp	Date:	Signature:
Reg No.: 2012/0171	Date:	Signature:

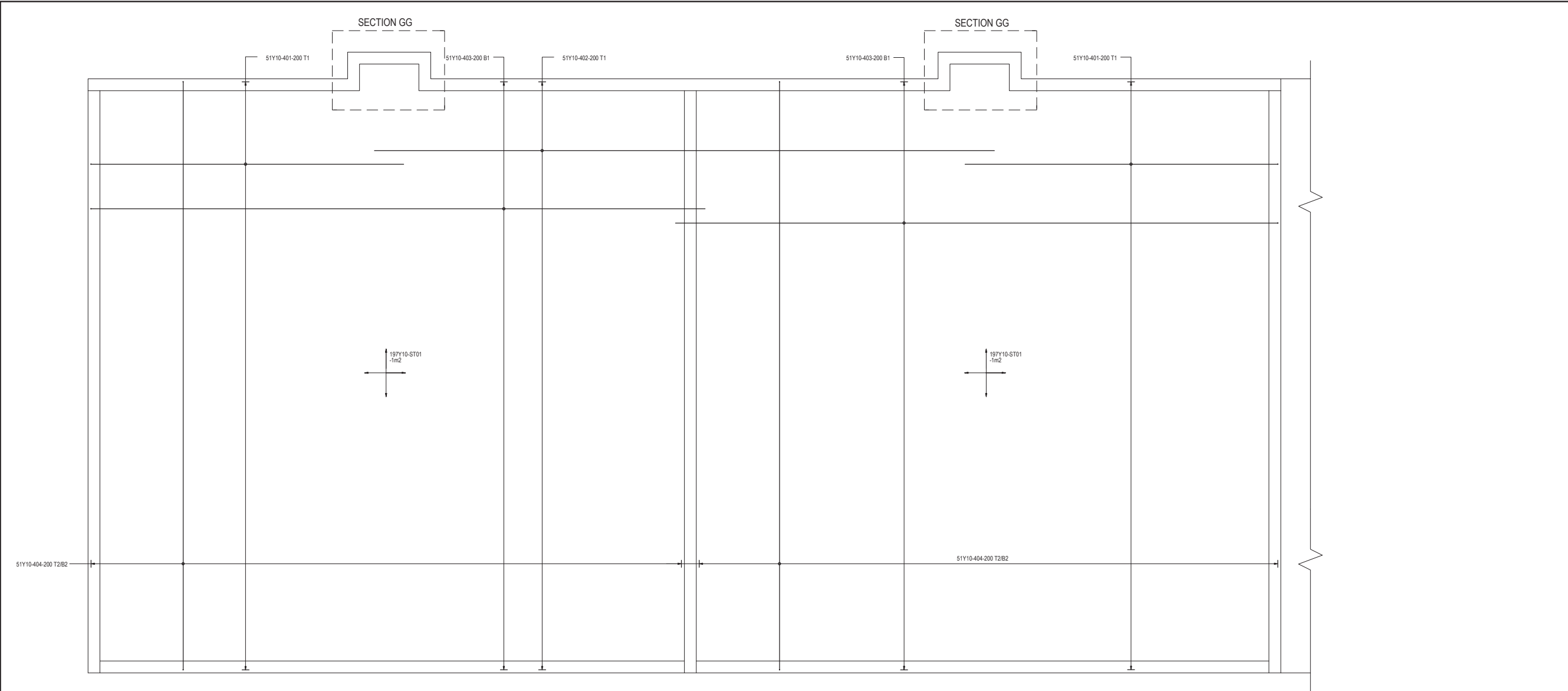
PROJECT TITLE
**MELMOTH I ES EU PGAUD2 E
GHD I E N**

PROJECT DESCRIPTION
MELMOTH S S TS WRTUUM PGAUD2 E

DRAWING TITLE
FLOW SPLITTER BOX REINFORCING

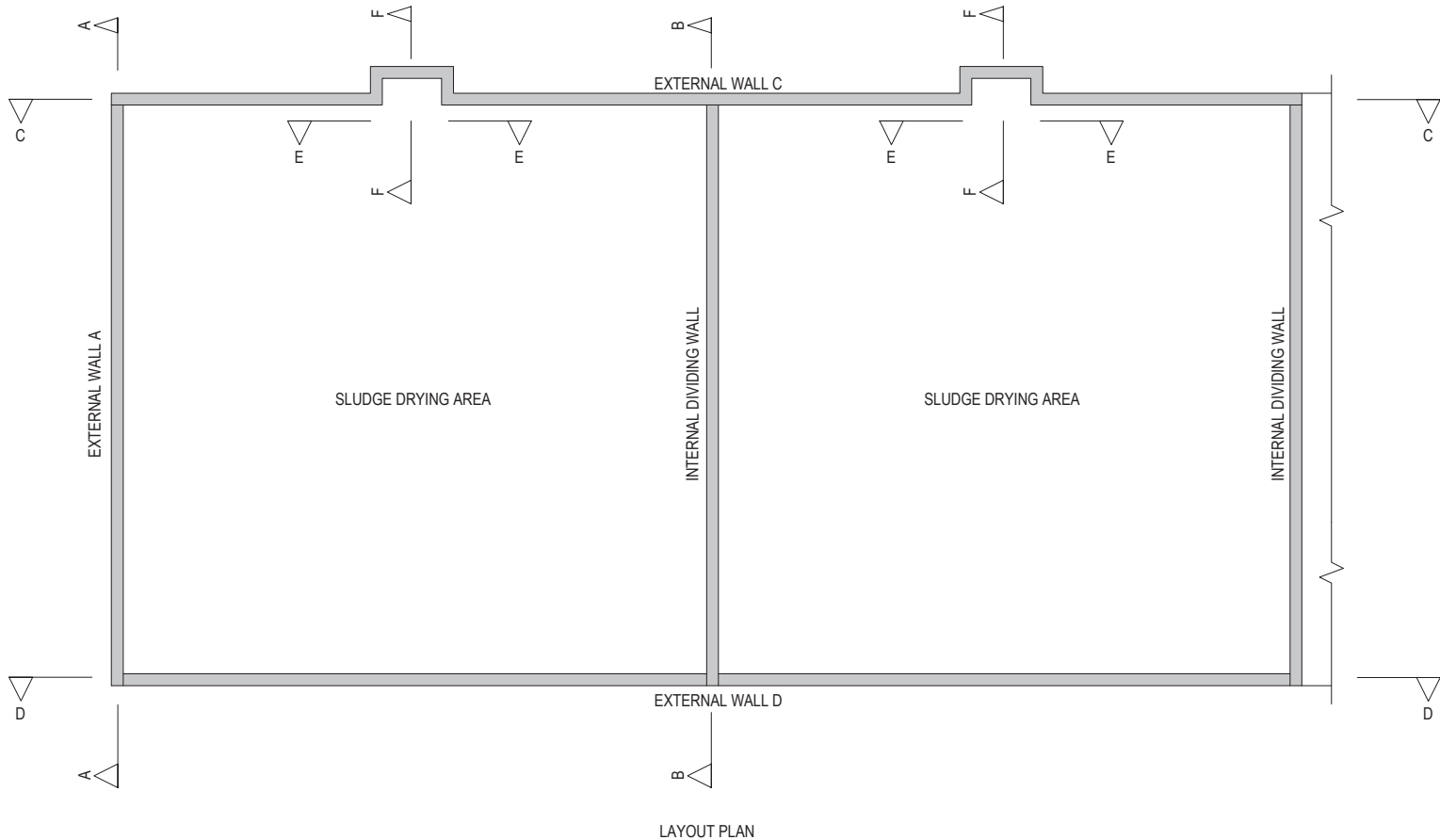
DATE NOVEMBER 2020	SCALE N.T.S	A1	SHEET No 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No. R11-024-20-00-R001			Rev A

W CTa (HKTVRTFN)	ES) Pta (JJE	A1	E2 TCOJ ca (BRAU
PLAN No.			
SH) EnFOJ, U (, JFF) O Q, V ca R11-024-20-00-R002			Fr: A



MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING				
								A	B	C	D	E/r
External Wall A and B	2	52	Y16	2000	104	001	37	200				
		50	Y16	1650	100	002	37	200				
		8	Y10	10100	16	003	35	9900				
		2	Y10	5000	4	004	35	4800				
		4	Y10	1000	8	005	35	810				
		13	R10	350	26	CL01	33	100				
Internal Walls	3	8	Y10	10100	24	101	35	9900				
		102	Y16	1300	306	102	37	200				
		9	R10	350	27	CL01	33	100				
Wall C	2	198	Y16	1150	392	201	37	200				
		198	Y10	1700	392	202	34	1600				
	4	24	Y10	4950	48	203	35	4470				
		12	Y10	9550	24	204	35	8850				
	8	90	R10	350	180	CL01	33	100				
		12	Y10	1000	48	205	35	1300				
	10	10	Y16	1150	40	201	37	200				
		10	Y10	1700	40	202	34	1600				
	12	4	Y16	1150	32	201	37	200				
		4	Y10	1700	32	202	34	1600				
	12	12	Y10	750	96	206	35	550				
		12	Y10	750	96	206	35	550				
Wall D	2	3	Y10	10450	6	301	20					
		6	Y10	5400	12	302	34	5270				
	6	6	Y10	10350	12	303	34	10250				
		196	Y12	850	392	304	37	200				
	10	10	R10	300	20	CL01	33	70				
		102	Y10	5400	204	401	34	5270				
Sludge drying bed	2	51	Y10	10450	102	402	20					
		102	Y10	10450	204	403	34	10350				
	204	204	Y10	10100	408	404	35	9900				
		394	Y10	750	788	ST01	83	200	120	200		
	4	3	Y10	2050	12	405	60	1300				
		16	Y10	1000	40	406	34	900				
Flow splitter box	1	34	Y10	1000	34	501	35	800				
		112	Y16	1350	112	502	35	1080				
	26	26	Y10	1600	26	503	35	1400				
		10	Y10	2400	10	504	34	2310				
	16	16	Y10	1450	16	505	34	1330				
		32	Y10	550	32	506	20					
	16	16	Y10	900	16	507	20					
		9	R10	300	9	CL01	33	70				
	6	6	Y10	3300	12	508	41	2088	424		300	
		6	Y10	3300	12	509	41	2130	424		300	
	12	12	Y10	1000	24	510	62	700	495			
		12	Y10	1000	24	510	62	700	495			
	8	10	12	16	20	25	32	40	TOT	Date		
R		56							56	Det. by		
Y		7024	296	2297					9617	Ref Dwg		
TOT		7080	296	2297					9673	Job No		
ILIFA Africa Engineers (Pty) Ltd									Revision			
(035) 753 1083									Schedule No			
FAX (035) 753 1094												

SLUDGE DRYING BED



GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa
2. MINIMUM CONCRETE COVER = 25mm EXCEPT FOR FOUNDATIONS = 50mm ; WATER RETAINING = 40mm
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4. FORMWORK (UNDERNEATH) FOR SLABS MUST STAY IN POSITION FOR AT LEAST 7 DAYS.
5. TEMPORARY PROPS AT SOFFIT OF SLABS MUST STAY IN POSITION FOR AT LEAST 21 DAYS. PROPS @ 1.8m c/c MAX.
6. FLOORSLABS MAY NOT BE USED TO STORE BUILDING MATERIALS.
7. NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
8. WHERE CONCRETE IS SUPPORTED BY BRICKWORK, 2 LAYERS OF PVC ON HORIZONTAL PLANE AND 10mm SOFTBOARD ON VERTICAL PLANE ARE REQUIRED.
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A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS	
AS BUILT DRAWINGS	
TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT	
	
DISTRICT MUNICIPALITY	
CLIENT APPROVAL	
Project leader:	Signature :
Date:	
CLIENT DRAWING NUMBER:	



PRETORIA 012- 362 1473
HARRISMITH 059- 622 1297
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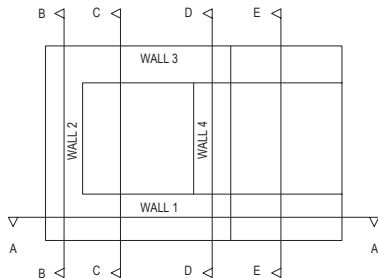
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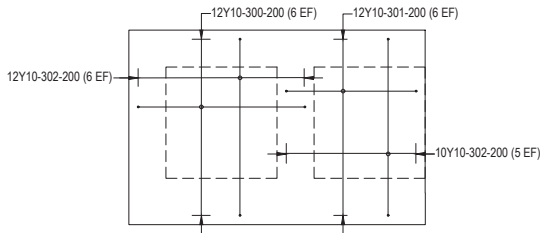
Designed :	D.Steenkamp	Date:		Signature :	
Drawn :	H.Jooste	Date:		Signature :	
Checked :	J.Scailliet	Date:		Signature :	
Approved: D.Steenkamp		Date:		Signature :	
Reg No: 2012/0171					

PROJECT TITLE			
MELMOTH I ES EU PGAUD2E GHDI E N			
PROJECT DESCRIPTION			
MELMOTH S S T S WTEUW PGAUD2E			
DRAWING TITLE			
SLUDGE DRYING BED REINFORCING			
DATE: NOVEMBER 2020	SCALE: N.T.S	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No: R11-024-20-00-R003			Rev: A



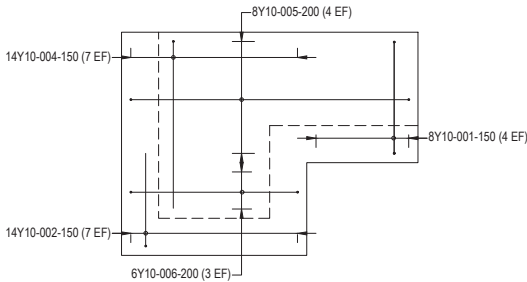
CHAMBER LAYOUT

SCALE 1:20



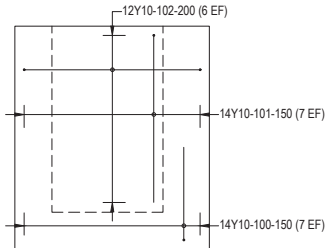
BASE REINFORCMENT LAYOUT

SCALE 1:20



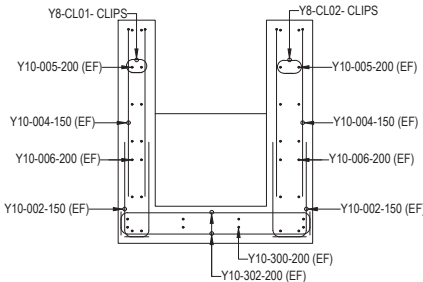
WALL 1 & 3 - SECTION A-A

SCALE 1:20



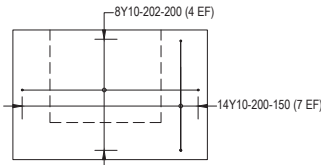
WALL 2 - SECTION B-B

SCALE 1:20



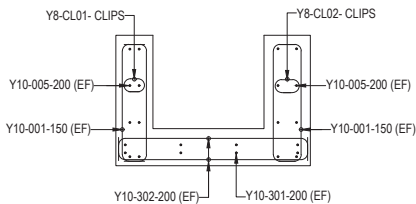
SECTION C-C

SCALE 1:20



WALL 4 - SECTION D-D

SCALE 1:20



SECTION E-E

SCALE 1:20

MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING				
								A	B	C	D	E/r
Walls 1 and 3	2	8	Y10	800	16	001	37	200				
		14	Y10	700	28	002	37	200				
		14	Y10	1100	28	004	35	904				
		8	Y10	1700	16	005	35	1500				
		6	Y10	1100	12	006	35	900				
		2	Y8	300	4	CL01	33	100				
Wall 2	1	14	Y10	700	14	100	37	200				
		14	Y10	1000	14	101	34	500				
		12	Y10	1150	12	102	35	850				
		2	Y8	300	2	CL01	33	100				
Wall 4	1	14	Y10	800	14	200	35	600				
		8	Y10	1150	8	202	35	950				
Base	1	12	Y10	1100	12	300	35	900				
		12	Y10	900	12	301	35	700				
		22	Y10	1150	22	302	35	950				
		4	Y8	750	4	ST02	83	200	120	200		
R	8	10	12	16	20	25	32	40	TOT			
Y	2	130							132			
TOT	2	130							132			

GENERAL NOTES:

- MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
- MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR FOUNDATIONS = 50mm ; WATER RETAINING = 40mm
- CONCRETE SHOULD BE CURED (KEPT PERMANENTLY WET) FOR 7 DAYS MIN.
- FORMWORK (UNDERNEATH) FOR SLABS MUST STAY IN POSITION FOR AT LEAST 7 DAYS.
- TEMPORARY PROPS AT SOFFIT OF SLABS MUST STAY IN POSITION FOR AT LEAST 21 DAYS. PROPS @ 1.8m c/c MAX.
- FLOORSLABS MAY NOT BE USED TO STORE BUILDING MATERIALS.
- NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
- WHERE CONCRETE IS SUPPORTED BY BRICKWORK, 2 LAYERS OF PVC ON HORIZONTAL PLANE AND 10mm SOFTBOARD ON VERTICAL PLANE ARE REQUIRED.
- LIVING CONCRETE PLACED IN ALTERNATIVE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.

A	03-12-2020	D.S.	FOR TENDER
No.	Date	By	Description

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR

ENGINEER

DATE:.....

DATE:.....

CLIENT



CLIENT APPROVAL	
Project leader: _____	Signature : _____
Date: _____	

CLIENT DRAWING NUMBER:



PRETORIA HARRISMITH VANDERBIJLPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE	012- 362 1473 058- 622 1297 016- 981 0591 011- 955 5334 035- 753 1083 017- 634 8895 034- 312 6464	RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.

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Designed : D.Steenkamp	Date:	Signature :
Drawn : H.Boote	Date:	Signature :
Checked : J.Scaaliet	Date:	Signature :
Approved: D.Steenkamp Reg No: 2012/70171	Date:	Signature :

PROJECT TITLE

MELMOTH SEWER UPGRADE
PHASE 2

PROJECT DESCRIPTION

MELMOTH WWTW INTERIM UPGRADE

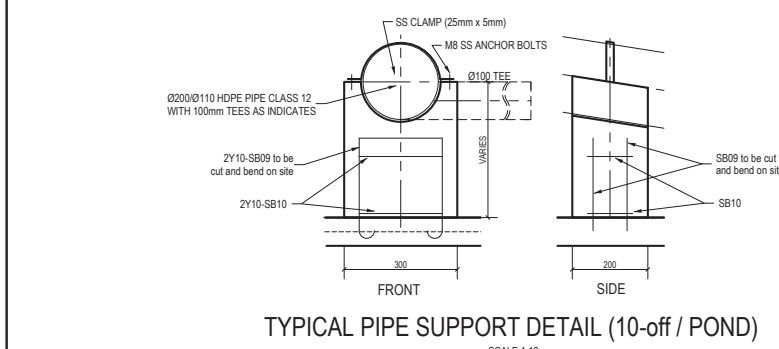
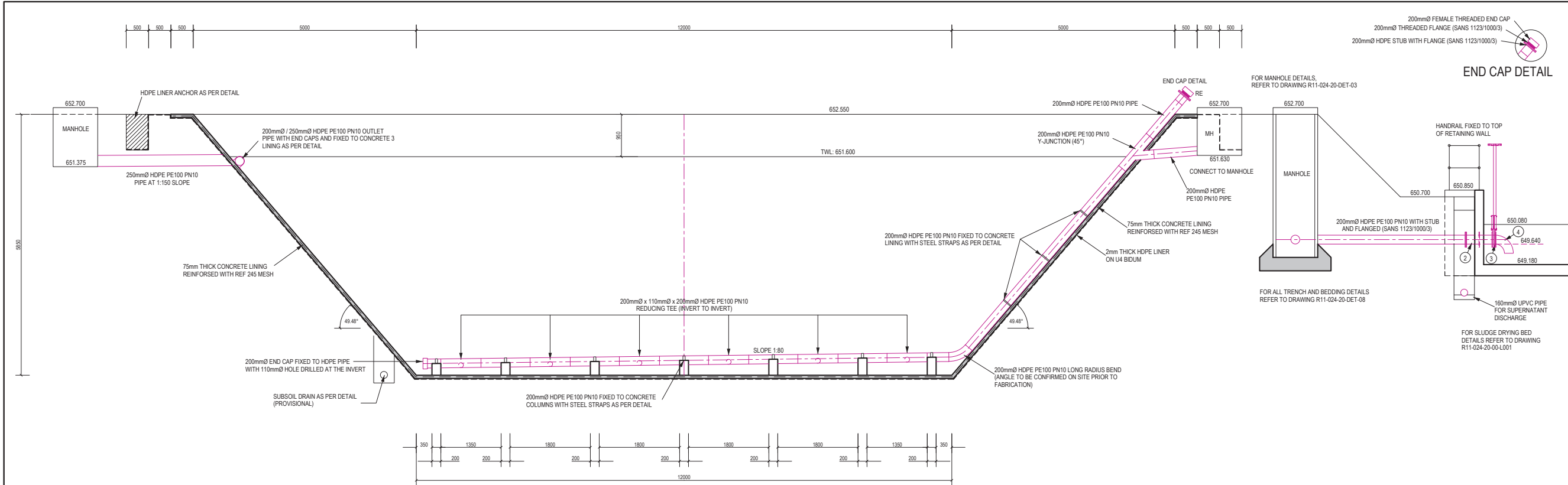
DRAWING TITLE

NEW CHAMBER REINFORCEMENT
LAYOUT AND SECTIONS

DATE: NOVEMBER 2020	SCALE: N.T.S	A1	SHEET No: 1 OF 1

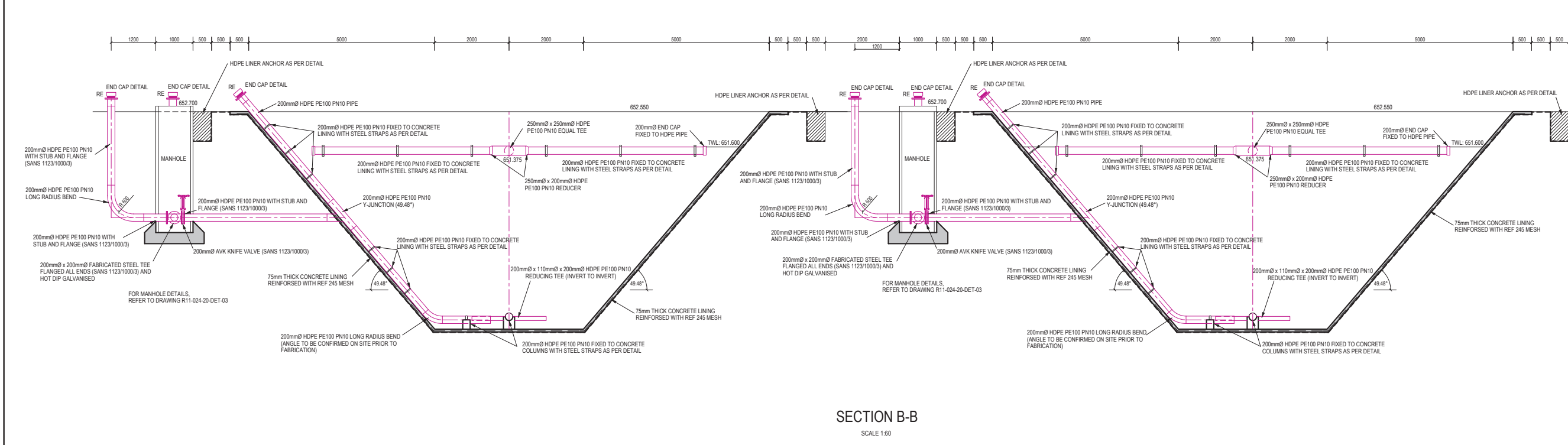
PLAN No.

CONSULTING ENG. DRAWING No: R11-024-20-00-R004	Rev: A



SCHEDULE FOR SUPPORTS OF 1 POND ONLY

MEMBER		BAR		NO.IN EACH	TOTAL	LENGTH	Shape code	BENDING				
MK	NO	MK	DIA					A	B	C	D	
PIPE SUPPORT EACH POND	10	SB09	Y10	2	20	1660	72	500	200	to be cut and bend on site		
		SB10	Y10	2	20	2080	60	120	220			
	NOTE: ALL TO BE VARIFIED ON SITE											



GENERAL NOTES:

- MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
- MINIMUM CONCRETE COVER = 25mm. EXCEPT FOR FOUNDATIONS = 50mm ; WATER RETAINING = 50mm
- CONCRETE SHOULD BE CURED (KEPT PERMANENTLY WET) FOR 7 DAYS MIN.
- FLOORS/SLABS MAY NOT BE USED TO STORE BUILDING MATERIALS.
- NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
- LINING CONCRETE PLACED IN ALTERNATIVE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.
- JOINT FILLER TO BE CLOSED CELL-EXPANDED POLYETHYLENE FOAM OR SIMILAR APPROVED.
- JOINT SEALER TO BE Sika FLEX PRO 3 1-CURE POLYURETHANE SEALANT OR SIMILAR APPROVED.
- ALL CONCRETE EDGES MUST BE NOSED WITH NOISING TOOL.
- WOOD FLOAT FINISH.
- SANS 1200 GA SHALL PREVAIL WITH SPECIAL REFERENCE TO CLAUSE 5.4.8.3
- CONCRETE MUST HAVE A NEAT SMOOTH EVEN & UNIFORM FINISH.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT

KING CETSHWAYO
DISTRICT MUNICIPALITY

CLIENT APPROVAL

Project leader: _____ Signature: _____

Date: _____

CLIENT DRAWING NUMBER: _____

ilifa
AFRICA ENGINEERS

PRETORIA 012- 362 1473 **RICHARDS BAY OFFICE,** 035- 622 1297 **21 Kingfish Creek,**
VANDERBIJLPARK 016- 981 0591 **MEERENSEE,**
KRUGERSDORP 011- 955 5334 **PO Box 10812,**
RICHARDSBAY 035- 753 1083 **Meerensee, 3901.**
SECUNDA 017- 634 8895
NEWCASTLE 034- 312 6464 **email: rbay@ilifa.biz**
Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.

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Designed :	D. Steenkamp	Date:		Signature :	
Drawn :	H. Jooste	Date:		Signature :	
Checked :	J. Scaffiet	Date:		Signature :	

Approved: D. Steenkamp
Reg No.: 2012/0171

PROJECT TITLE

**MELMOTH I ES EU PGAUD2E
GHDI E N**

PROJECT DESCRIPTION

MELMOTH S S TS WTEUM PGAUD2E

DRAWING TITLE

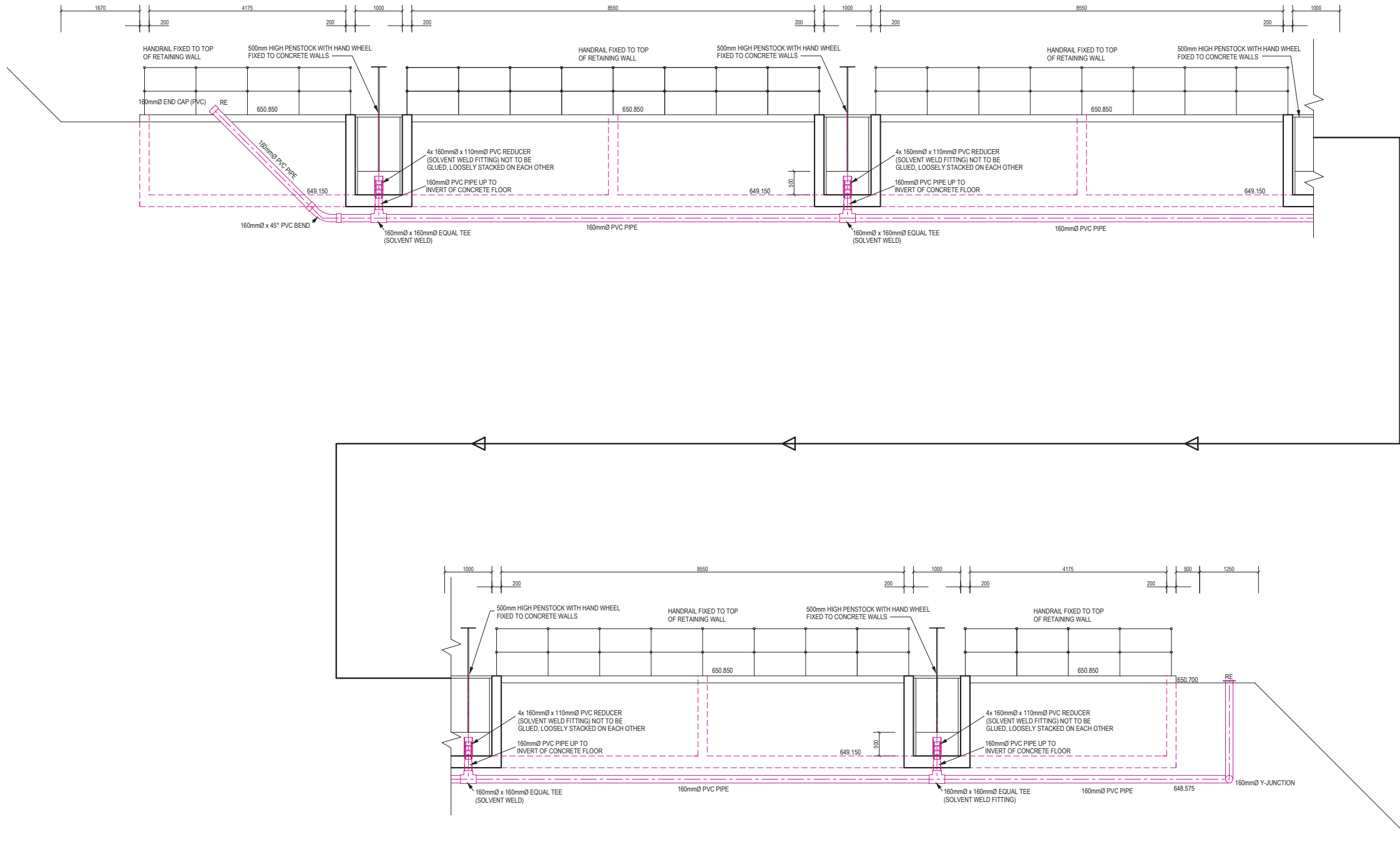
SLUDGE PONDS SECTION

DATE	SCALE	A1	SHEET No.
NOVEMBER 2020	1: 250		1 OF 1

PLAN No.

CONSULTING ENG. DRAWING No: **R11-024-20-00-SEC01**

Rev **A**



TYPICAL SECTION WALL "C" THROUGH SLUDGE DRYING BEDS

SCALE 1:50

GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
2. MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR FOUNDATIONS = 50mm; WATER RETAINING = 50mm
3. CONCRETE SHOULD BE CURED (KEPT PERMANENTLY WET) FOR 7 DAYS MIN.
4. FLOOR SLABS MAY NOT BE USED TO STORE BUILDING MATERIALS.
5. NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
6. LINING CONCRETE PLACED IN ALTERNATIVE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.
7. JOINT FILLER TO BE CLOSED CELL-EXPANDED POLYETHYLENE FOAM OR SIMILAR APPROVED.
8. JOINT SEALER TO BE SIKAFLEX-PRO 3 1-CURE POLYURETHANE SEALANT OR SIMILAR APPROVED.
9. ALL CONCRETE EDGES MUST BE NOSED WITH NOSING TOOL.
10. WOOD FLOAT FINISH.
11. SANS 1200 GA SHALL PREVAIL WITH SPECIAL REFERENCE TO CLAUSE 5, 4, 8, 3
CONCRETE MUST HAVE A NEAT SMOOTH EVEN & UNIFORM FINISH.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS	
AS BUILT DRAWINGS	
TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT	
	
DISTRICT MUNICIPALITY	
CLIENT APPROVAL	
Project leader:	Signature :
Date:	
CLIENT DRAWING NUMBER:	



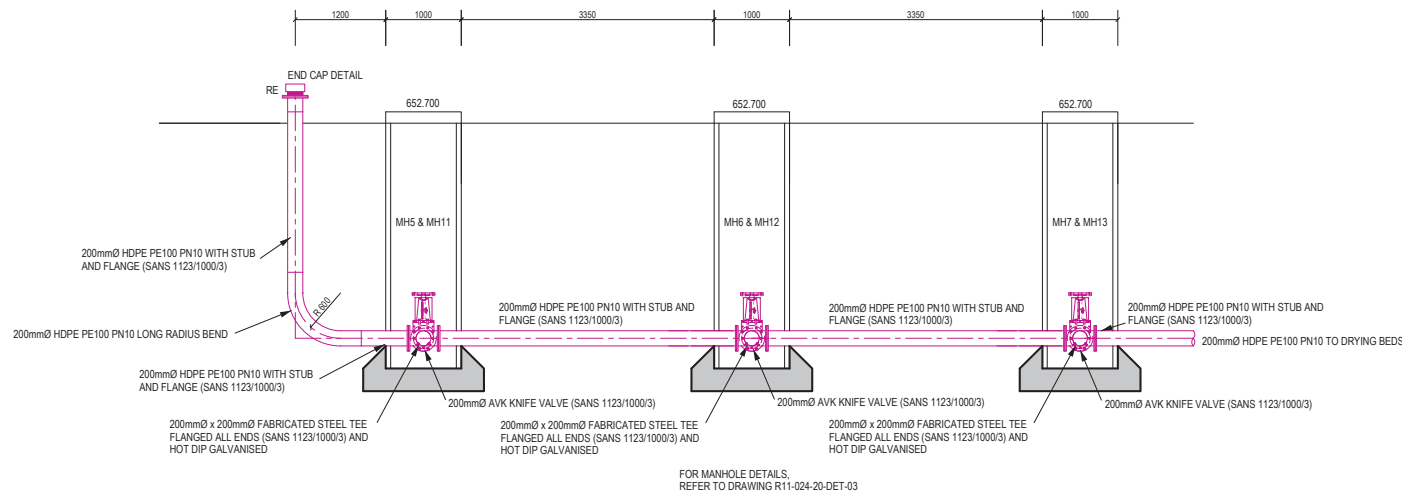
PRETORIA 012- 362 1473 **RICHARDS BAY OFFICE,**
HARRISMITH 056- 622 1297 **21 Kingfish Creek,**
VAN DER BIJLPARK 016- 981 0591 **MEERENSEE,**
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RICHARDSBAY 035- 753 1083 **Meerensee, 3901.**
SECUNDA 017- 634 8895
NEWCASTLE 034- 312 6464 **email: rbay@ilifa.biz**
Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS : MTUBATUBA ; NELSPRUIT; DUNDEE.

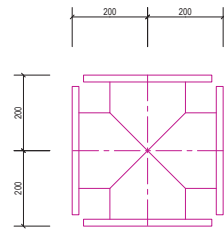
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Designed :	D.Steenkamp	Date:	Signature :
Drawn :	H.Jooze	Date:	Signature :
Checked :	J.Scallet	Date:	Signature :
Approved: D.Steenkamp		Date:	Signature :
Reg No: 201270171			

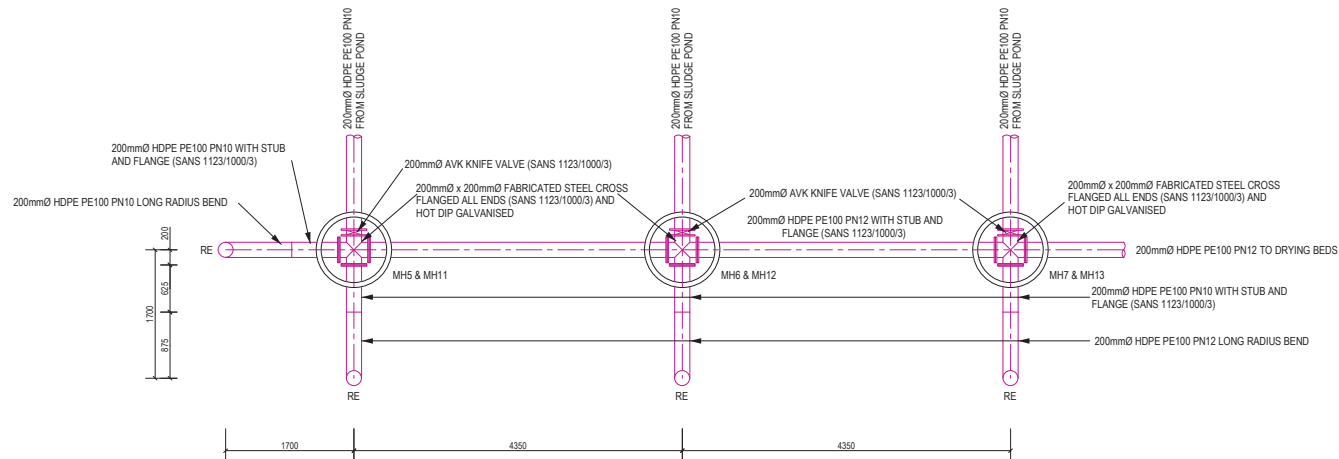
PROJECT TITLE			
MELMOTH I ES EU PGAUD2E GHDI E N			
PROJECT DESCRIPTION			
MELMOTH S S TS WTEUW PGAUD2E			
DRAWING TITLE			
SECTION WALL C THROUGH SLUDGE DRYING BED			
DATE: NOVEMBER 2020	SCALE: 1 : 250	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No: R11-024-20-00-SEC02			Rev A



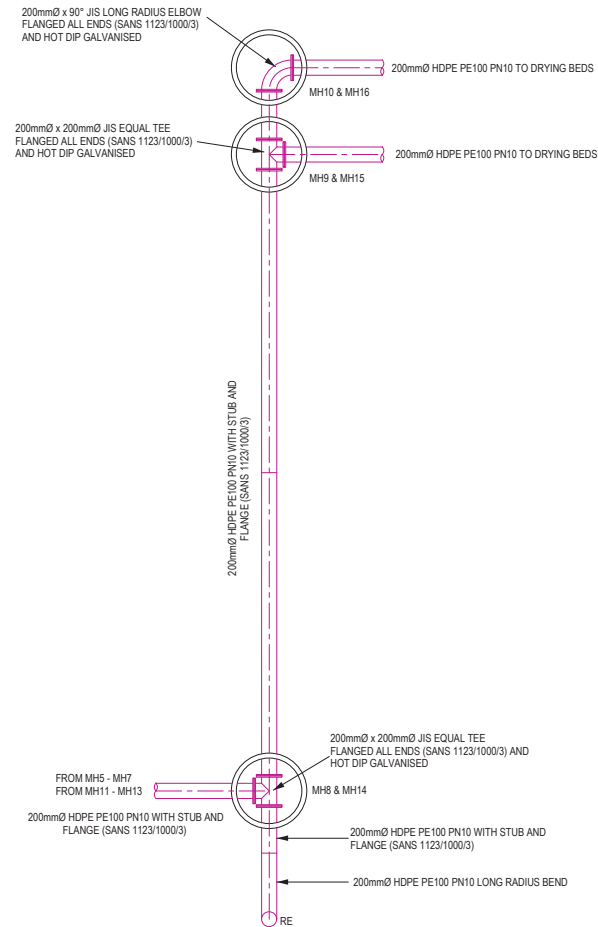
TYPICAL SECTION MH5 TO MH7 AND MH11 TO MH13
SCALE 1:50



FABRICATED STEEL CROSS DIMENSIONS
SCALE 1:10



PLAN LAYOUT MH5 TO MH7 AND MH11 TO MH13
SCALE 1:50



PLAN LAYOUT MH8 TO MH10 AND MH14 TO MH16
SCALE 1:50

GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
2. MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR
FOUNDATIONS = 50mm : WATER RETAINING = 50mm
3. CONCRETE SHOULD BE CURED (KEPT PERMANENTLY
WET) FOR 7 DAYS MIN.
4. FLOORSLABS MAY NOT BE USED TO STORE BUILDING
MATERIALS.
5. NO CONCRETE MAY BE PLACED BEFORE APPROVAL
OF THE REINFORCING BY THE ENGINEER.
6. LINING CONCRETE PLACED IN ALTERNATIVE PANELS
AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.
7. JOINT FILLER TO BE CLOSED CELL-EXPANDED
POLYETHYLENE FOAM OR SIMILAR APPROVED.
8. JOINT SEALER TO BE SIKAFLEX-PRO 3 I-CURE
POLYURETHANE SEALANT OR SIMILAR
APPROVED.
9. ALL CONCRETE EDGES MUST BE NOSED WITH
NOSING TOOL.
10. WOOD FLOAT FINISH.
11. SANS 1200 GA SHALL PREVAIL WITH SPECIAL
REFERENCE TO CLAUSE 5.4.8.3
CONCRETE MUST HAVE A NEAT SMOOTH EVEN
& UNIFORM FINISH.

No.	Date	By	Description
A	16-11-2020	D.S	FOR TENDER

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....



Project leader:	Signature :
Date:	

CLIENT DRAWING NUMBER:

ilifa
AFRICA ENGINEERS

PRETORIA
HARRISMITH
VANDERBILPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

012- 362 1473
058- 622 1297
016- 981 0591
011- 955 5334
035- 753 1083
017- 634 8895
034- 312 6464

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ASSOCIATED OFFICES:
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Designed :	D.Steenkamp	Date:		Signature :	
Drawn :	H.Jooste	Date:		Signature :	
Checked :	J.Scallet	Date:		Signature :	
Approved: D.Steenkamp		Date:		Signature :	
Reg No. 2012070171		Date:		Signature :	

PROJECT TITLE

**MELMOTH I ES EU PGAUD2E
GHD I E N**

PROJECT DESCRIPTION

MELMOTH S S TS WTEUM PGAUD2E

DRAWING TITLE

TYPICAL SECTION

DATE: NOVEMBER 2020	SCALE: 1 : 250	A1	SHEET No: 1 OF 1

PLAN No.

CONSULTING ENG. DRAWING No:
R11-024-20-00-SEC03

Rev
A

MUNICIPALITY EMBLEM

PROJECT NAME

ILIFA EMBLEM

CONTRACTOR EMBLEM

PROJECT NAME

EPWP EMBLEM


KING CETSHWAYO
DISTRICT MUNICIPALITY

PROJECT DESCRIPTION


ilifa
AFRICA ENGINEERS

PROJECT TYPE


EXPANDED PUBLIC WORKS PROGRAMME
Creating opportunities towards human fulfilment

KING CETSHWAYO
DISTRICT MUNICIPALITY

MELMOTH SEWER UPGRADE - PHASE 2
MELMOTH WWTW INTERIM UPGRADE

CONSULTING ENGINEERS:
ILIFA AFRICA ENGINEERS (Pty) Ltd

CONTRACTOR :

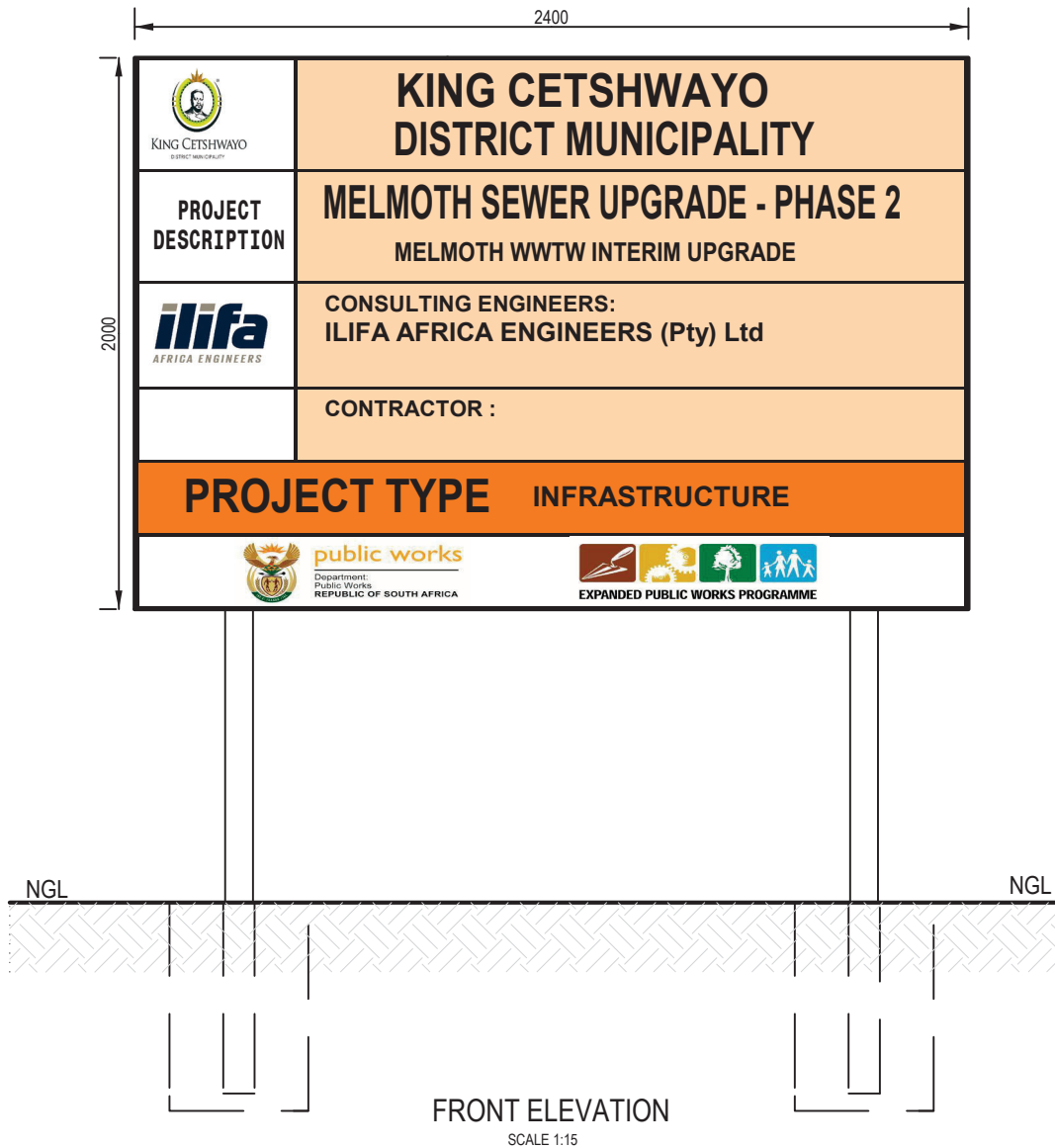
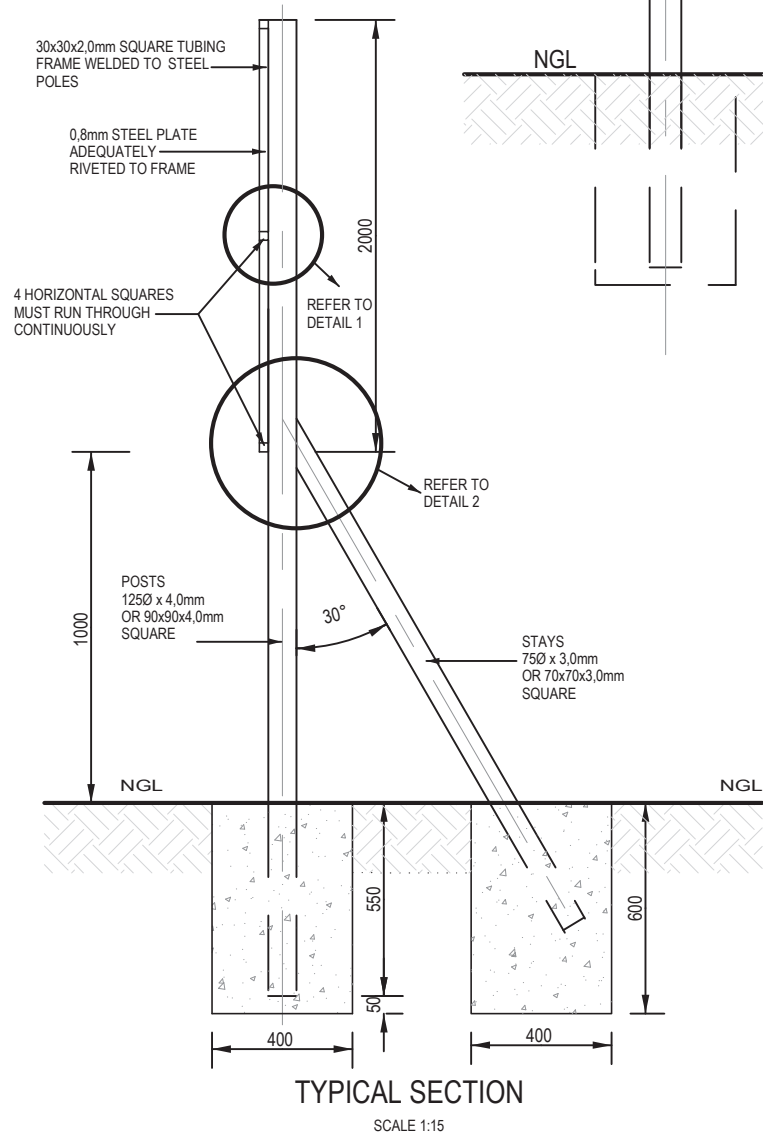
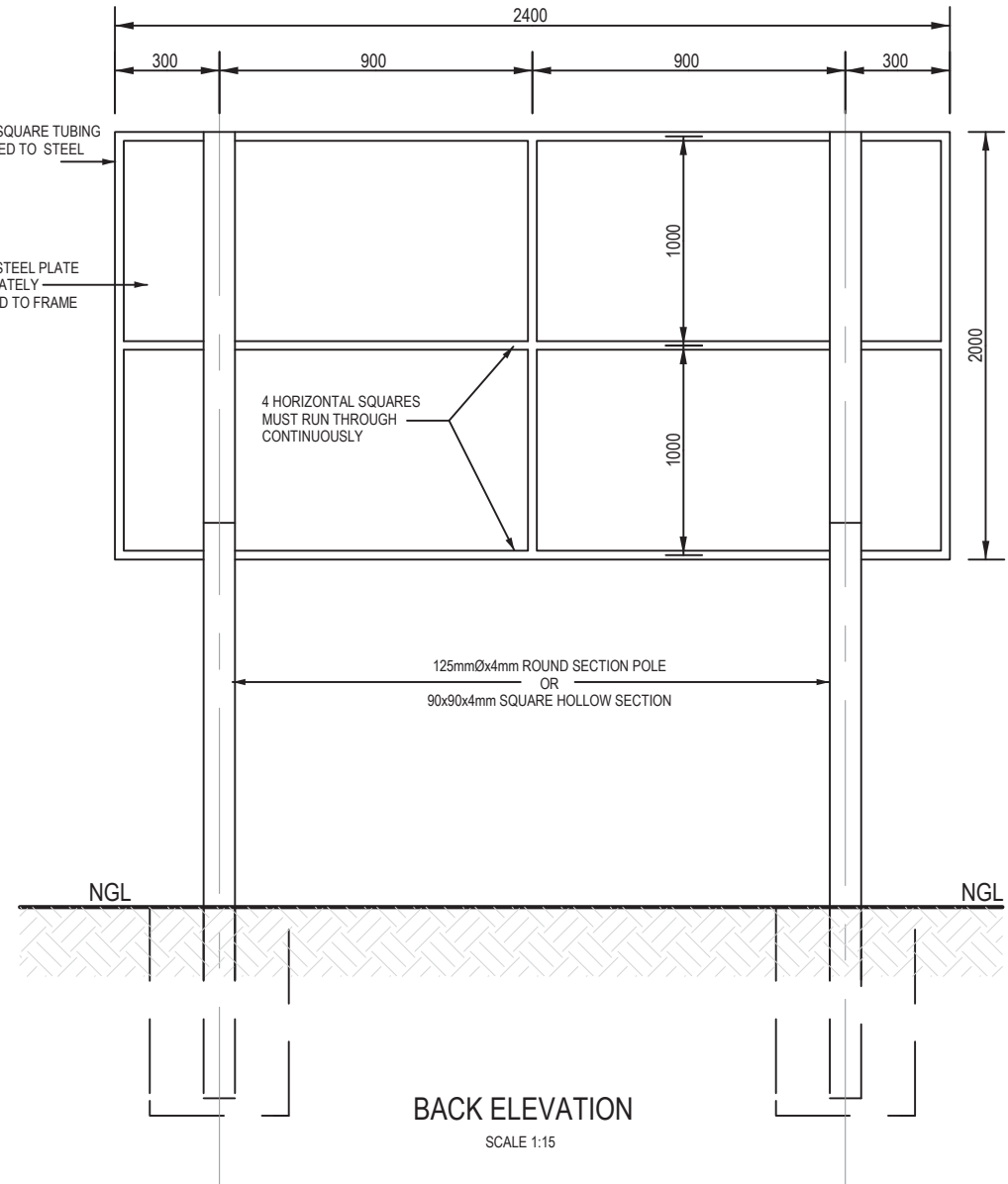
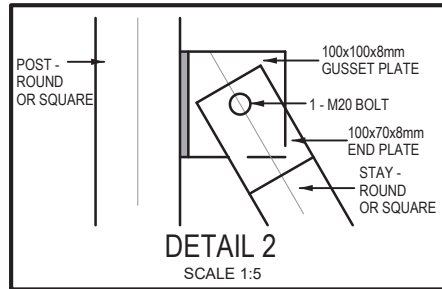
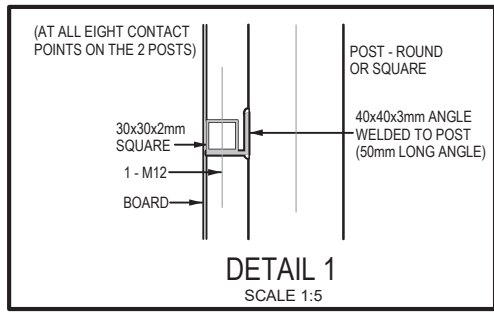
PROJECT TYPE INFRASTRUCTURE

CONSTRUCTION NAME BOARD

SCALE 1:10

- No REQUIRED: 2
- BACKGROUND: AS PER EPWP COLOUR PALETTE.
- BORDER: 12 mm BLACK.
- LETTERS: CAPITAL LETTERS, SERIES "C", MATT-BLACK. EXCEPT FOR EMBLEMS (COINCIDES WITH THE SOUTH AFRICAN ROAD TRAFFIC SIGNS MANUAL.)
- EMBLEMS: MAY ONLY BE USED BY MEMBERS AND MUST BE DISPLAYED IN FULL COLOUR.
- NOTES: SITTING AND ERECTION METHODS, AS DIRECTED BY THE PROJECT MANAGER

A				16/11/2020				D.S				FOR TENDER			
No.		Date		By		Description		No.		Date		By		Description	
						: 2017 P 7									
AS BUILT DRAWINGS															
TECHNICAL CO-ORDINATOR								ENGINEER							
DATE:.....								DATE:.....							
CLIENT															
															
KING CETSHWAYO DISTRICT MUNICIPALITY															
Project leader:				Signature:											
Date:															
CLIENT DRAWING NUMBER															
															
PRETORIA 012- 362 1473 RICHARDS BAY OFFICE, 21 Kingfish Creek, HARRISMITH 058- 622 1297 MEERENSEE, PO Box 10812, VANDERBULPARK 016- 981 0591 MEERENSEE, PO Box 10812, KRUGERSDORP 011- 965 5334 MEERENSEE, PO Box 10812, RICHARDSBAY 035- 753 1083 MEERENSEE, PO Box 10812, SECUNDA 017- 634 8895 NEWCASTLE 034- 312 6464 email: rbay@ilifa.biz Web: www.ilifa.biz															
ASSOCIATED OFFICES: BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.															
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Designed:		G.T.M. nka L		Date:				Signature:							
Drawn:		m.pooladi		Date:				Signature:							
Checked:		p.7.ikadi		Date:				Signature:							
g.L.A.E.V. 30.7.M nka L				Date:				Signature:							
PROJECT TITLE															
MELMOTH SEWER UPGRADE PHASE 2															
PROJECT DESCRIPTION															
MELMOTH WWTW INTERIM UPGRADE															
DRAWING TITLE															
TYPICAL DETAIL: CONTRACTOR SIGN BOARD															
DATE: NOVEMBER 2020				SCALE: AS SHOWN				A3				SHEET NO: 1 OF 1			
CONSULTING ENG. DRAWING NO:															
R11-024-20-DET-01															
A															



- NOTES:
1. TYPE FACE TO BE USED SHALL BE HELVETICA MEDIUM.
 2. SIZES OF LETTERING & DIMENSIONS ARE INDICATED ON THE DIAGRAM AND SHALL BE STRICTLY ADHERED TO.
 3. PROJECT NAME & OWNER SHALL BE WHITE, LETTERING ON MIDDLE BLUE BACKGROUND. SURROUNDING BORDER SHALL ALSO BE IN MIDDLE BLUE.
 4. PROFESSIONAL TITLES & LINES THEREUNDER SHALL BE IN BLACK, ON WHITE BACKGROUND.
 5. PROFESSIONAL CRESTS & COMPANY NAMES SHALL BE IN BLACK, ON WHITE BACKGROUND.
 6. PROFESSIONAL CRESTS SHALL BE PLACED CENTRAL ON SPACE PROVIDED AS SHOWN ON DIAGRAM.
 7. PAINT COLOURS ARE BASED ON PLASCON-EVANS:
VELVAGLO POLYURETHANE VELVET ENAMEL:
WHITE VLO 1
TEQUILLA VLO 10
ACRYLIC ROAD SIGN PAINTS:
BLACK REF. 266
MIDDLE BLUE REF. 290
 8. PROJECT BOARD TO RECEIVE FIXTURE TOP LAYER TO PREVENT REMOVAL OF OR DAMAGE TO LETTERING.
 9. THE BOARD WILL BE SUPPLIED COMPLETE WITH ALL POSTS (MINIMUM 50mm Ø) AND BRACKETS REQUIRED FOR ERECTION.

A	16/11/2020	D.S.	FOR TENDER
No.	Date	By	Description
			2017 P 7

AS BUILT DRAWINGS	
TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT	
	
KING CETSHWAYO DISTRICT MUNICIPALITY	
CLIENT APPROVAL	
Project leader:	Signature:
Date:	
CLIENT DRAWING NUMBER:	

ilifa
AFRICA ENGINEERS

PRETORIA
HARRISMITH
VANDERBULPARK
KRUGERSDORP
RICHARDSBAY
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NEWCASTLE

012- 362 1473
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ASSOCIATED OFFICES:
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Designed:	0.7BW nka L	Date:		Signature:	
Drawn:	m.pooHDV	Date:		Signature:	
Checked:	p.7.8 nka L	Date:		Signature:	
g.L.A.B. 30.7BW nka L		Date:		Signature:	

PROJECT TITLE	
MELMOTH SEWER UPGRADE PHASE 2	

PROJECT DESCRIPTION	
MELMOTH WWTW INTERIM UPGRADE	

DRAWING TITLE	
TYPICAL DETAIL: SIGN SUPPORT STRUCTURE	

DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
Reg. No.			Rev.
CONSULTING ENG. DRAWING NO:			
R11-024-20-DET-01A			A

ABREVIATIONS:

V = VALVE

AV= AIR VALVE

FH = FIRE HYDRANT

SV = SCOUR VALVE

E = ELECTRICAL

G = GAS

S = SEWER

W = WATER

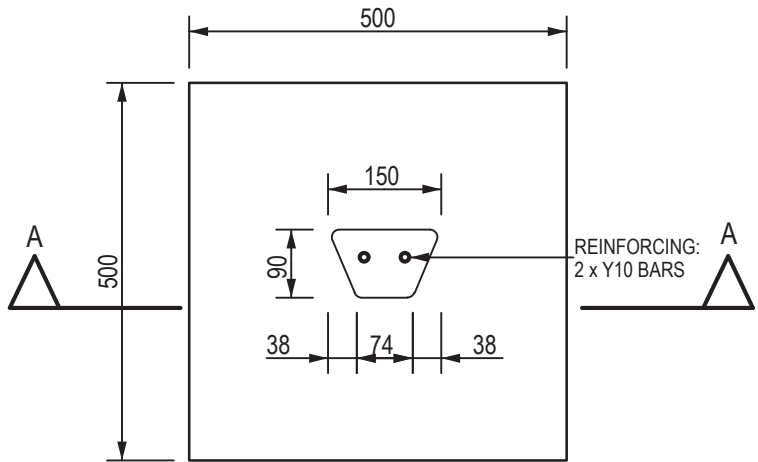
SD = SUB-SOIL DRAINAGE

T = TELKOM

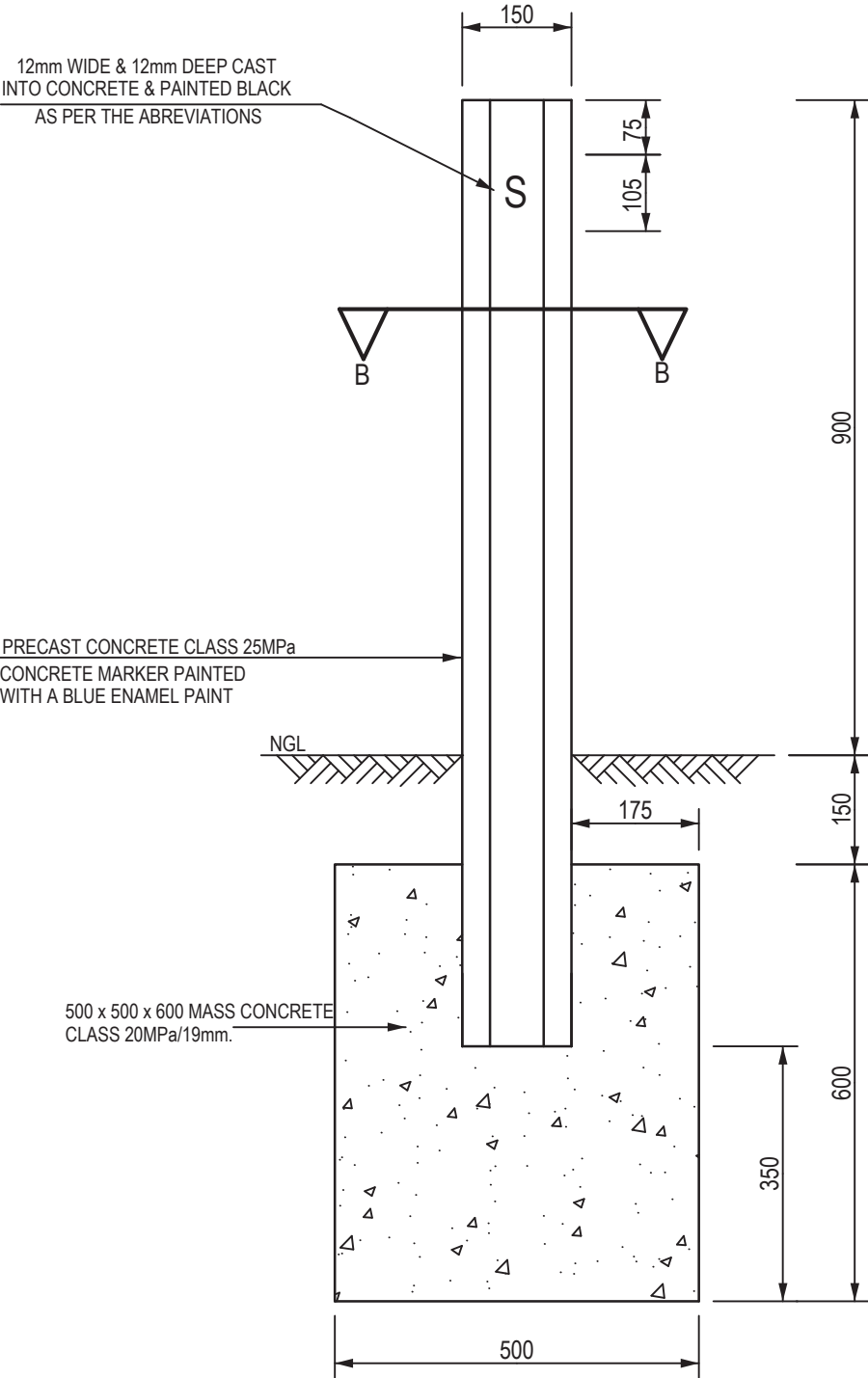
IT = INFORMATION TECHNOLOGY

N = NEOTEL

ALL EXPOSED PIPES TO BE COLOUR COATED
AS PER SABS 0140-1



SECTION B-B
SCALE 1:10



SECTION A-A
PIPE LINE MARKER
(ON ALL THE BENDS AND EVERY 100m)
SCALE 1:10

NOTES:
MARKERS MUST ALWAYS BE PLACED 1.5m TO
THE LEFT OF THE PIPELINE WHEN FACING
DOWNSTREAM.

WHEN THE PIPELINE LIES NEXT TO A ROAD,
THE MARKER MUST BE PLACED ON THE SIDE
FURTHEST AWAY FROM TH EROAD

A	16/11/2020	D.S	FOR TENDER
No.	Date	By	Description
			2017P 7
AS BUILT DRAWINGS			

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....



Project leader:	Signature:
Date:	
CLIENT DRAWING NUMBER:	

ilifa
AFRICA ENGINEERS

PRETORIA
HARRISMITH
VANDERBULPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

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017-634 8895
034-312 6464

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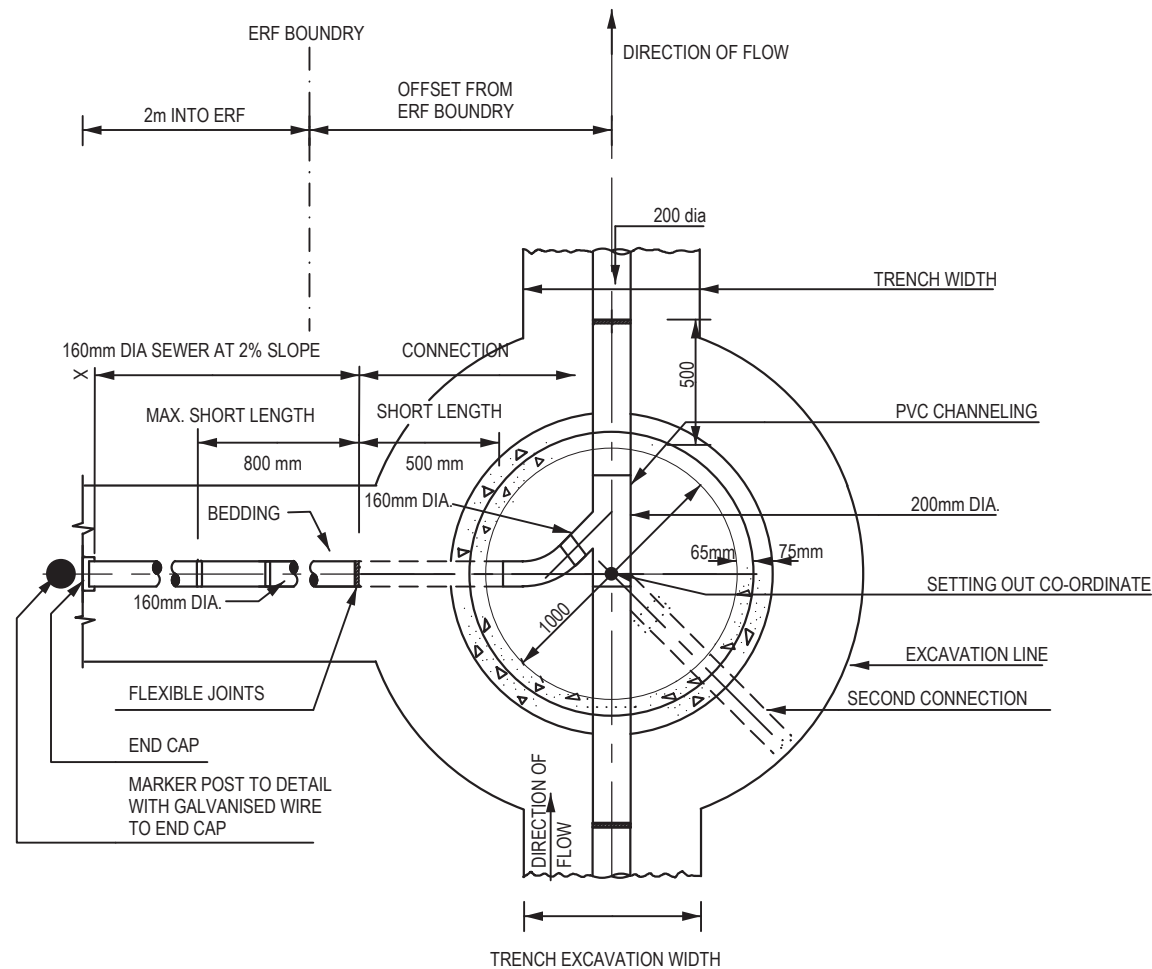
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PROJECT TITLE
**MELMOTH SEWER UPGRADE
PHASE 2**

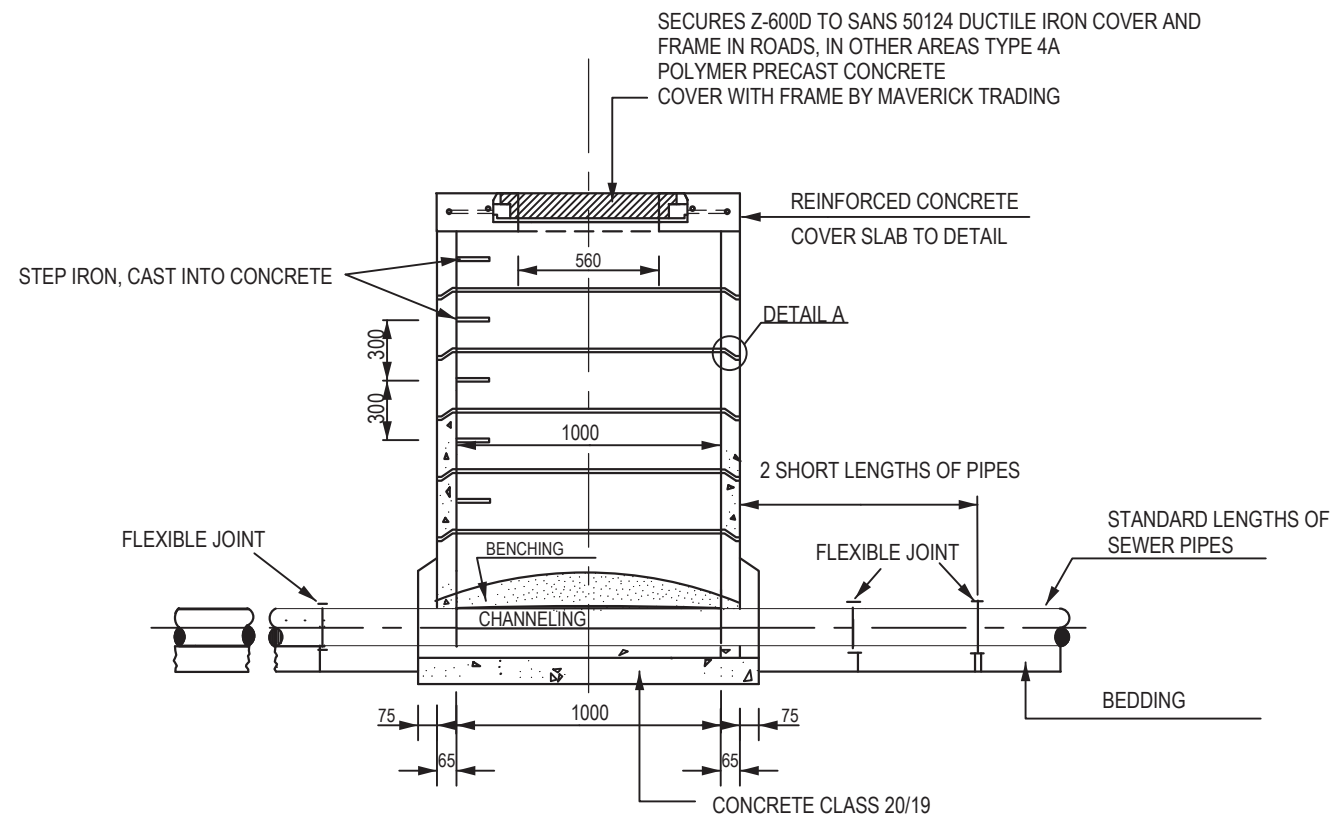
PROJECT DESCRIPTION
MELMOTH WWTW INTERIM UPGRADE

DRAWING TITLE
**TYPICAL DETAIL:
PIPE LINE MARKERS**

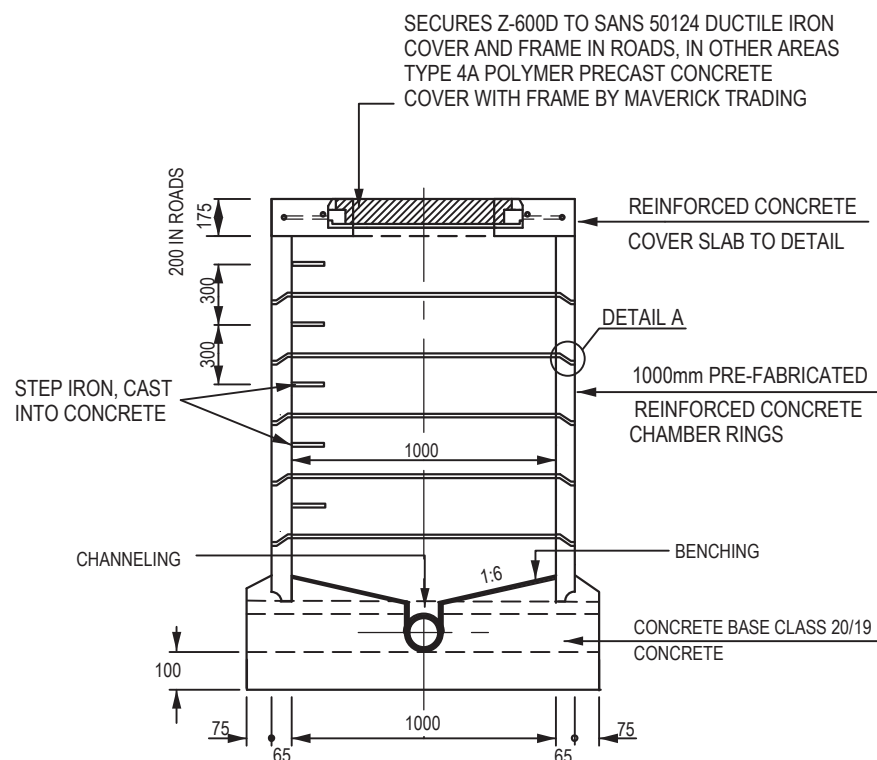
DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
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CONSULTING ENG. DRAWING NO: R11-024-20-DET-02			Rev: A



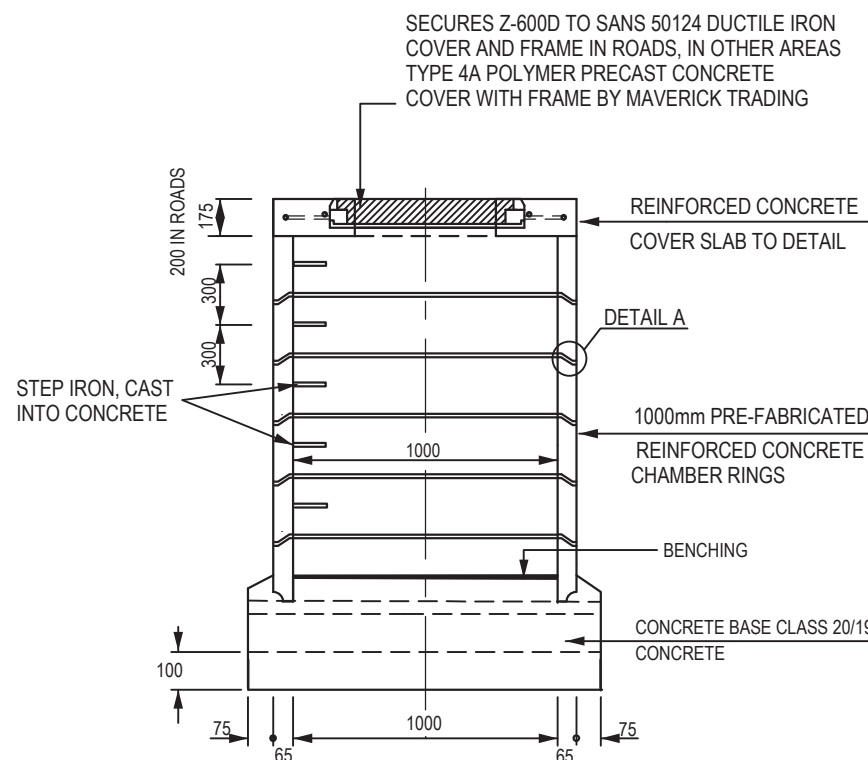
TYPICAL PLAN OF MANHOLE WITH ERF CONNECTION
SCALE 1: 30



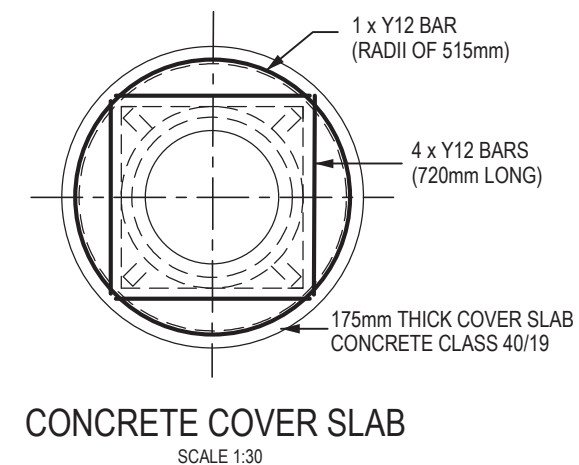
TYPICAL SECTION OF MANHOLE
SCALE 1: 30



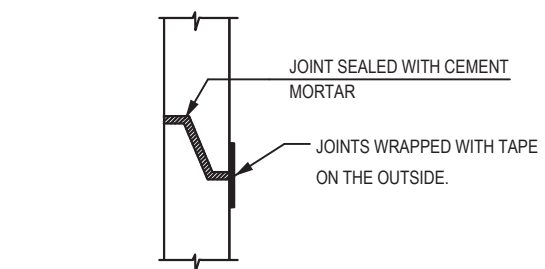
TYPICAL SECTION OF MANHOLE
SCALE 1:30



TYPICAL SECTION OF SERVICE MANHOLE
SCALE 1:30



CONCRETE COVER SLAB
SCALE 1:30



DETAIL A
TYPICAL JOINT DETAIL
N.T.S.

NOTE:

1. MANHOLES TOP OF FRAME MUST BE 150mm PROUD OF NATURAL GROUND LEVEL
2. CONCRETE SECTIONS TO BE SEALED WITH BITU JOINT PUTTY FROM ABE OR SIMILAR APPROVED.
3. FACTORY FABRICATED MANHOLE RINGS MUST COMPLY WITH SABS 1294-1981.
4. OVEREXCAVATION TO BE BACKFILLED WITH BEDDING MATERIAL ACCORDING TO SPESIFICATION FOR BEDDING MATERIAL.

THE FOLLOWING CODES OF SABS 1200 SHALL PREVAIL.
a) SANS 1200 DB PIPE TRENCHES.
b) SANS 1200 LB BEDDING PIPES.
c) SANS 1200 LD SEWERS.
THE BOTTOM SECTION OF THE CHAMBER IS SET INTO A FRESHLY CAST CONCRETE BASE INTO WHICH THE SEWER PIPES HAVE BEEN LAID.

No.	Date	By	Description
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2017 P 7
AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:	DATE:

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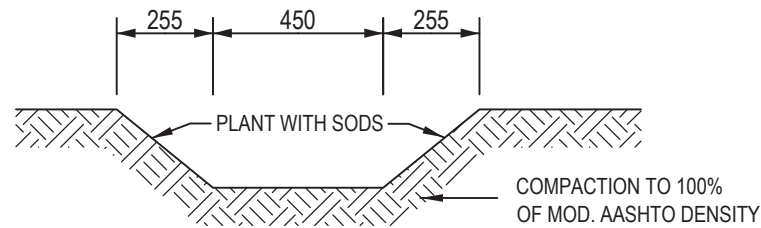
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PROJECT TITLE
**MELMOTH SEWER UPGRADE
PHASE 2**

PROJECT DESCRIPTION
MELMOTH WWTW INTERIM UPGRADE

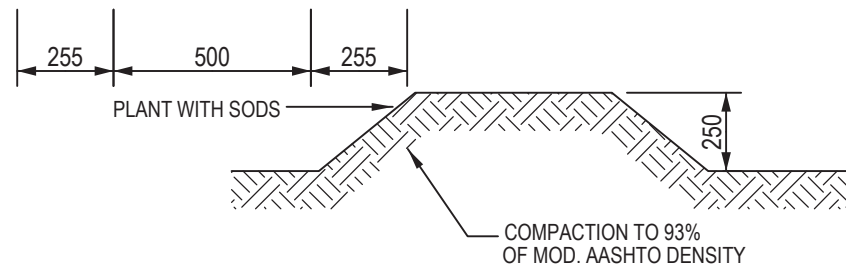
DRAWING TITLE
**STANDARD DETAILS
SEWER MANHOLES**

DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
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R11-024-20-DET-03			A



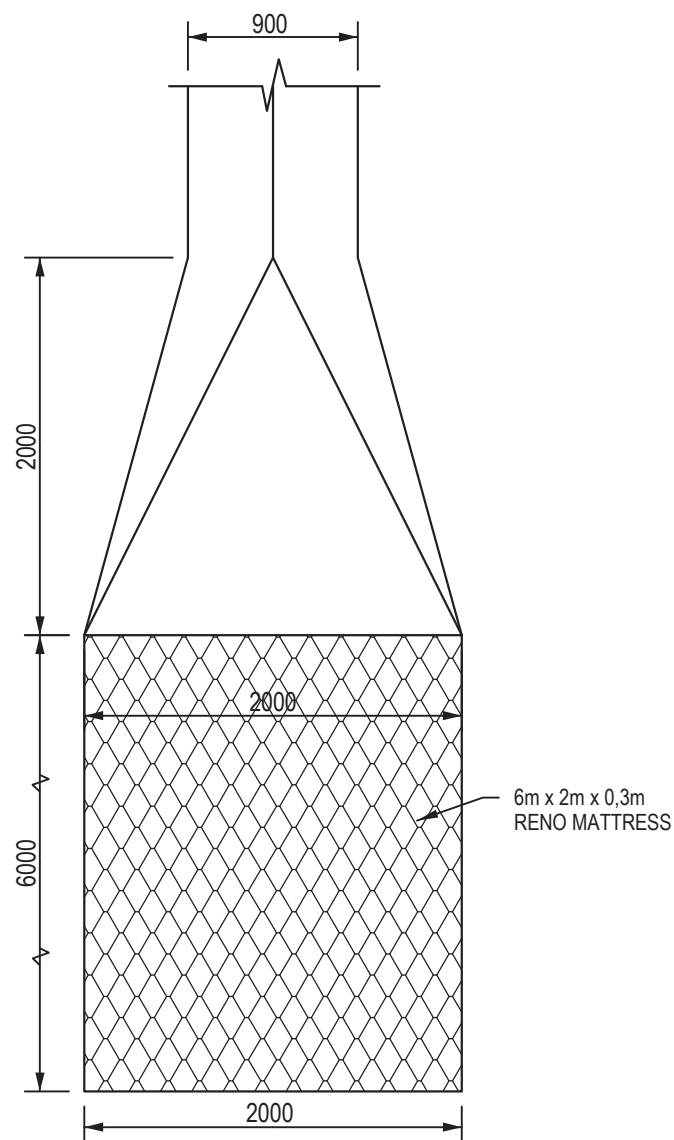
TYPICAL TRAPIZODAL
EARTH CHANNEL

SCALE 1:25



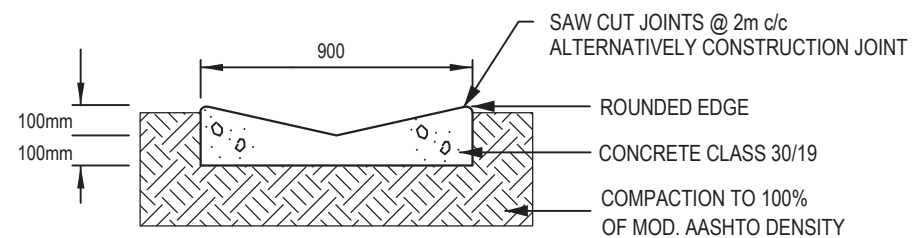
TYPICAL SECTION
OF EARTH BERM

SCALE 1:25



STORMWATER
CHANNEL OUTLET

SCALE 1:40



TYPICAL SECTION
900 V CHANNEL

SCALE 1:25

NOTES:

1) ALL CONCRETE TO BE CLASS 30/19 UNLESS OTHERWISE SHOWN

CONCRETE WALKWAYS & APRONS

- ALL CONCRETE TO BE 30 MPa AT 28 DAYS STRENGTH
 - SAW-CUT JOINTS AT 2000 c/c
 - EXPANSION JOINTS AT 16000 c/c
 - JOINT FILLER TO BE FLEXELL OR SIMILAR APPROVED
 - JOINT SEALER TO BE SIKAFLEX-PRO 2HP OR SIMILAR APPROVED
 - ALL CONCRETE EDGES MUST BE NOSED WITH NOSING TOOL
 - WOOD FLOAT FINISH
 - SANS 1200 GA SHALL PREVAIL WITH SPECIAL REFERENCE TO CLAUSE 5, 4, 8, 3
- CONCRETE MUST HAVE A NEAT SMOOTH EVEN & UNIFORM FINISH

A	16/11/2020	D.S	FOR TENDER
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TECHNICAL CO-ORDINATOR	ENGINEER
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Checked:	p.7. J. ad	Date:	Signature:
gLLaEM 30.7 DM rka L		Date:	Signature:

PROJECT TITLE
**MELMOTH SEWER UPGRADE
PHASE 2**

PROJECT DESCRIPTION
MELMOTH WWTW INTERIM UPGRADE

DRAWING TITLE
**TYPICAL DETAIL:
STORMWATER**

DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1

CONSULTING ENG. DRAWING NO: R11-024-20-DET-04	Rev: A

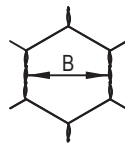


FIGURE 1
THE MESH

TABLE 1: MESH CHARACTERISTICS						
MESH TYPE	b (mm)	TOLERANCE (%)	WIRE DIAMETER (mm)			
			MESH		SELVEDGE	
			GALV	GALV/PVC	GALV	GALV/PVC
60	60	+5, -2	2,2	2,2 / 3,2	2,7	2,7 / 3,7
80	80	+5, -2	2,2	2,7 / 3,7	3,4	3,4 / 4,4

SPECIFICATIONS: ALL LACING WIRE - 2,2mm FOR GALVANISED MESH AND 2,2 / 3,2mm FOR PVC COATED MESH

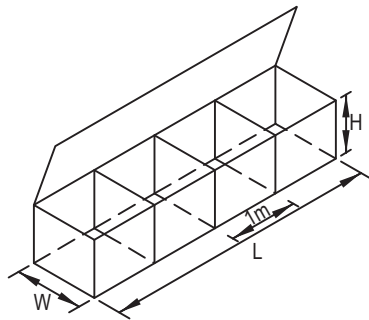


FIGURE 2
GABIONS

TABLE 2: GABIONS						
NOMINAL DIMENSIONS			NUMBER OF CELLS	CAPACITY (m³)	UNITS PER BUNDLE	
LENGTH (L) (m)	WIDTH (W) (m)	HEIGHT (H) (m)			GALV	GALV / PVC
1,0	1,0	1,0	1	1,0	74	64
1,5	1,0	1,0	1	1,5	74	62
2,0	1,0	1,0	2	2,0	44	38
3,0	1,0	1,0	3	3,0	32	26
4,0	1,0	1,0	4	4,0	24	20
2,0	0,5	0,5	2	0,5	100	80
2,0	1,0	0,5	2	1,0	60	50
3,0	1,0	0,5	3	1,5	40	34
4,0	1,0	0,5	4	2,0	32	30

TOLERANCES: HEIGHT (H) : ±5%; LENGTH (L) : ±10%

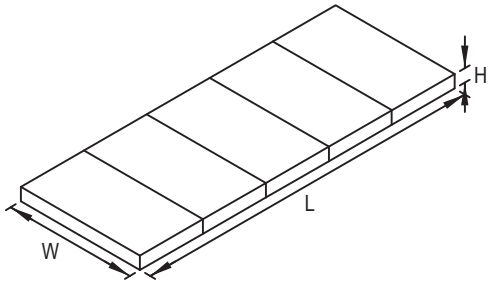


FIGURE 3
RENO MATTRESSES

TABLE 3: RENO MATTRESSES						
NOMINAL DIMENSIONS			NUMBER OF CELLS	CAPACITY (m³)	UNITS PER BUNDLE	
LENGTH (L) (m)	WIDTH (W) (m)	HEIGHT (H) (m)			GALV	GALV / PVC
* 2,0	1,0	0,30	2	0,6	80	60
* 3,0	1,0	0,30	3	0,9	60	40
6,0	2,0	0,17	6	2,04	25	20
6,0	2,0	0,23	6	2,76	25	20
6,0	2,0	0,30	6	3,60	25	20

TOLERANCES: HEIGHT (H) : ±5%; LENGTH (L) : ±10%

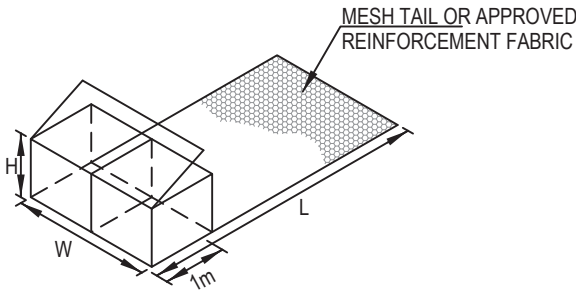


FIGURE 4
EARTH REINFORCEMENT

TABLE 4: EARTH REINFORCEMENT SYSTEMS				
NOMINAL DIMENSIONS			FRONT FACE CAPACITY (m²)	UNITS PER BUNDLE
LENGTH (L) (m)	WIDTH (W) (m)	HEIGHT (H) (m)		
3,0	2,0	0,5	1,0	20
4,0	2,0	0,5	1,0	20
5,0	2,0	0,5	1,0	20
6,0	2,0	0,5	1,0	20
3,0	2,0	1,0	2,0	20
4,0	2,0	1,0	2,0	20
5,0	2,0	1,0	2,0	20
6,0	2,0	1,0	2,0	20

TOLERANCES: HEIGHT (H) : ±5%; LENGTH (L) : ±10%

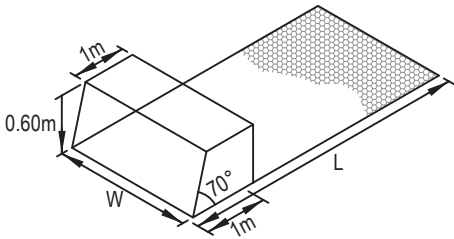


FIGURE 5
GREEN TERRAMESH

TABLE 5: ENVIRONMENTALLY FRIENDLY EARTH REINFORCEMENT SYSTEMS			
NOMINAL DIMENSIONS			UNITS PER BUNDLE
LENGTH (L) (m)	WIDTH (W) (m)	HEIGHT (H) (m)	
2,0	2,0	0,6	20
3,0	2,0	0,6	20
4,0	2,0	0,6	20
5,0	2,0	0,6	20
6,0	2,0	0,6	20

TOLERANCES: HEIGHT (H) : ±5%; LENGTH (L) : ±10%

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PROJECT TITLE	
MELMOTH SEWER UPGRADE PHASE 2	

PROJECT DESCRIPTION	
MELMOTH WWTW INTERIM UPGRADE	

DRAWING TITLE	
STANDARD DETAILS : GABION & RENO MATTRESS DETAIL (SHEET 1 OF 2)	

DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO. 1 OF 1
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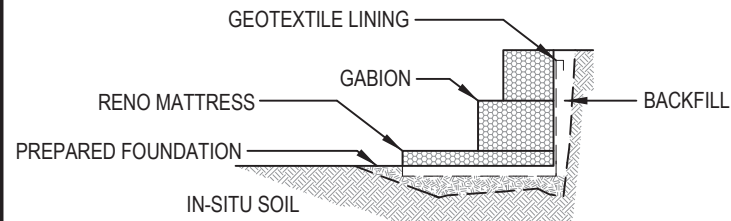


FIGURE 1
TYPICAL ARRANGEMENT OF GABION STRUCTURE

NOTES: FOUNDATION PREPERATION

1. THE FOUNDATIONS SHOULD BE LEVEL AND GRADED TO THE ELEVATIONS AS SPECIFIED BY THE ENGINEER
2. THE FOUNDATIONS SHOULD BE SMOOTH AND FREE FROM SURFACE IRREGULARITIES, LOOSE MATERIAL AND VEGETATION
3. THE COMPACTION OF THE GABION FOUNDATIONS SHOULD BE AT LEAST 90% OF THE MOD AASHTO DENSITY.
4. CAVITIES BETWEEN ROCK PROTRUSIONS IN FOUNDATIONS SHOULD BE FILLED AND LEVELED USING 15 MPa CONCRETE
5. A CONCRETE LEVELLING PAD AND DOWEL ANCHORS SHOULD BE USED WHEN FOUNDING ON ROCK.

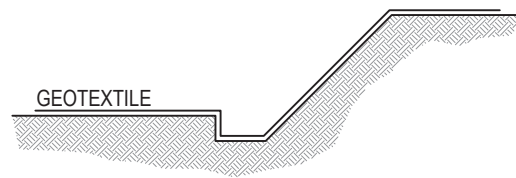


FIGURE 2
GEOTEXTILE PLACING

NOTES: GEOTEXTILE PLACING

1. FILTER FABRIC SHOULD BE PLACED AT ALL SOIL-GABION INTERFACES TO PREVENT LOSS OF FINES FROM THE SOIL BEHIND THE GABION.
2. THE FILTER FABRIC SHALL BE A GRADE 3 GEOTEXTILE ACCORDING TO THE SPECIFICATIONS STIPULATED UNDER CLAUSE 2104 (a)(iii) OF THE COLTO STANDARD
3. THE GEOTEXTILE SHOULD BE PLACED IN STRIPS ON THE PREPARED FOUNDATION (FIGURE 2) WITH A MINIMUM OVERLAP OF 300mm AT THE JOINTS AND SHOULD BE PROPERLY FASTENED TO PREVENT ANY MOVEMENT OR SLIPPING WHEN THE GABIONS ARE BEING PLACED OR PACKED.

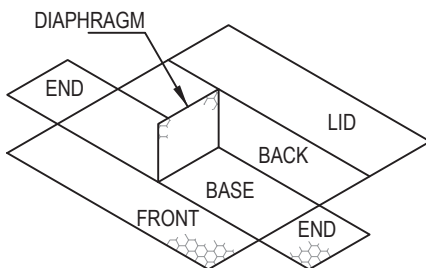


FIGURE 3
UNFOLDING OF UNITS FOR ASSEMBLY PURPOSES

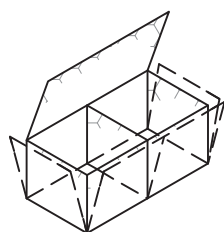


FIGURE 4
FOLDING OF UNITS FOR ASSEMBLY PURPOSES

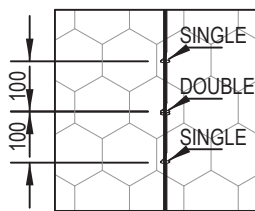


FIGURE 5
LACING OF UNITS DURING ASSEMBLY

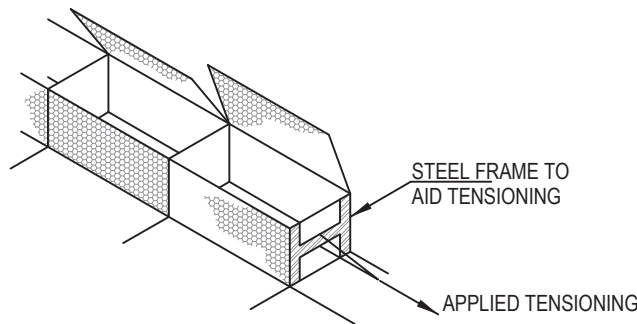


FIGURE 6
TENSIONING OF GABION STRUCTURES DURING PLACING

NOTES: ASSEMBLY

1. UNFOLD EACH INDIVIDUAL UNIT ON A HARD FLAT SURFACE AND PRESS THE GABION OUT TO ITS ORIGINAL SHAPE. (FIGURE 3)
2. LIFT THE FRONT, BACK AND END PANELS INTO AN UPRIGHT POSITION TO FORM AN OPEN BOX (FIGURE 4)
3. FASTENED THE PANELS TOGETHER WITH WIRE BY FIRMLY WRAPPING THE SELVEDGE WIRE AROUND THE SELVEDGE OR EDGE OF INTERSECTING PANELS. THE INNER DIAGRAMS SHALL BE LIFTED VERTICALLY AND SECURED IN THE SAME MANNER.
4. LACE THE EDGES OF PANELS TO BE JOINED USING THE DOUBLE AND SINGLE LOOP TECHNIQUE ALONG THE WIRE MESH OPENINGS WITH 100mm BETWEEN LOOPS. (FIGURE 5)
5. FOR TYING EDGES, PIECES OF WIRE APPROXIMATELY 1.5 TIMES THE LENGTH OF THE EDGES SHOULD BE USED. THE MAXIMUM LENGTH OF EDGE TO BE JOINED SHOULD NOT EXCEED 1m. LONGER EDGES SHOULD BE JOINED BY SEVERAL LENGTHS OF WIRES.

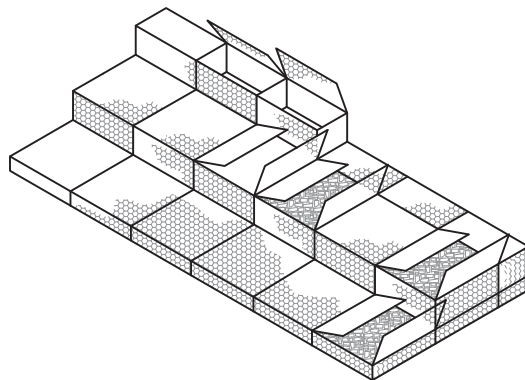


FIGURE 7
PLACING OF UNITS IN GABION STRUCTURE

NOTES: PLACING THE UNITS

1. PLACE A NUMBER OF INDIVIDUALLY LACED UNITS SIDE BY SIDE IN THE REQUIRED POSITION TAKING CARE NOT TO DAMAGE THE GEOTEXTILE. THE ALLIGNMNET OF THE UNITS SHOULD BE DONE USING STANDARD ENGINEERING METHODS, I.E. FISH LINES, DUMPY LEVELS AND FORMWORK.
2. LACE SMALL GROUPS OF GABION BOXES TOGETHER AS COMPLETE SECTIONS BEFORE JOINING TO THE REST OF THE STRUCTURE, USING EXACTLY THE SAME METHOD AS FOR ASSEMBLING SINGLE BOXES. PLACE THEM FRONT TO FRONT AND BACK TO BACK, SO THAT PAIRS OF FACING LIDS CAN LATER BE LACED DOWN TOGETHER.
3. LACE THE INDIVIDUAL UNITS TOGETHER IN A SIMILAR MANNER AS WHEN LACING UP THE EDGE OF EACH UNIT AS DESCRIBED ABOVE.
4. THE CORNERS OF THE INDIVIDUAL UNITS SHOULD BE FIRMLY WIRED TOGETHER TO FORM A UNIFORM SURFACE.
5. TENSION THE UNITS LONGITUDINALLY USING A FENCING WIRE TENSIONER. THE GABIONS SHOULD REMAIN IN TENSION DURING FILLING TO ENSURE GOOD ALLIGNMNET AND FINISH. (FIGURE 6)

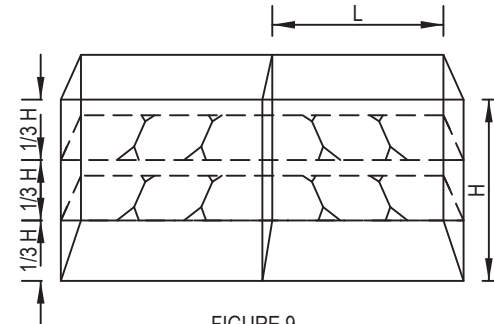


FIGURE 9
BRACING OF UNITS

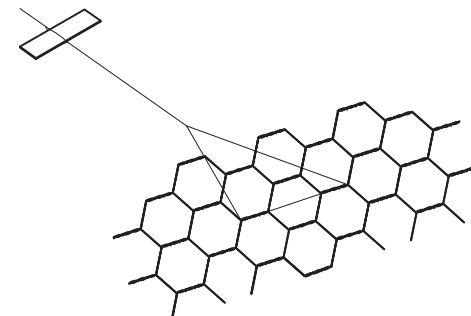


FIGURE 10
BRACING OF GABIONS

NOTES: GABION FILLING AND BRACING

1. ONLY USE STONE AS SPECIFIED IN TABLE 6 OF DRAWING 558/VV/17Td TAKING PARTICULAR CARE IN PACKING THE VISIBLE FACES TO ENSURE A EVEN-FACED FINISH.
2. FILL EACH GABION CELL TO 1/3 H. INSTALL BRACING WIRES AT THIS HEIGHT (FIGURE 9) A MINIMUM OF FOUR BRACING WIRES PER SQUARE METRE OF GABION FRONT FACE SHOULD BE USED. BRACE EACH GABION OF THE UNIT BEFORE PROCEEDING TO FILL THE GABIONS FURTHER.
3. USE APPROXIMATELY 2,3 - 2,7m OF BINDING WIRE PER BRACE FOR A 1M GABION AND 3,3 - 3,7m FOR A 1,5m GABION. THREAD THE WIRE AROUND TWO MESH OPENINGS ON THE FRONT AND THE REAR FACES OF THE BASKET AND TWIST THE ENDS TOGETHER IN THE MIDDLE. TENSION THE BRACE BY WINDLASSING WITH A PLIER HANDLE UNTIL THE FRONT FACE IS IN LINE. (FIGURE 10)
4. FILL THE GABIONS UP TO 2/3 H. AGAIN BRACE ALL THE GABIONS IN A SIMILAR MANNER.
5. FILL THE GABIONS TO THE TOP. EACH GABION SHOULD BE OVERFILLED BY APPROXIMATELY 25 - 50mm TO ALLOW FOR NATURAL SETTLEMENT.

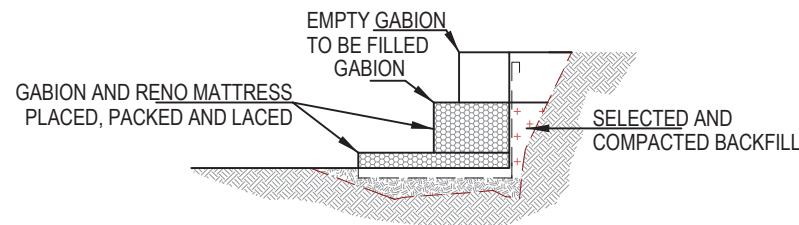


FIGURE 11
BACKFILLING BEHIND GABION STRUCTURES

NOTES: BACKFILLING

1. COMPACTION OF THE BACKFILL MUST BE DONE SIMULTANEOUSLY WITH EVERY ROW OF GABIONS LAID IN MAXIMUM 200mm LAYERS (FIGURE 11). CARE MUST BE TAKEN NOT TO DAMAGE THE GEOTEXTILE DURING PLACING AND COMPACTION OF THE BACKFILL. ONLY SMALL HAND HELD COMPACTION EQUIPMENT MAY BE USED ADJACENT TO THE GABION BASKET UP TO A DISTANCE OF 1m.

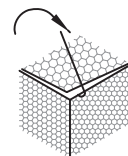
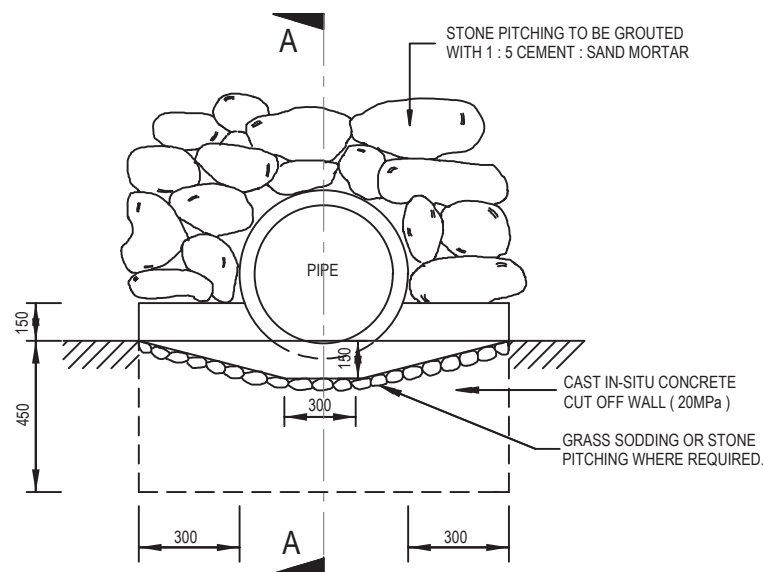


FIGURE 12
CLOSING OF THE GABION UNITS

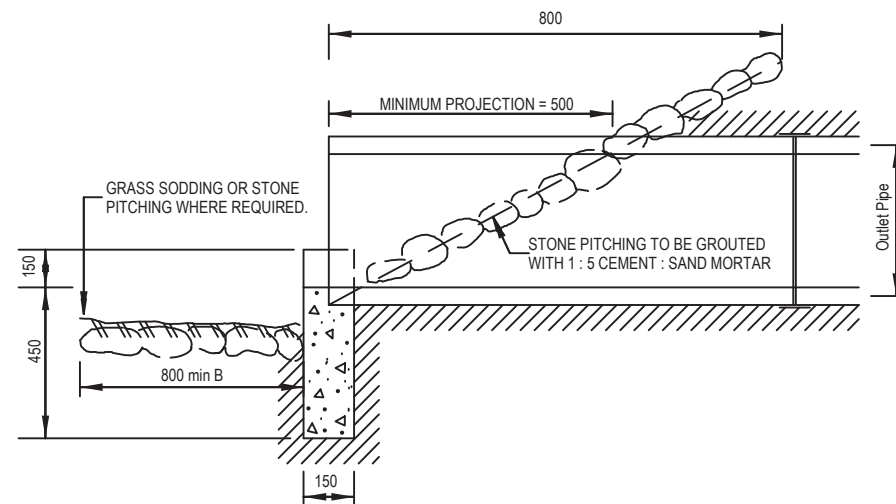
NOTES: CLOSING

1. FOLD THE LID DOWN AND STRETCH IT INTO POSITION WITH A SUITABLE TOOL. LACE THE DOWN THE LID FRONT AND ENDS AS WELL AS THE TOP IF THE DIAPHRAGM AS DESCRIBED ABOVE. (FIGURE 12)

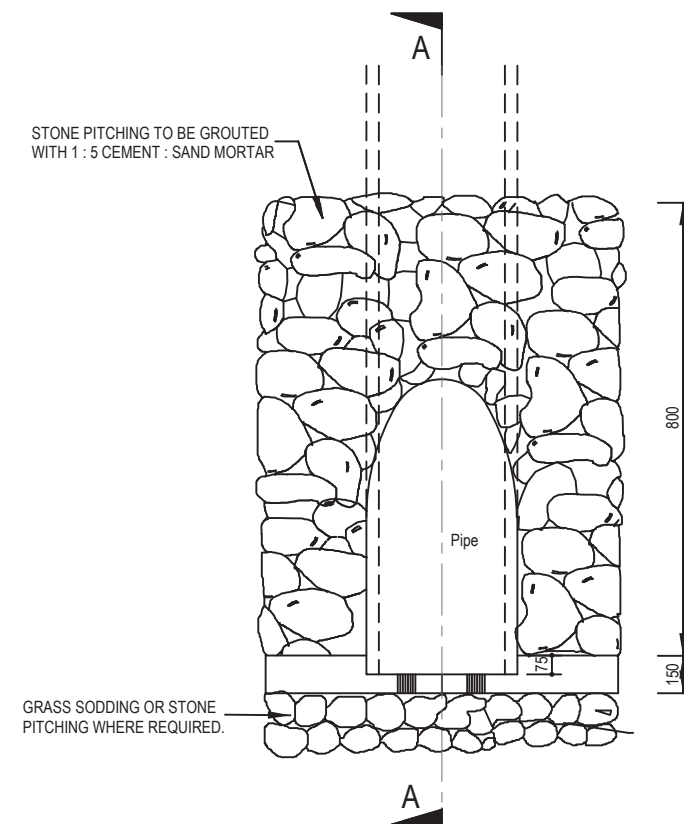
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PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE				012-362 1473 058-822 1257 016-981 0591 011-955 5334 035-753 1083 017-634 8895 034-312 6464				RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz				ASSOCIATED OFFICES: BRITS : MTUBATUBA : NELSPRUIT: DUNDEE.			
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PROJECT TITLE															
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MELMOTH WWTW INTERIM UPGRADE															
DRAWING TITLE															
STANDARD DETAILS : GABION & RENO MATTRESS DETAIL (SHEET 2 OF 2)															
DATE: NOVEMBER 2020				SCALE: AS SHOWN				A3				SHEET NO: 1 OF 1			
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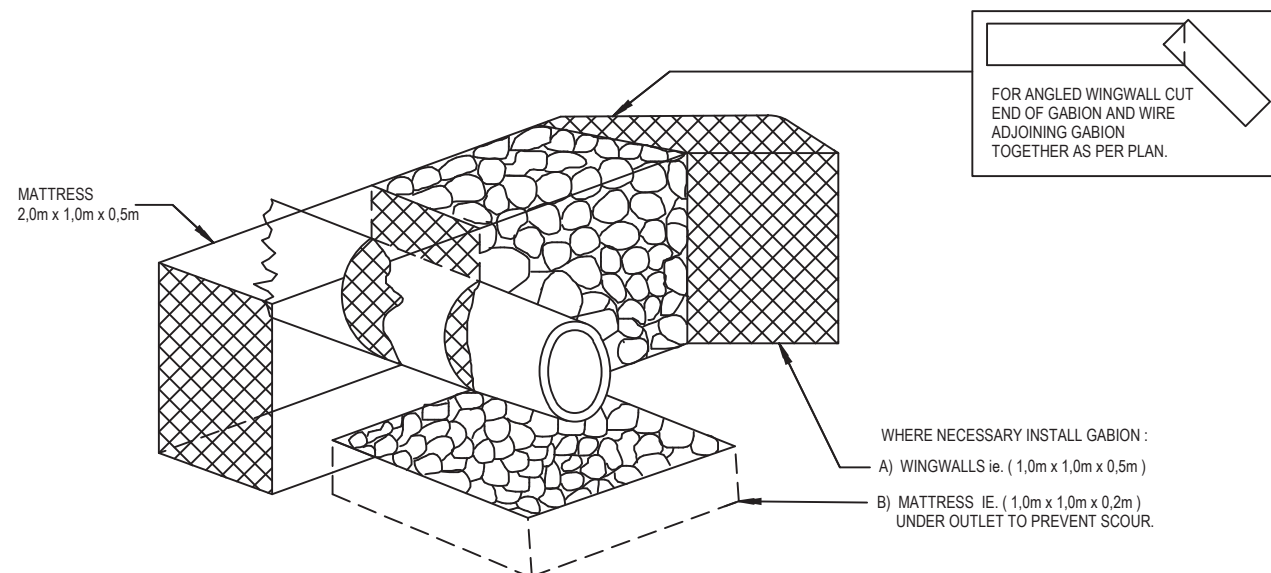
FRONT ELEVATION OF OTLET STRUCTURE
STONE PITCHED HEADWALL



OUTLET STRUCTURE SECTION A - A



PLAN OF OUTLET STRUCTURE
STONE PITCHED HEADWALL



OUTLET STRUCTURE GABION HEADWALL

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AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR

ENGINEER

DATE:.....

DATE:.....

CLIENT



CLIENT APPROVAL

Project leader: Signature: Date: Date:

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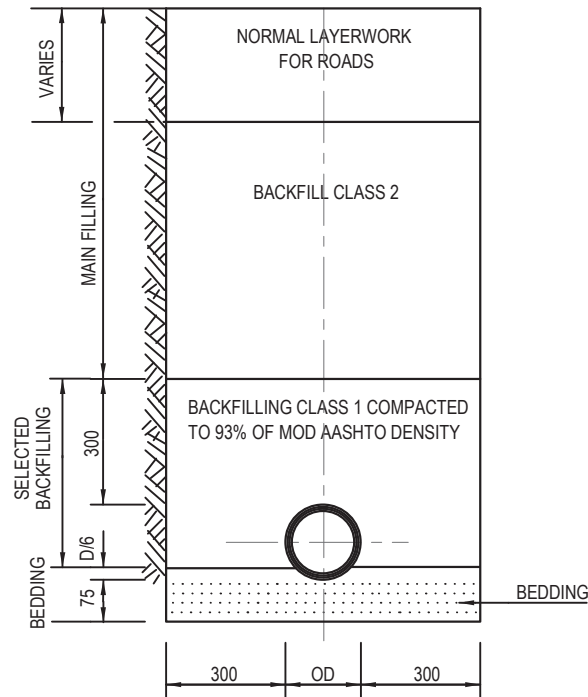
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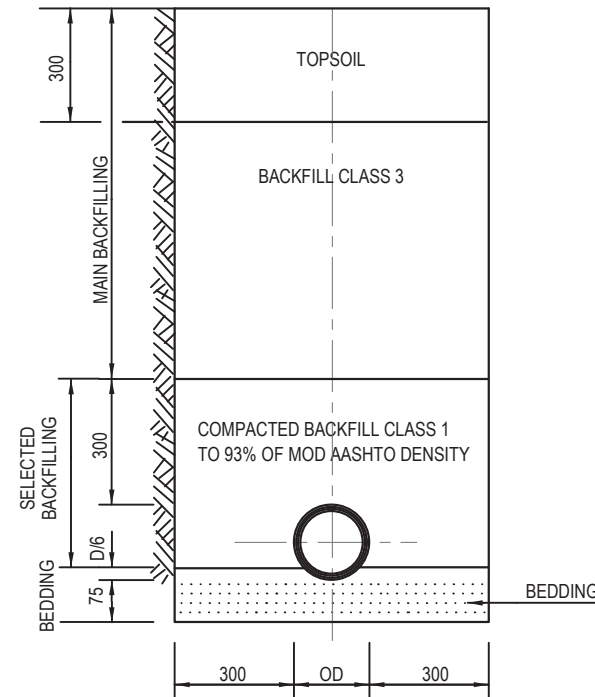
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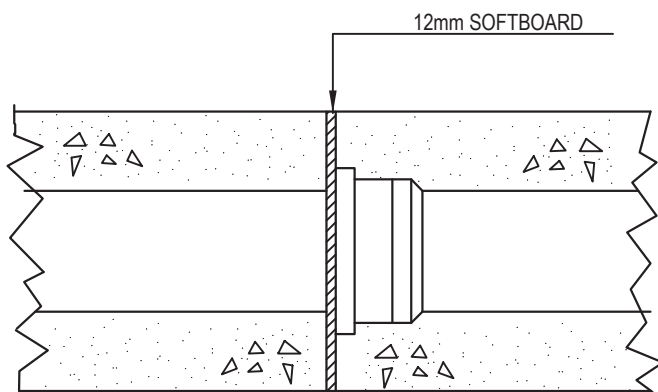
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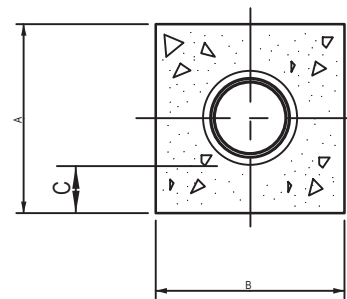
PVC SEWER PIPES
UNDER ROADS & PARKING AREAS



PVC SEWER PIPES IN
MTD BLOCKS & ROAD RESERVES



SECTION OF FLEXIBLE JOINT
IN CONCRETE ENCASING
N.T.S.



CONCRETE ENCASING OF
SEWER PIPES
N.T.S.

1. BEDDING MATERIAL

THE BEDDING MATERIAL MUST BE SELECTED GRANULAR MATERIAL WITH PI < 6 AND MUST BE WITHOUT STONE > 20mm, ORGANIC MATTER OR LUMPS OF CLAY.

THE BEDDING MATERIAL MUST BE COMPACTED UNDERNEATH AND ON BOTH SIDES OF THE SEWER PIPE TO 93% OF MOD. AASHTO DENSITY.

IN EXCESSIVE WATER CONDITIONS (SWAMPY AREAS, HIGH WATER TABLE) A 150mm BEDDING LAYER OF 19mm SINGLE DIAMETER STONE MAY BE USED. (BY WRITTEN INSTRUCTION OF THE ENGINEER ONLY)

2. BACKFILL CLASS I

THE BACKFILL MATERIAL MUST BE HOMOGENEOUS, AND MUST BE COMPACTED TO 100% OF MOD. AASHTO DENSITY, IN LAYERS NOT EXCEEDING 100mm.

THE FOLLOWING MAY NOT BE PRESENT:

- a) TREE ROOTS, BUILDING RUBBLE AND/OR ORGANIC MATTER.
- b) LUMPS OF CLAY > 75mm
- c) STONES > 20mm

3. BACKFILLING CLASS 2

SELECTED BACKFILLING MATERIAL WITH CBR > 7 AT 100% OF MOD. AASHTO DENSITY.

MAX. PI < 12

MAX. LAYER THICKNESS = 100mm.

COMPACTED TO 100% OF MOD. AASHTO DENSITY.

4. BACKFILLING CLASS 3

BACKFILL FROM TRENCH EXCAVATIONS COMPACTED TO 93% OF MOD. AASHTO DENSITY. (95% FOR NON-COHESIVE SOIL)

5. SANS 1200 CODES.

THE FOLLOWING CODES OF SANS 1200 SHALL PREVAIL.

- a) SANS 1200 DB PIPE TRENCHES.
- b) SANS 1200 LD SEWERS.
- c) SANS 1200 LB BEDDING PIPES.

NOTE:

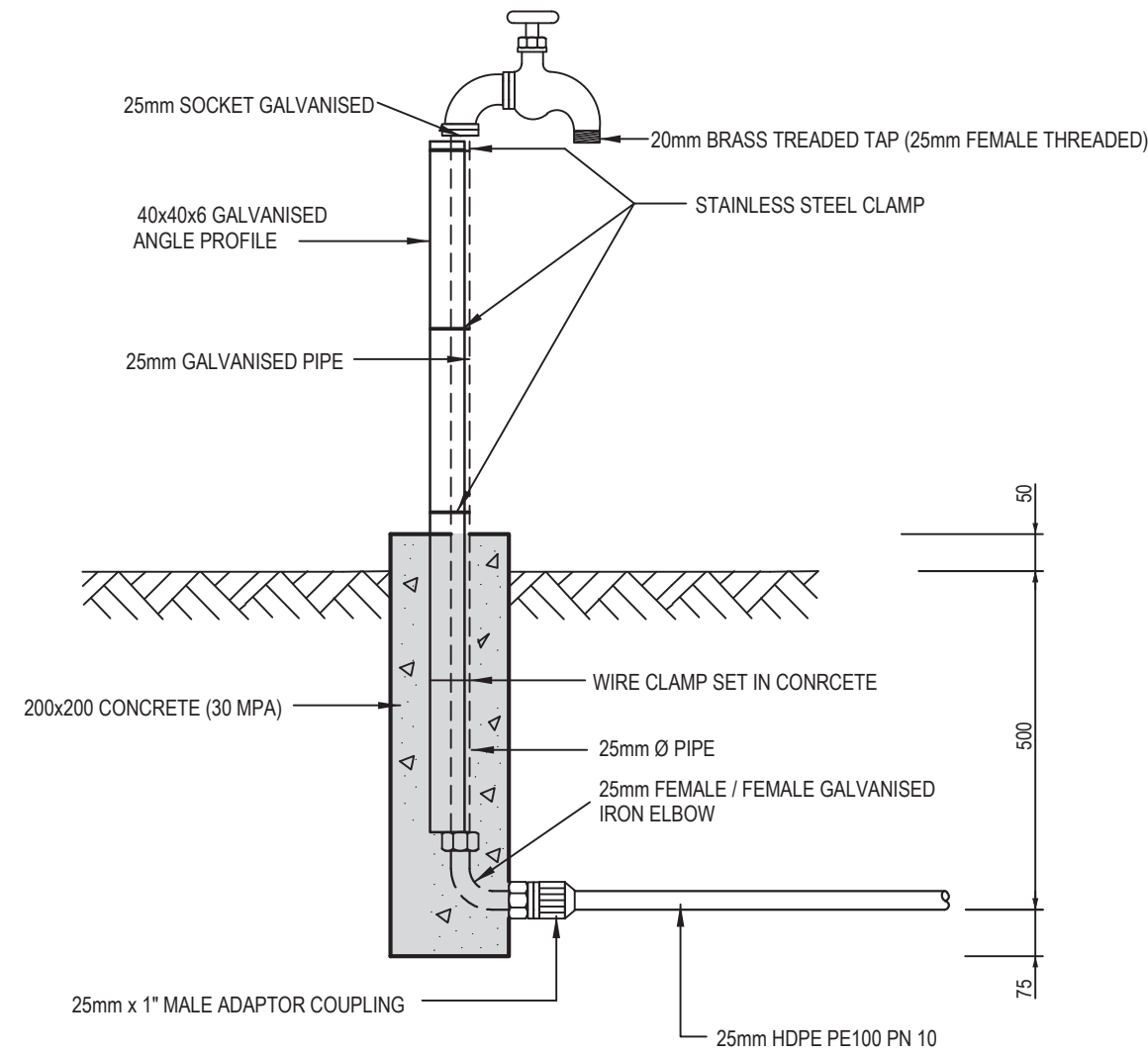
THE CONTRACTOR MUST AT ALL TIMES COMPLY WITH THE SAFETY REGULATIONS IMPOSED IN CLAUSE 5.1.1.2 OF SANS 1200D WHICH STIPULATES THE PRECAUTIONS TO BE TAKEN IN ALL TRENCH EXCAVATIONS

PIPE CONCRETE ENCASING		
Ø (mm)	A & B	C
100	250	75
150	325	75
200	400	75

NOTES:

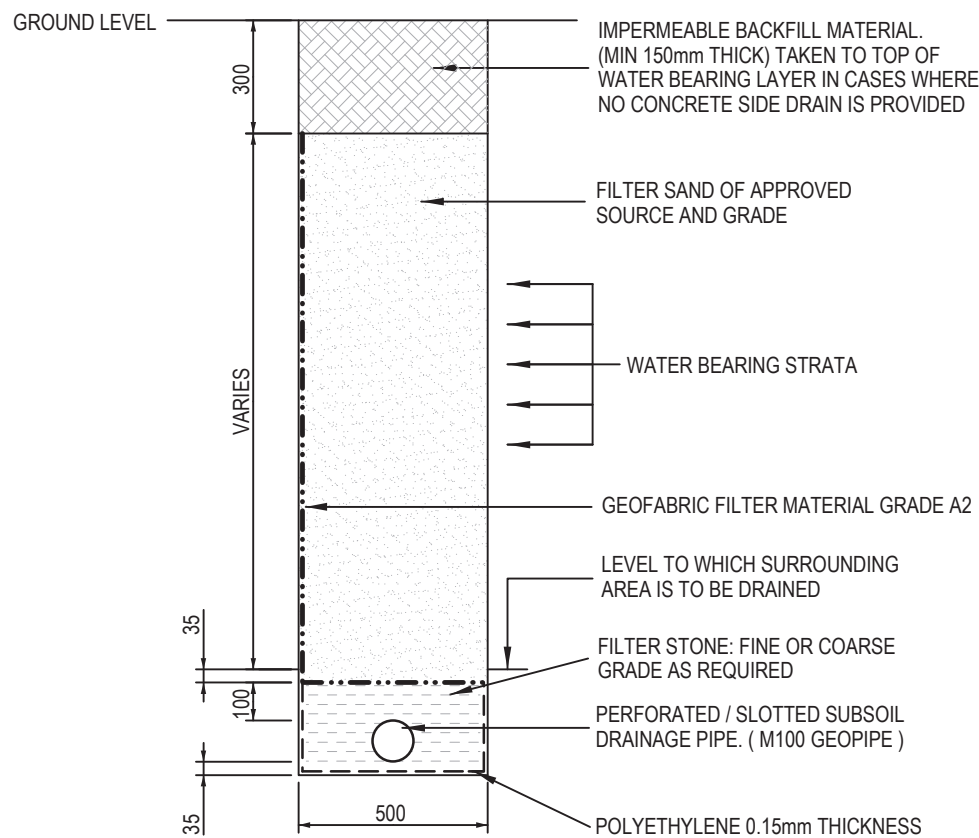
CONCRETE CLASS 30/19 FOR ENCASING OR BEDDING OF PIPES.
ONLY VERTICAL CONSTRUCTION JOINTS ARE USED.

A	16/11/2020	D.S	FOR TENDER
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KING CETSHWAYO DISTRICT MUNICIPALITY			
CLIENT APPROVAL			
Project leader:	Signature:		
Date:			
CLIENT DRAWING NUMBER			
			
PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE 058-822 1257 016-981 0591 011-955 5334 035-753 1083 017-534 8895 034-312 0454 RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz			
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Designed:	Q.70M rka L	Date:	Signature:
Drawn:	m.poothi	Date:	Signature:
Checked:	p.7.11a10	Date:	Signature:
g.L.LaEM 30.70M rka L		Date:	Signature:
PROJECT TITLE			
MELMOTH SEWER UPGRADE PHASE 2			
PROJECT DESCRIPTION			
MELMOTH WWTW INTERIM UPGRADE			
DRAWING TITLE			
TYPICAL DETAIL: SEWER PIPE BACKFILL DETAIL			
DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
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CONSULTING ENG. DRAWING NO: R11-024-20-DET-08			Rev: A



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PRETORIA: HARRISMITH, VANDERBULPARK, KRUGERSDORP, RICHARDSBAY, SECUNDA, NEWCASTLE. 058-822 1297, 016-981 0591, 011-955 5334, 035-753 1083, 017-534 8695, 034-312 6464. RICHARDS BAY OFFICE: 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz, Web: www.ilifa.biz															
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PROJECT DESCRIPTION															
MELMOTH WWTW INTERIM UPGRADE															
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Rev.															
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SUBSOIL DRAIN WITH POLYETHYLENE LINING
SCALE 1:20

FILTER CRITERIA

A. FILTER SAND (FS) IN RELATION TO WATER BEARING STRATA (WS)

- FOR $D^{85}_{(WS)} > 0.05\text{mm}$:
 - TO PREVENT BLOCKING OF FILTER SAND:
 $D^{15}_{(FS)} < 5 \times D^{85}_{(WS)}$
 $D^{50}_{(FS)} < 25 \times D^{50}_{(WS)}$
 - FOR PERMEABILITY OF FILTER SAND:
 $D^{15}_{(FS)} > 5 \times D^{15}_{(WS)}$

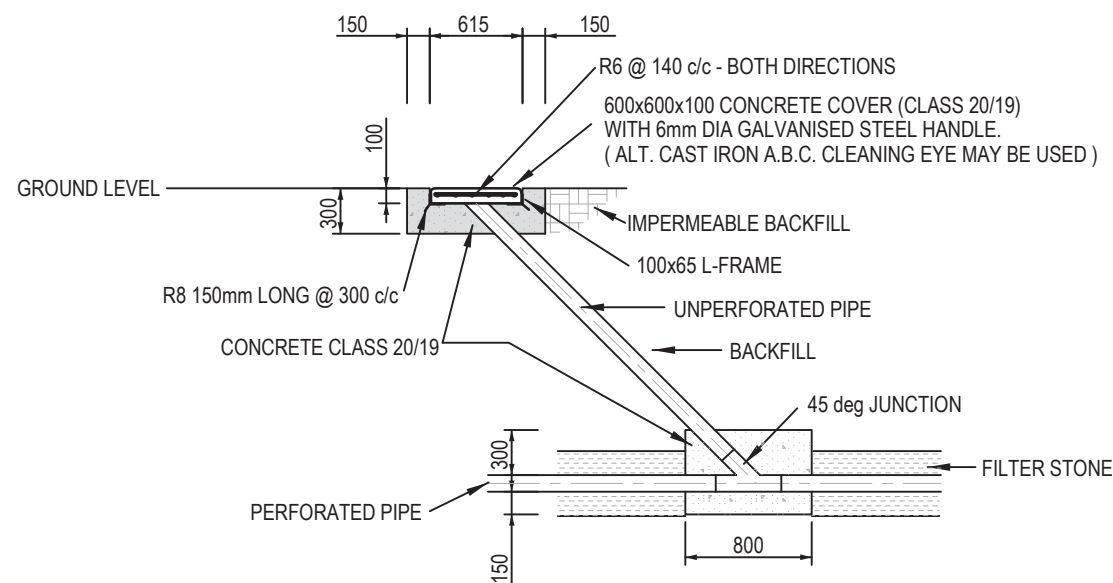
- FOR $D^{85}_{(WS)} < 0.05\text{mm}$:
 - TO PREVENT BLOCKING OF FILTER SAND:
 $D^{15}_{(FS)} < 0.25\text{mm}$
 $D^{50}_{(FS)} > 0.075\text{mm}$
 - PERMEABILITY REQUIREMENTS NOT NECESSARY

B. FILTER STONE (FNS) IN RELATION TO FILTER SAND (FS)

- TO PREVENT BLOCKING OF FILTER STONE:
 $D^{15}_{(FNS)} < 5 \times D^{85}_{(FS)}$
 $D^{50}_{(FNS)} < 25 \times D^{50}_{(FS)}$
- PERMEABILITY: FILTER STONE MUST BE COARSER THEN SAND AT ALL PERCENTAGES

NOTE:

- ALL CRITERIA ASSUMES THAT FILTER SAND AND FILTER STONE ARE CONTINUOUSLY GRADED FROM COARSE TO FINE.
- USE THE ENVELOPE CURVES FOR THE WATER BEARING STRATA, FILTER SAND AND FILTER STONE GRADINGS AND APPLY TO MOST CRITICAL COMBINATIONS.
- WHERE SUBSOIL DRAINAGE IS INSTALLED IN SOLID ROCK, THE POLYETHELENE LINING MAY BE OMITTED.
- TYPE A OUTLET PREFERABLY TO BE USED WHERE THE NATURAL GROUND LEVELS ALLOW IT. OUTLETS MAY ALSO BE COMBINED WITH CULVERT INLETS OR OUTLETS
- SPACING OF CLEANING EYES TO BE AS FOLLOW:
 - 40m MAY ON STRAIGHT SECTIONS.
 - AT ALL BENDS.
 - OR AS DIRECTED BY THE ENGINEER.



CLEANING EYE IN SUBSOIL DRAIN
SCALE 1:50

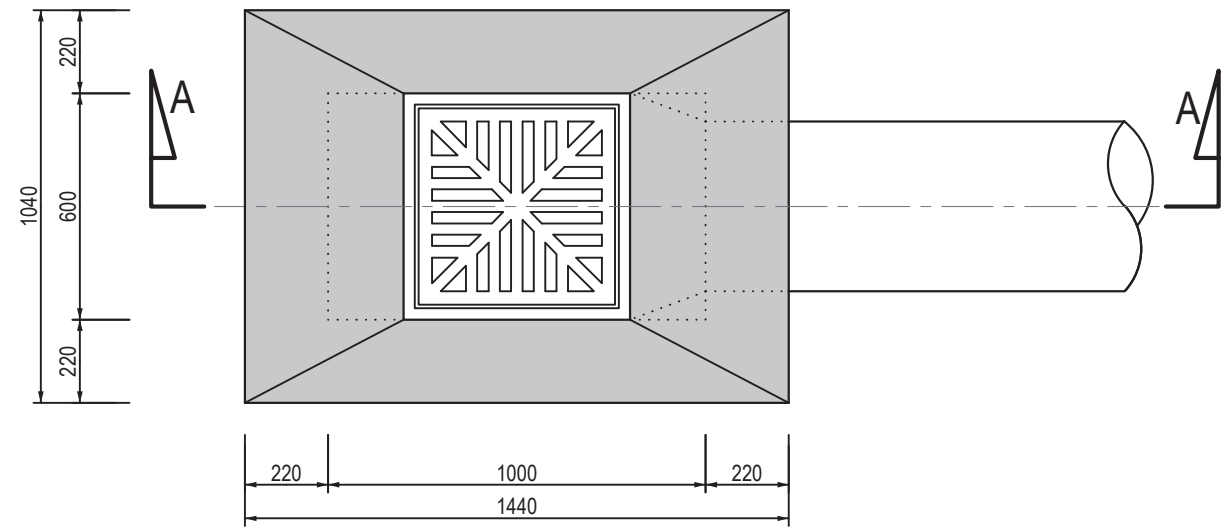
C. FILTER STONE (FSN) IN RELATION TO PERFORATIONS IN PIPES

- TO PREVENT BLOCKING OF PERFORATIONS IN PIPES:
- $D^{85}_{(FNS)} > 1.2 \times \text{DIAMETER ROUND PERFORATIONS}$
 - $D^{85}_{(FNS)} > x \text{ WIDTH OF SLOTS}$

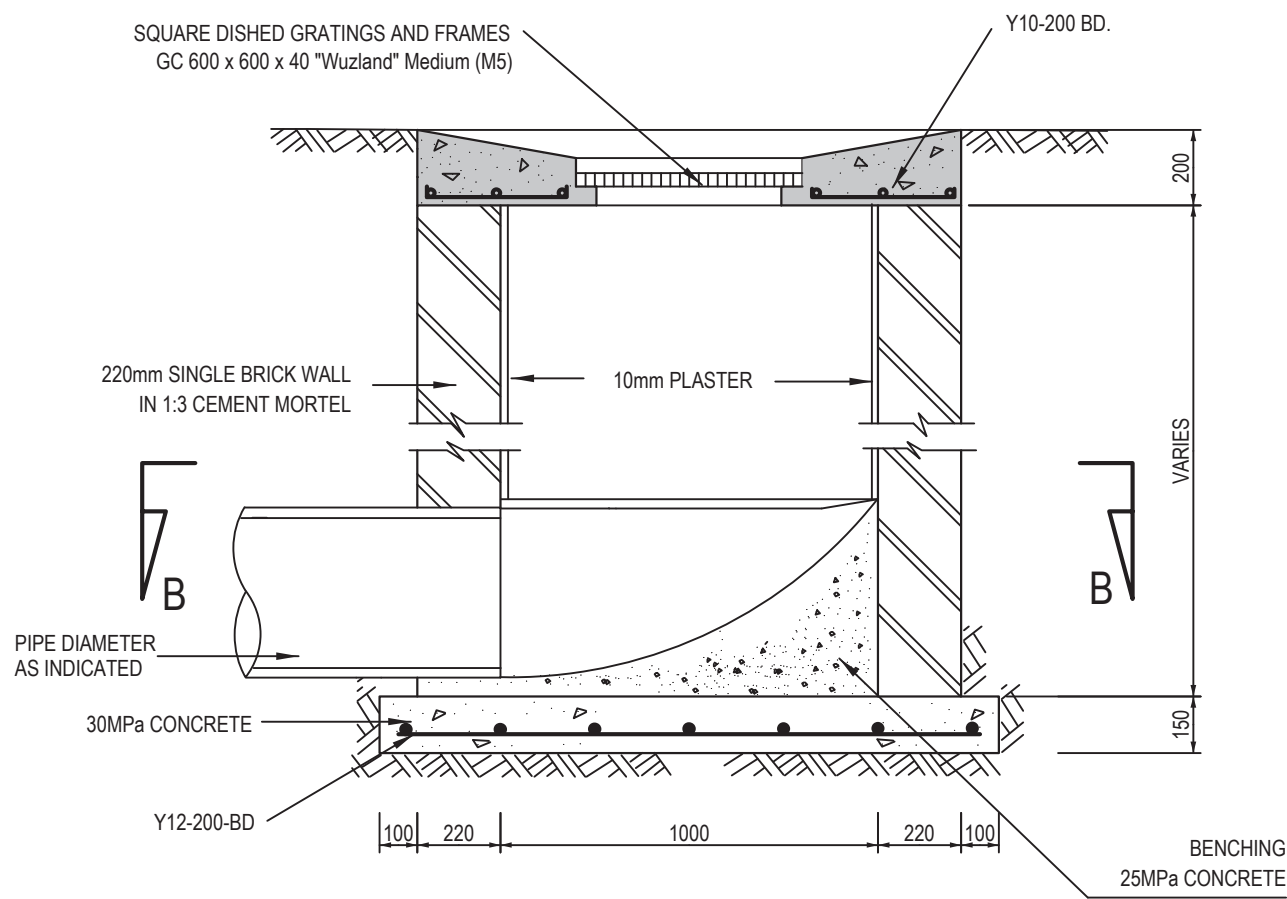
D. SYNTHETIC FIBRE FILTER FABRIC (SF) IN RELATION TO FILTER SAND (FS)

- TO PREVENT CLOGGING OF SYNTHETIC FIBRE FILTER FABRIC:
 $O^{50}_{(SF)} < D^{85}_{(FS)}$
- FOR PERMEABILITY OF SYNTHETIC FIBRE FILTER FABRIC:
 $O^{50}_{(SF)} > D^{15}_{(FS)}$

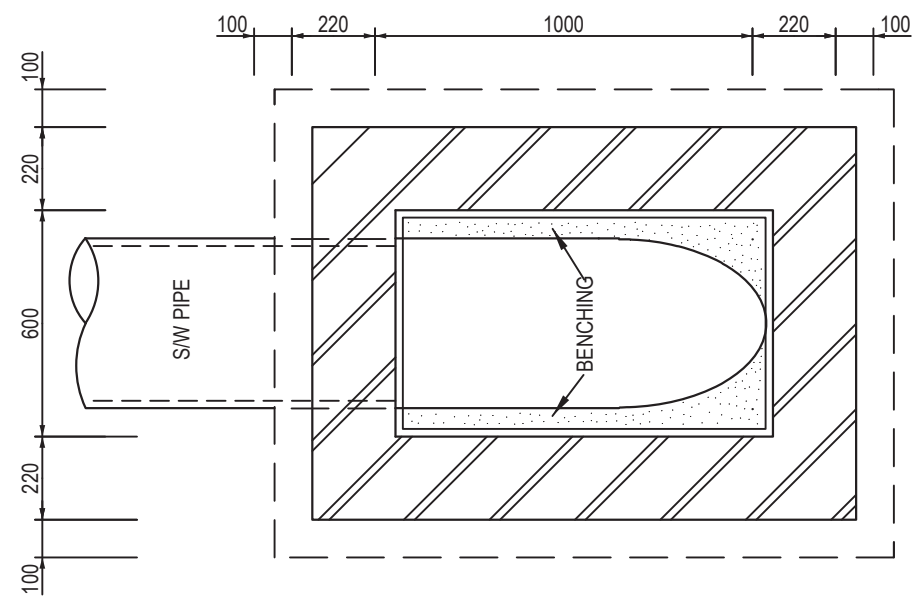
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TECHNICAL CO-ORDINATOR		ENGINEER	
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PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE 012-362 1473 058-822 1297 016-981 0591 011-955 5334 035-753 1083 017-634 8895 034-312 6464			
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PROJECT TITLE			
MELMOTH SEWER UPGRADE PHASE 2			
PROJECT DESCRIPTION			
MELMOTH WWTW INTERIM UPGRADE			
DRAWING TITLE			
TYPICAL DETAIL: SUBSOIL DRAIN DETAIL			
DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
Reg. No.			
CONSULTING ENG. DRAWING NO: R11-024-20-DET-10			Rev: A



STORMWATER GRID INLET
SCALE 1:20



SECTION A-A
SCALE 1:20



SECTION B-B
SCALE 1:20

NOTES FOR RIGID PIPES:

1. ALL PIPES SHALL COMPLY WITH SANS 667-2003, "STANDARD SPECIFICATIONS FOR CONCRETE NON-PRESSURE PIPES", AND SHALL BE INSTALLED IN ACCORDANCE WITH SANS 10102-2-2011, "CODE OF PRACTICE FOR DESIGN AND INSTALLATION OF PRECAST CONCRETE PIPES."
2. JOINTS SHALL BE SPIGOT AND SOCKET WITH RUBBER RING,
3. THE MINIMUM COVER OVER ANY PIPE CULVERT SHALL BE 600mm. IN EXCEPTIONAL CASES PIPES MAY BE ENCASED IN CONCRETE AND THE COVER REDUCED TO 200mm.
4. ALL PIPE LIFTING HOLES MUST BE PLUGGED TO THE SATISFACTION OF THE ENGINEER.

NOTES FOR FLEXIBLE PIPES:

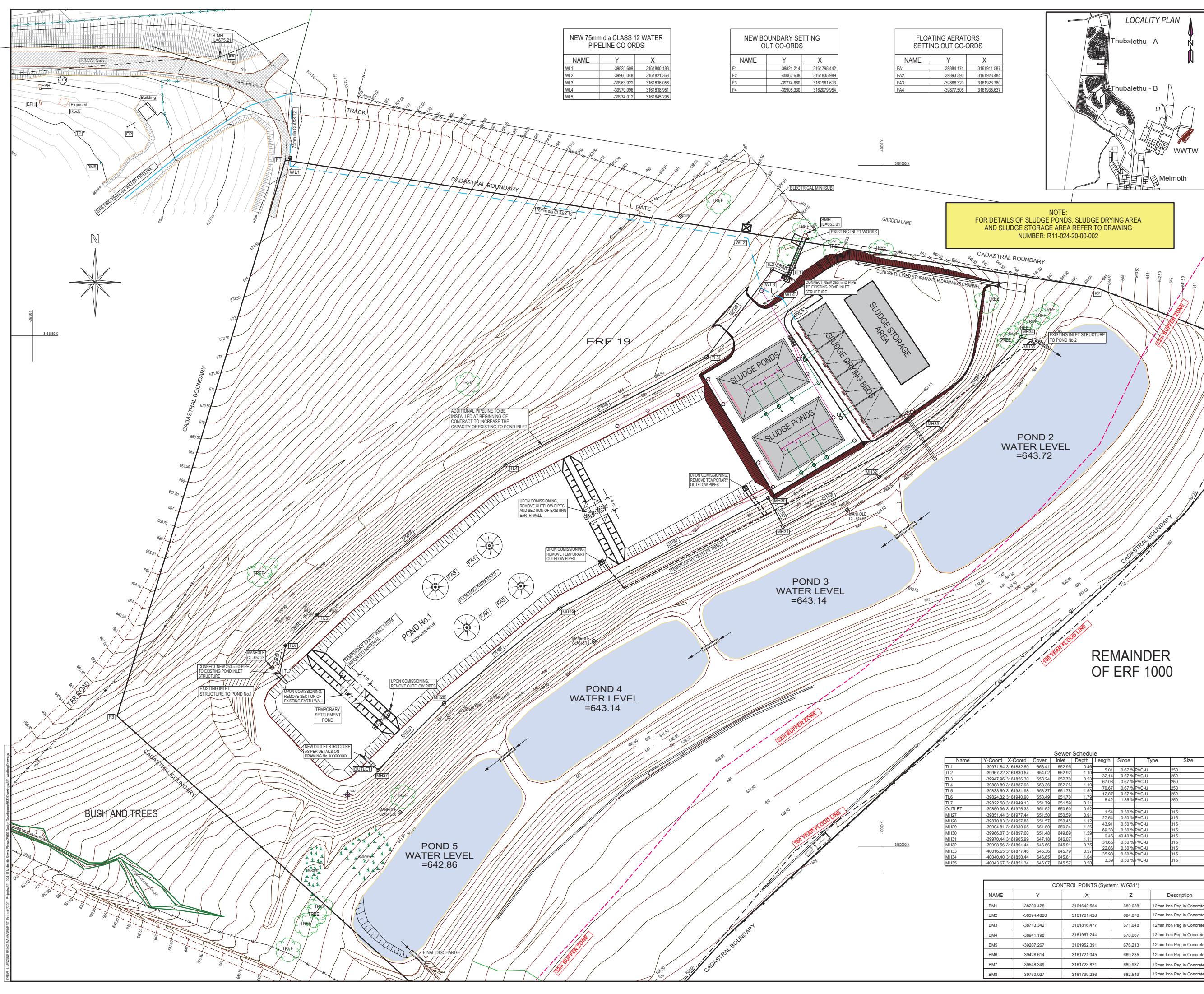
1. ALL PIPES TO BE SWP (STRUCTURED WALL PIPES) WEHOLITE OR SIMILAR APPROVED. PIPES SHALL COMPLY WITH EN 13776 AND SANS 21138.
2. SWP HDPe PIPES SUPPLIED AS STORMWATER TYPE.
3. SANDTIGHT MALE - FEMALE COUPLING, NO SEAL = OGGE JOINT
4. PIPE DIAMETERS AS INDICATED.
5. PIPE STIFFNESS SN4 UNLESS OTHERWISE INDICATED.
6. STANDARD PIPE LENGTHS, 3m , 6m & 12m

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TECHNICAL CO-ORDINATOR				ENGINEER			
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Project leader:		Signature:		Date:			
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PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE		012-362 1473 058-822 1297 016-981 0591 011-955 5334 035-753 1083 017-534 8895 034-312 6464		RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz			
ASSOCIATED OFFICES: BRITS; MTUBATUBA; NELSPRUIT; DUNDEE.							
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PROJECT TITLE							
MELMOTH SEWER UPGRADE PHASE 2							
PROJECT DESCRIPTION							
MELMOTH WWTW INTERIM UPGRADE							
DRAWING TITLE							
TYPICAL DETAIL: STORMWATER GRID INLET DETAIL							
DATE: NOVEMBER 2020		SCALE: AS SHOWN		A3		SHEET NO: 1 OF 1	
Reg. No.							
CONSULTING ENG. DRAWING NO: R11-024-20-DET-11						Rev: A	

CONTRACT
Part C5: Annexures

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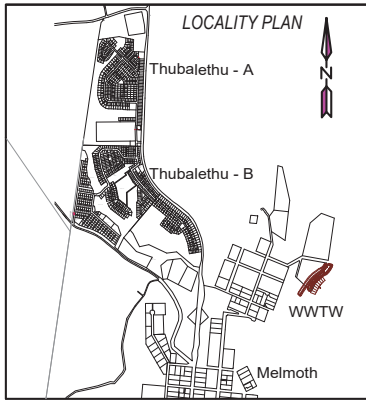
EPWP Monthly Progress Form		
Field requested	Description if needed	Please complete the sections in white
Project Details		
Profile ID	full description of what is happening in the project (as per the appointment letter) and the community benefiting from the project	
Project Name	The name of the project	
Project Reference Number	Contract number	
Project description	Full description of what is happening in the project (as per the appointment letter) and the community benefiting from the project	
Month		
Reporting Month		April
Budget Expenditure		
Cumulative Expenditure Amount	What is the Overall amount spend on this project?	
Current Expenditure Amount	What is the amount spend including all grants for this month?	
Wages	How much paid on wages for this month only?	
UIF	How much paid on UIF for this month only?	
COIDA	How much paid on COIDA for this month only?	
Stipends for training	Amount paid to participants whilst on training (this month only)	
Amount spent on service providers for training	How much paid to service providers for training for this month only?	
Training	Total Cost of training for this month? (number captured on ERS)	
Administration	How much paid on administration for this month only?	
Equipment and materials	How much paid on equipment and materials for this month only?	
Other	How much paid on other?	
Describe other	Be specific e.g. Consulting fees, Transport etc.	
Project output description	Describe the project output (end product and not the milestone) (e.g. kms of tar road constructed) Start with the unit of measure such as number of, kms, ha, sqms etc	
Unit of measure of primary output	Eg. m, m ² , m ³ , km, no, ha etc	
Cumulative primary output achieved	Since the onset of the project	
Quantity Achieved	enter numeric output for this month only	
Percentage achieved	How much work done / achieved in percentages?	
EPWP Branding		
Branding compliant	Yes / No	
Date that the branding was provided	When was the project branded?	
Has a photo of project branding been provided?	Yes / No	
First name of Official Who Branded Project	Official Name	
Surname of Official Who Branded Project	Official Surname	
Phone number of official who erected branding for the project	Official contact number	
Give the public body reference and name, and organisational details of the person that provided branding.	Public body details (reference & name)	



NEW 75mm dia CLASS 12 WATER PIPELINE CO-ORDS			
NAME	Y	X	
WL1	-39825.609	3161800.188	
WL2	-39960.048	3161821.368	
WL3	-39963.922	3161836.056	
WL4	-39970.096	3161839.951	
WL5	-39974.012	3161845.295	

NEW BOUNDARY SETTING OUT CO-ORDS			
NAME	Y	X	
F1	-39824.214	3161798.442	
F2	-40062.608	3161835.989	
F3	-39774.860	3161961.613	
F4	-39965.330	3162079.954	

FLOATING AERATORS SETTING OUT CO-ORDS			
NAME	Y	X	
FA1	-39884.174	3161911.587	
FA2	-39893.390	3161923.484	
FA3	-39898.320	3161933.780	
FA4	-39877.506	3161935.637	



NOTE:
FOR DETAILS OF SLUDGE PONDS, SLUDGE DRYING AREA
AND SLUDGE STORAGE AREA REFER TO DRAWING
NUMBER: R11-024-20-00-002

- NOTES:
- ALL EXISTING SERVICES WHETHER INDICATED OR NOT, ON THE DRAWINGS ARE TO BE TREATED AS LIVE. THE CONTRACTOR IS TO MAKE THE NECESSARY ALLOWANCES TO DEAL WITH THE SERVICES AFFECTED BY THE PROPOSED WORKS IN ACCORDANCE WITH THE VARIOUS SERVICES AFFECTED BY THE PROPOSED WORK SO THAT THE NECESSARY ALTERATIONS CAN BE MADE TO THE DRAWINGS WITHOUT AFFECTING THE PROGRESS ON THE WORKS.
- GENERAL:
- 1) ALL WORKMANSHIP TO BE IN ACCORDANCE WITH THE RELEVANT PROJECT SPECIFICATIONS AS INCLUDED IN THE CONTRACT DOCUMENT.
- 2) ALL LEVEL AND DIMENSIONS TO BE CHECKED PRIOR TO COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES ARE TO BE BROUGHT UNDER THE ATTENTION OF THE ENGINEER.
- 3) ALL EXISTING SERVICES TO BE LOCATED AND IDENTIFIED BY THE CONTRACTOR, PRIOR TO THE COMMENCEMENT OF WORK.
- SEWER NOTES:
- UPVC SEWER PIPES UNDER GROUND:-
- UPVC SEWER PIPES & FITTINGS MUST BE MANUFACTURED TO SANS 1601 HEAVY DUTY PIPE STIFFNESS 400 KPA.
- HDPE SEWER PIPES UNDER GROUND:-
- ALL HD-PE PIPING SHALL BE MANUFACTURED TO THE LATEST SABS ISO 4427 SPECIFICATION. ALL HD-PE PIPES WILL COMPLY WITH SABS ISO 4427 (1996) PE100 OF CLASS PN12.5 UNLESS OTHERWISE INDICATED.
- UPVC SEWER PIPES & FITTINGS ABOVE GROUND:-
- UPVC SEWER PIPES & FITTINGS MUST BE MANUFACTURED TO SANS 967 - 1987 (WHITE).
- SEWER PIPES TRENCHES BEDDING AND SEWERS
- SANS 1200 DB, SANS 1200 CB, SANS 1200 CD SHALL PREVAIL. MANHOLES AND CLEANING EYES TO DETAILS. COMPACTION TO BACKFILLING OF TRENCHES CROSSING BUILDINGS 95% OF MOD. ASHTO DENSITY.

No.	Date	By	Description
A	16-11-2020	D.S.	FOR TENDER

REVISIONS
AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....



Project leader:	Signature:
Date:	
Client Drawing Number:	

ilifa
AFRICA ENGINEERS

PRETORIA 012-362 1473
HARRISMITH 058-622 1297
VANDERBIJLPARK 016-981 0591
KRUGERSDORP 011-955 5334
RICHARDSBAY 035-753 1083
SECUNDA 017-634 8895
NEWCASTLE 034-312 6464

RICHARDS BAY OFFICE, 21 Kingfish Creek, PO Box 10812, Meerensee, 3901.
email: rbay@ilifa.biz
Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS; MTUBATUBA; NELSPRUIT; DUNDEE.

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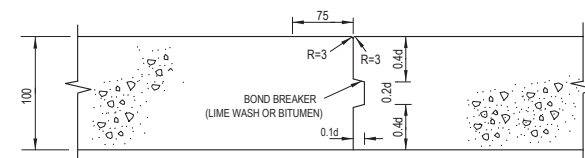
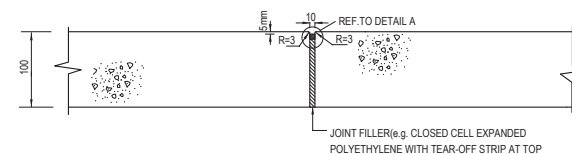
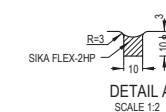
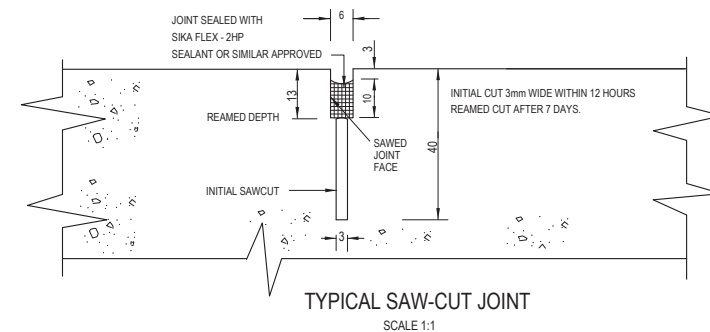
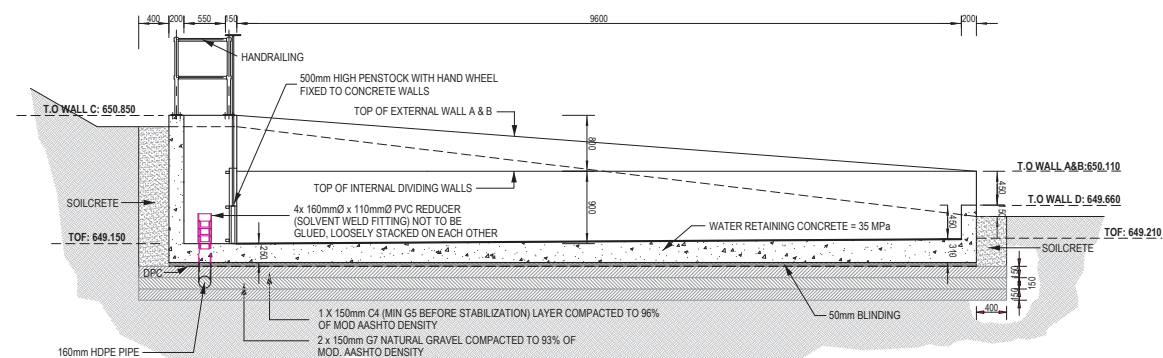
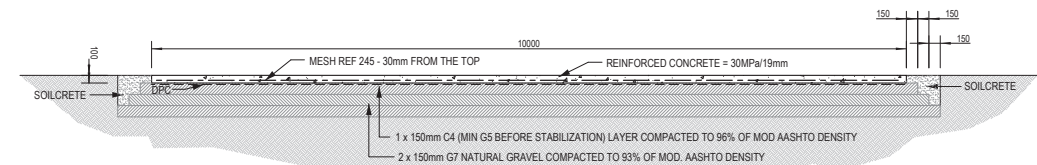
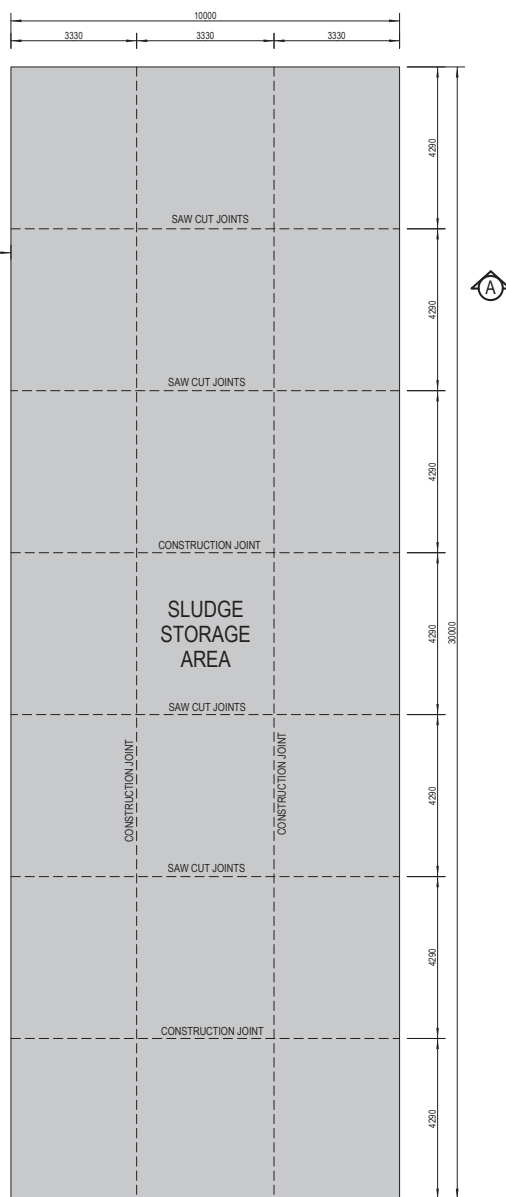
Designed: D. Steenkamp	Date:	Signature:
Drawn: H. Jacobs	Date:	Signature:
Checked: J. Scalliet	Date:	Signature:
Approved: D. Steenkamp	Date:	Signature:
Reg No: 201270171		

PROJECT TITLE
**MELMOTH SEWER UPGRADE
PHASE 2**

PROJECT DESCRIPTION
MELMOTH WWTW INTERIM UPGRADE

DRAWING TITLE
WWTW SITE DEVELOPMENT PLAN

DATE: MAY 2020	SCALE: 1:500	A1	SHEET No: 1 OF 1
CONSULTING ENG. DRAWING No: R11-024-20-00-001	Rev: A		

[illegible]

- ## GENERAL NOTES:
1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 30 MPa
MINIMUM CONCRETE COVER = 50mm. EXCEPT FOR
FOUNDATIONS = 50mm; WATER RETAINING = 50mm
CONCRETE SHOULD BE CURED (KEEP PERMANENTLY
WET) FOR 7 DAYS.
FLOORS ARE MAY NOT BE USED TO STORE BUILDING
MATERIALS.
NO CONCRETE MAY BE PLACED BEFORE APPROVAL
OF THE REINFORCING BY THE ENGINEER.
 2. CONCRETE REINFORCING SHALL USE ALTERNATIVE PANELS
AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE
 3. JOINT FILLER TO BE CLOSED CELL-EXPANDED
POLYETHYLENE FOAM OR SIMILAR APPROVED.
JOINT SEALANT TO BE Sika Flex-Pro 3 or Sika
Polyurethane Sealant OR SIMILAR
APPROVED.
 4. ALL CONCRETE EDGES MUST BE NOSED WITH
NOSING
 5. WOOD FLOOR FINISH.
 6. SANS 1200 GA SHAL PREVAIL WITH SPECIAL
REFERENCE TO CLAUSE 5.4 & 3
 7. CONCRETE MUST HAVE A NEAT SMOOTH EVEN
& UNIFORM FINISH.

A	16-11-2020	D.S	FOR TENDER
No.	Date	Ru	Description

REVISIONS AS BUILT DRAWINGS	
TECHNICAL CO-ORDINATOR DATE:.....	ENGINEER DATE:.....



The logo for Ilifa Africa Engineers features the word "ilifa" in a large, bold, blue sans-serif font, with a small gold-colored horizontal bar above the "i". Below "ilifa" is the text "AFRICA ENGINEERS" in a smaller, blue, all-caps sans-serif font. The entire logo is set against a white background.

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DIRECTLY OR INDIRECTLY NOR USED FOR ANY PURPOSE
OTHER THAN THAT FOR WHICH IT IS SPECIALLY FURNISHED, AND/OR
THE INSTALLATION AND/OR MAINTENANCE OF EQUIPMENT TO WHICH ITS
REFERS

Designed :	<i>D.Steenkamp</i>	Date:	Signature :
Drawn :	<i>H.Jooste</i>	Date:	Signature :
Checked :	<i>J.Scaillet</i>	Date:	Signature :
<i>Approved: D.Steenkamp</i> Reg No.: 201270171		Date:	Signature :

PROJECT TITLE

**MELMOTH I ES EU PGAUD2 E
GHD I E N**

MELMOTH S S TS WTEUW PGAUD2E

DRAWING TITLE

SLUDGE DRYING BED LAYOUT

DATE: JULY 2018	SCALE: 1: 100 / 50	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No: R11-024-20-00-L001			Rev A

GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa
2. MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR FOUNDATIONS = 50mm ; WATER RETAINING = 50mm
3. CONCRETE SHOULD BE CURED (KEPT PERMANENTLY WET) FOR 7 DAYS MIN.
4. FLOORSLABS MAY NOT BE USED TO STORE BUILDING MATERIALS
5. NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
6. LINING CONCRETE PLACED IN ALTERNATIVE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.
7. JOINT FILLER TO BE CLOSED CELL-EXPANDED POLYETHYLENE FOAM OR SIMILAR APPROVED.
8. JOINT SEALER TO BE SIKAFLEX-PRO 31-CURE POLYURETHANE SEALANT OR SIMILAR APPROVED
9. ALL CONCRETE EDGES MUST BE NOSED WITH NOSING TOOL.
10. WOOD FLOAT FINISH.
11. SANS 1200 GA SHALL PREVAIL, WITH SPECIAL REFERENCE TO CLAUSE 5, 4, 8, 3 CONCRETE MUST HAVE A NEAT SMOOTHEN EVEN & UNIFORM FINISH.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT	
	
KING CETSHWAYO DISTRICT MUNICIPALITY	
CLIENT APPROVAL	Signature : _____
Project leader: _____	Date: _____
CLIENT DRAWING NUMBER:	



ilifa
AFRICA ENGINEERS

PRETORIA 012-362 1473
HARRISMITH 058-622 1297
VANDERBULPARK 016-981 0591
KRUGERSDORP 011-955 5334
RICHARDSBAY 035-753 1083
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email: rbay@ilifa.biz
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ASSOCIATED OFFICES:
BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.

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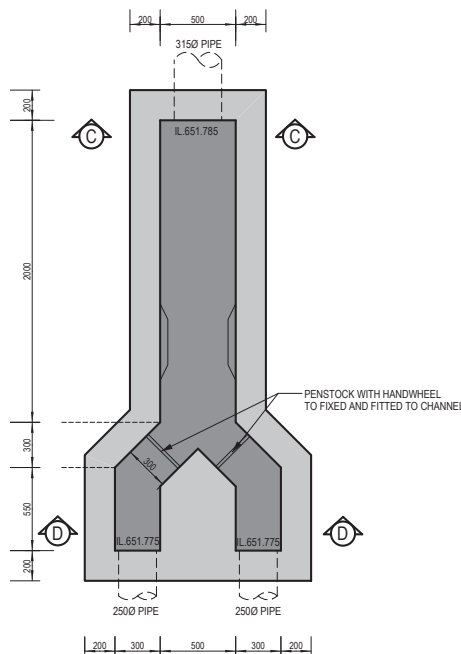
Designed : D. Steenkamp	Date:	Signature : _____
Drawn : H. Jooste	Date:	Signature : _____
Checked : J. Scalliet	Date:	Signature : _____
Approved: D. Steenkamp Reg No.: 201270171	Date:	Signature : _____

PROJECT TITLE
**MELMOTH I ES EU PGAUD2 E
GHDI E N**

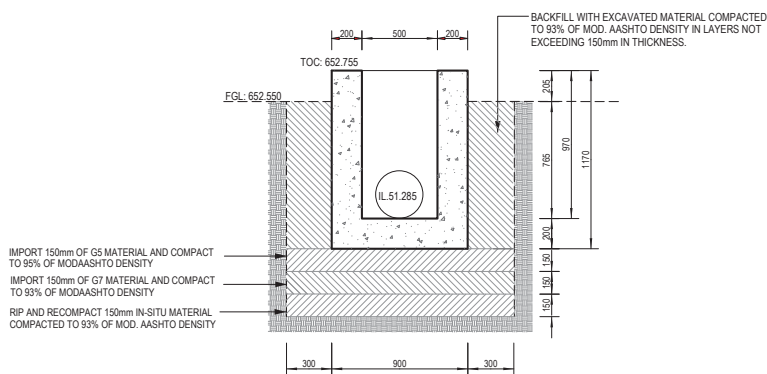
PROJECT DESCRIPTION
MELMOTH S S TS WTEUW PGAUD2 E

DRAWING TITLE
FLOW SPLITTER BOX LAYOUT PLAN

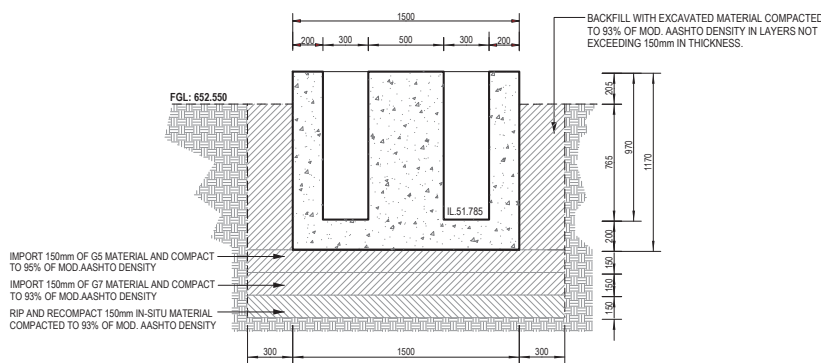
DATE: JULY 2018	SCALE: 1:50	A1	SHEET No: 1 OF 1
PLAN No.			Rev
R11-024-20-00-L002			A



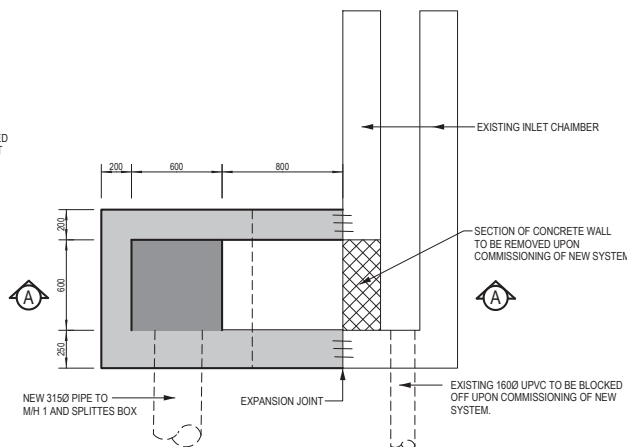
FLOW SPLITTER BOX LAYOUT PLAN
SCALE 1:25



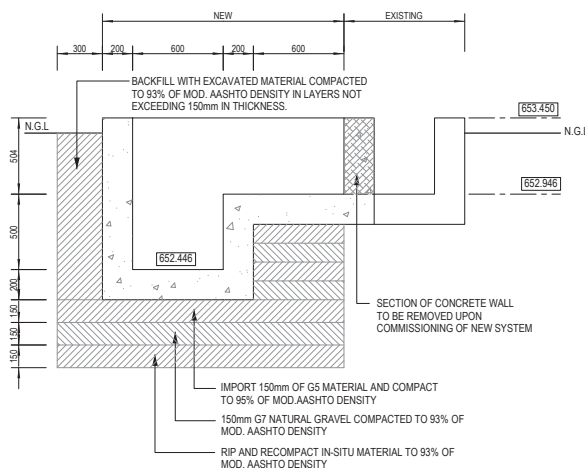
SECTION C-C THROUGH BOX
SCALE 1:25



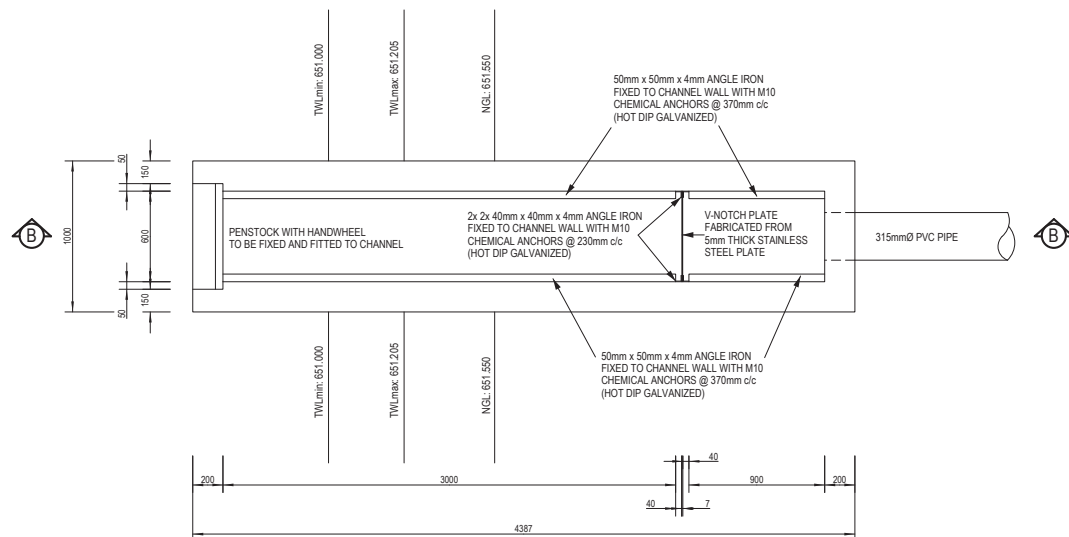
SECTION D-D THROUGH BOX
SCALE 1:25



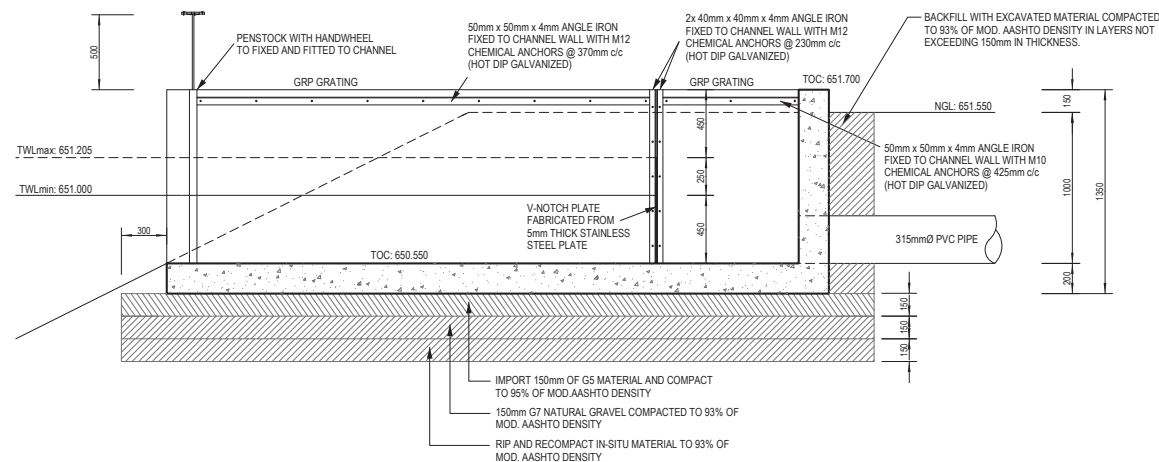
NEW INLET CHAMBER DETAIL
SCALE 1:25



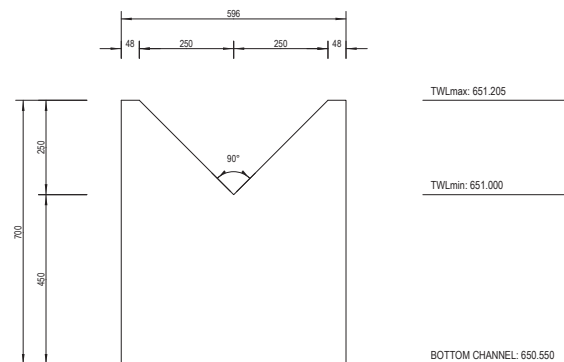
TYPICAL SECTION A-A OF INLET CHAMBER
SCALE 1:25



LAYOUT PLAN OUTLET CHANNEL
SCALE 1:25



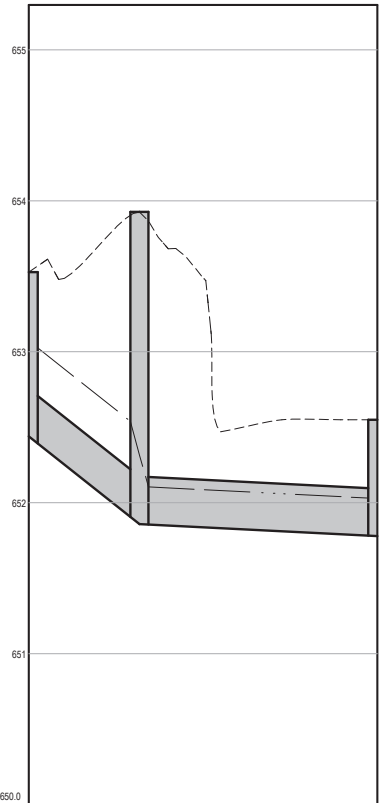
SECTION B - B OF OUTLET CHANNEL
SCALE 1:25



V-NOTCH PLATE
SCALE 1:10

INLET - SB1

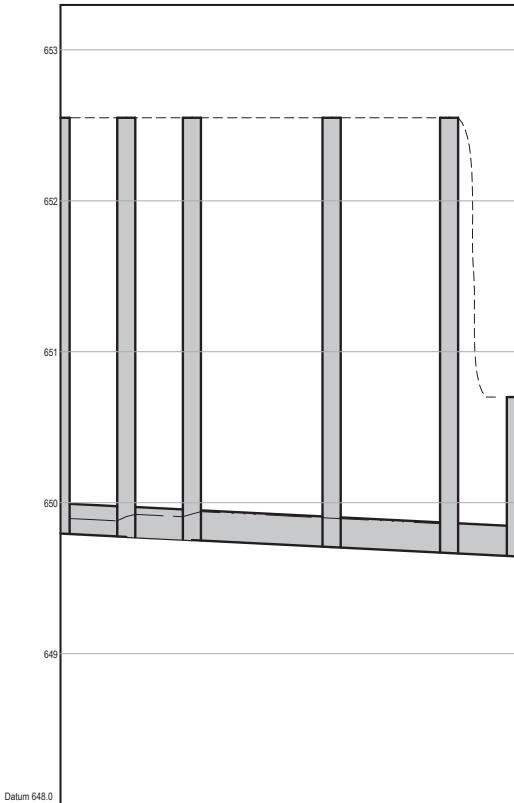
Horizontal Scale: 250
Vertical Scale :25



Chainage	0.000	7.334	20.91
Ground Level	653.97	653.06	652.50
Manhole Name	INLET	MH1	SB1
Depth	1.031	2.051	0.755
Inlet Level / Outlet Level	652.446	651.865	651.755
Link Type / Link Size	PVC-U 315	PVC-U 315	
Length / Slope	7.334 m 1:12.623	15.757 m 1:196.962	
Design Flow	48.380 l/s	48.380 l/s	
Capacity (80% Flow)	322.878 l/s	81.739 l/s	
Velocity (Design Flow)	3.280 m/s	1.200 m/s	
Full Bore Velocity	5.220 m/s	1.320 m/s	
Hydraulic Grade	653.073	651.108	652.037

MH5 - SD2

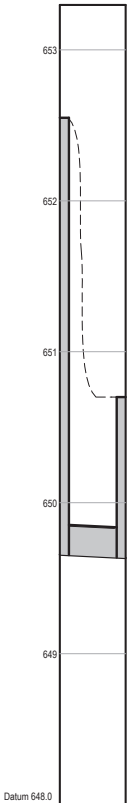
Horizontal Scale: 250
Vertical Scale :25



Chainage	0.000	4.350	8.701	17.853	25.739	30.161
Ground Level	652.950	652.950	652.950	652.950	652.950	650.700
Manhole Name	MH5	MH6	MH7	MH8	MH9	SD2
Depth	2.750	2.772	2.794	2.840	2.879	1.051
Inlet Level / Outlet Level	648.800	648.778	648.756	648.710	648.671	648.649
Link Type / Link Size	HDPe 200	HDPe 200	HDPe 200	HDPe 200	HDPe 200	HDPe 200
Length / Slope	4.350 m 1:200.000	4.351 m 1:200.000	9.252 m 1:200.000	7.786 m 1:200.000	4.422 m 1:200.000	
Design Flow	7.063 l/s	14.126 l/s	21.189 l/s	21.189 l/s	21.189 l/s	
Capacity (80% Flow)	24.029 l/s	24.029 l/s	24.029 l/s	24.029 l/s	24.029 l/s	
Velocity (Design Flow)	0.730 m/s	0.880 m/s	0.950 m/s	0.950 m/s	0.950 m/s	
Full Bore Velocity	0.970 m/s	0.970 m/s	0.970 m/s	0.970 m/s	0.970 m/s	
Hydraulic Grade	648.800	648.926	648.944	648.898	648.899	648.899

MH10 - SD1

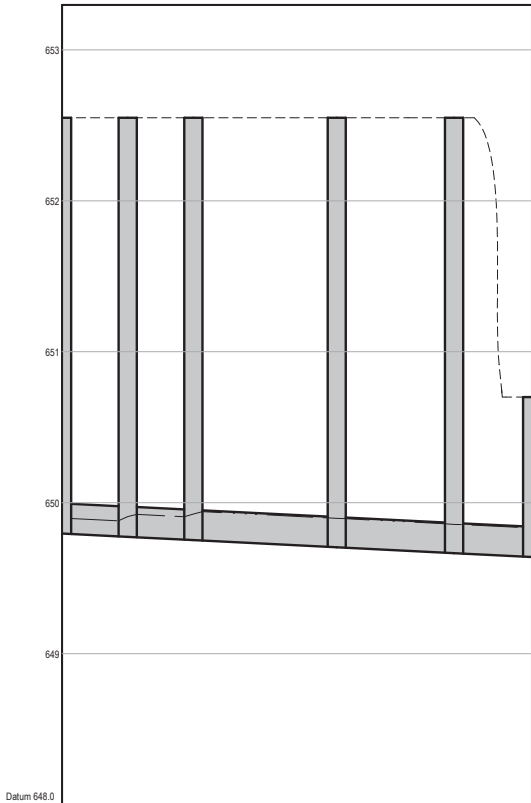
Horizontal Scale: 250
Vertical Scale :25



Chainage	0.000	4.365
Ground Level	652.950	650.700
Manhole Name	MH10	SD1
Depth	2.890	1.052
Inlet Level / Outlet Level	648.800	648.638
Link Type / Link Size	HDPe 200	HDPe 200
Length / Slope	4.365 m 1:200.000	
Design Flow	21.189 l/s	
Capacity (80% Flow)	24.029 l/s	
Velocity (Design Flow)	0.950 m/s	
Full Bore Velocity	0.970 m/s	
Hydraulic Grade	648.848	648.926

MH11 - SD4

Horizontal Scale: 250
Vertical Scale :25



Chainage	0.000	4.350	8.700	18.199	25.973	31.141
Ground Level	652.950	652.950	652.950	652.950	652.950	650.700
Manhole Name	MH11	MH12	MH13	MH14	MH15	SD4
Depth	2.750	2.772	2.793	2.841	2.890	1.056
Inlet Level / Outlet Level	648.800	648.778	648.756	648.709	648.670	648.644
Link Type / Link Size	HDPe 200	HDPe 200	HDPe 200	HDPe 200	HDPe 200	HDPe 200
Length / Slope	4.350 m 1:200.000	4.350 m 1:200.000	9.499 m 1:200.000	7.774 m 1:200.000	5.168 m 1:200.000	
Design Flow	7.063 l/s	14.126 l/s	21.189 l/s	21.189 l/s	21.189 l/s	
Capacity (80% Flow)	24.029 l/s	24.029 l/s	24.029 l/s	24.029 l/s	24.029 l/s	
Velocity (Design Flow)	0.730 m/s	0.880 m/s	0.950 m/s	0.950 m/s	0.950 m/s	
Full Bore Velocity	0.970 m/s	0.970 m/s	0.970 m/s	0.970 m/s	0.970 m/s	
Hydraulic Grade	648.899	648.926	648.944	648.897	648.898	648.894

A

16-11-2020

D.S

FOR TENDER

No.

Date

By

Description

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR

ENGINEER

DATE:.....

DATE:.....

CLIENT



KING CETSHWAYO

DISTRICT MUNICIPALITY

Project leader:

Signature :

Date:

CLIENT DRAWING NUMBER:



PRETORIA
HARRISMITH
VANDERSBULPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

012- 362 1473
056- 622 1297
016- 981 0591
011- 955 5334
035- 753 1083
017- 634 8895
034- 312 6464

RICHARDS BAY OFFICE,
21 Kingfish Creek,
MEERENSEE,
PO Box 10812,
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Web: www.ilifa.biz

ASSOCIATED OFFICES:

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Designed : D. Steenkamp

Date:

Signature :

Drawn : H. Jooste

Date:

Signature :

Checked : J. Scalliet

Date:

Signature :

Approved: D. Steenkamp

Reg No: 2012/0171

Date:

Signature :

PROJECT TITLE

MELMOTH I ES EU PGAUD2E
GHD I E N

PROJECT DESCRIPTION

MELMOTH S S TS RTEUW PGAUD2E

DRAWING TITLE

LONGSECTIONS PLAN 1 OF 6

DATE:
NOVEMBER 2020

SCALE:
1 : 250

A1

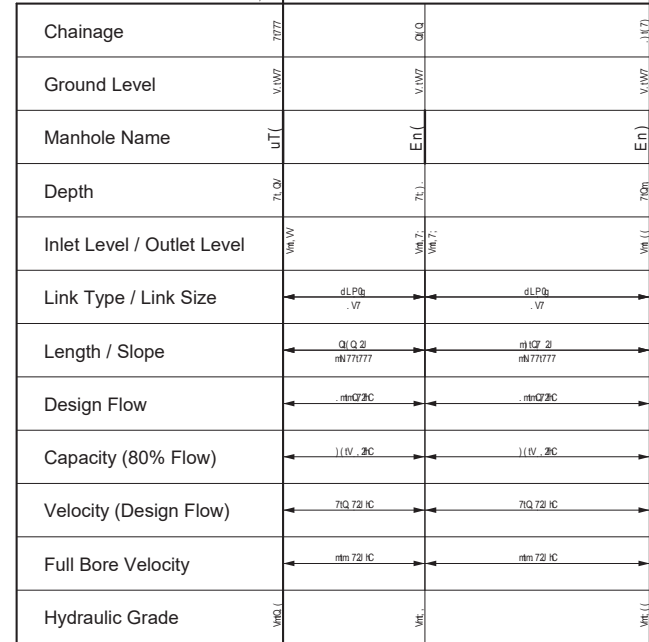
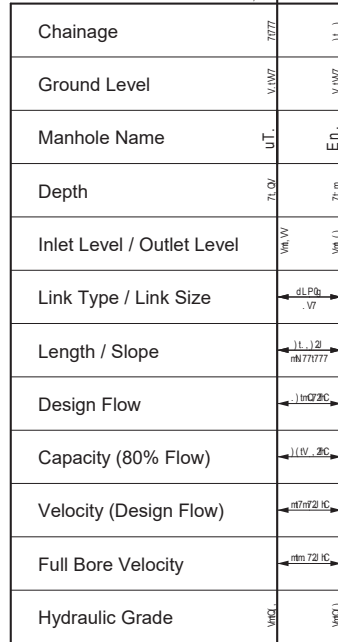
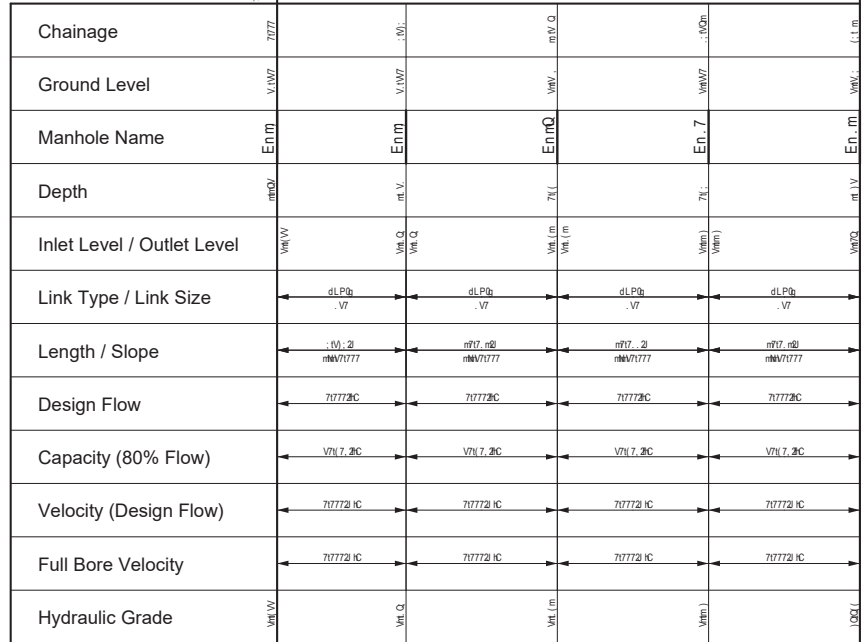
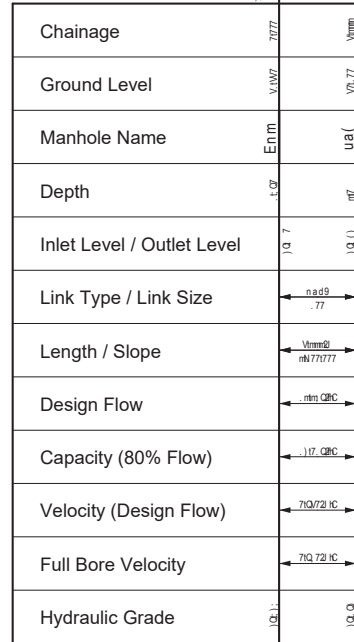
SHEET No:
1 OF 1

CONSULTING ENG. DRAWING No:

R11-024-20-00-LS01

Rev

A



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D1	aF9	TS	45940														
REVISIONS 8u2ZgH32a18MHDSu																	
34PnDhP825 05 1aH8351		4D5HD441															
a834N		a834N															
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4A Y808R1 9N	uU F04N																
aF0N																	
iilfa AFRICA ENGINEERS PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE 7m 0, 2h, 1 7V 0, 2n Q 7m 0, 2n Qm 7m 0 Q/V2 () 7V 0, V 2R, 7m 0, V 12, Q/ 7V 0 (m 2) RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. Email: rbay@iilfa.biz Web: www.iilfa.biz <u>ASSOCIATED OFFICES:</u> T11u3u253g 783g 182MD4Bud1g8H34D441																	
3nH2a18MHDS2a2n42i15d413o2562B852yFF2: U: 99A2d3or2B0D1 8D2a2a2u4a2522n424P4H4D3H512B12138Pg8812g145u42B02n4 gD2a1u38D4H52n4832m4H4191MH52n18B2D55227a42B55d4a20251 a2g2B8P34a2B02D2aH8B85B515E0D512B2u4a25D3523n412B81314up aH4D5u4aH44P32a2512B0H44P32a2D512u4a2512B02a2p1d5u4 53n412n8D2n4832B512M1nHn232a2u4P4H5B2a2P1D4n4a2B2a151p 3n42B0u38B8B3H5D2B2a1512E8H34D8DP42562a2kH4E4D3252M1Hn23 14541318 <table border="1" style="width: 100%;"> <tr> <td style="width: 25%;">aF0U 9 2B</td> <td style="width: 25%;">D.Steenkamp</td> <td style="width: 25%;">aF0N</td> <td style="width: 25%;">uU F04N</td> </tr> <tr> <td>aF0V 2N</td> <td>H.Jooste</td> <td>aF0N</td> <td>uU F04N</td> </tr> <tr> <td>P04N 9 2N</td> <td>J.Scalliet</td> <td>aF0N</td> <td>uU F04N</td> </tr> </table> Approved: D.Steenkamp Reg.No. 2012/07171 <table border="1" style="width: 100%;"> <tr> <td style="width: 25%;">aF0N</td> <td style="width: 25%;">uU F04N</td> </tr> </table> c15) 4P2B08 MELMOTH I ES EU PGAUD2E GHDI E N c15) 4P2B4UP1H38D MELMOTH S S TS WTEUM PGAUD2E				aF0U 9 2B	D.Steenkamp	aF0N	uU F04N	aF0V 2N	H.Jooste	aF0N	uU F04N	P04N 9 2N	J.Scalliet	aF0N	uU F04N	aF0N	uU F04N
aF0U 9 2B	D.Steenkamp	aF0N	uU F04N														
aF0V 2N	H.Jooste	aF0N	uU F04N														
P04N 9 2N	J.Scalliet	aF0N	uU F04N														
aF0N	uU F04N																
a18MHDS2B8 LONGSECTIONS PLAN 2 OF 6 <table border="1" style="width: 100%;"> <tr> <td style="width: 33%;">a83AN D5L4E74127.7</td> <td style="width: 33%;">uP8EN r28 V7</td> <td style="width: 33%;">A1</td> <td style="width: 33%;">uH43D2 N a6.6m</td> </tr> </table> PLAN No. P04g2B082532a18MHDS2N R11-024-20-00-LS02 15				a83AN D5L4E74127.7	uP8EN r28 V7	A1	uH43D2 N a6.6m										
a83AN D5L4E74127.7	uP8EN r28 V7	A1	uH43D2 N a6.6m														

Horizontal Scale: 250
Vertical Scale :25

Vina700[illegible]

REVISIONS

8u2gH32a18MHDSu

a834	N		a834	N	

P84 D3

PB4D32a18MBS2DgET41N

PBHD32a18MHS2DgET41N

a 9C1) 01 22	D Steenkamp	a 9C1) 01 22	a 9C1) 01 22

Approved: D. Steenkamp		

d15j4P32HBM

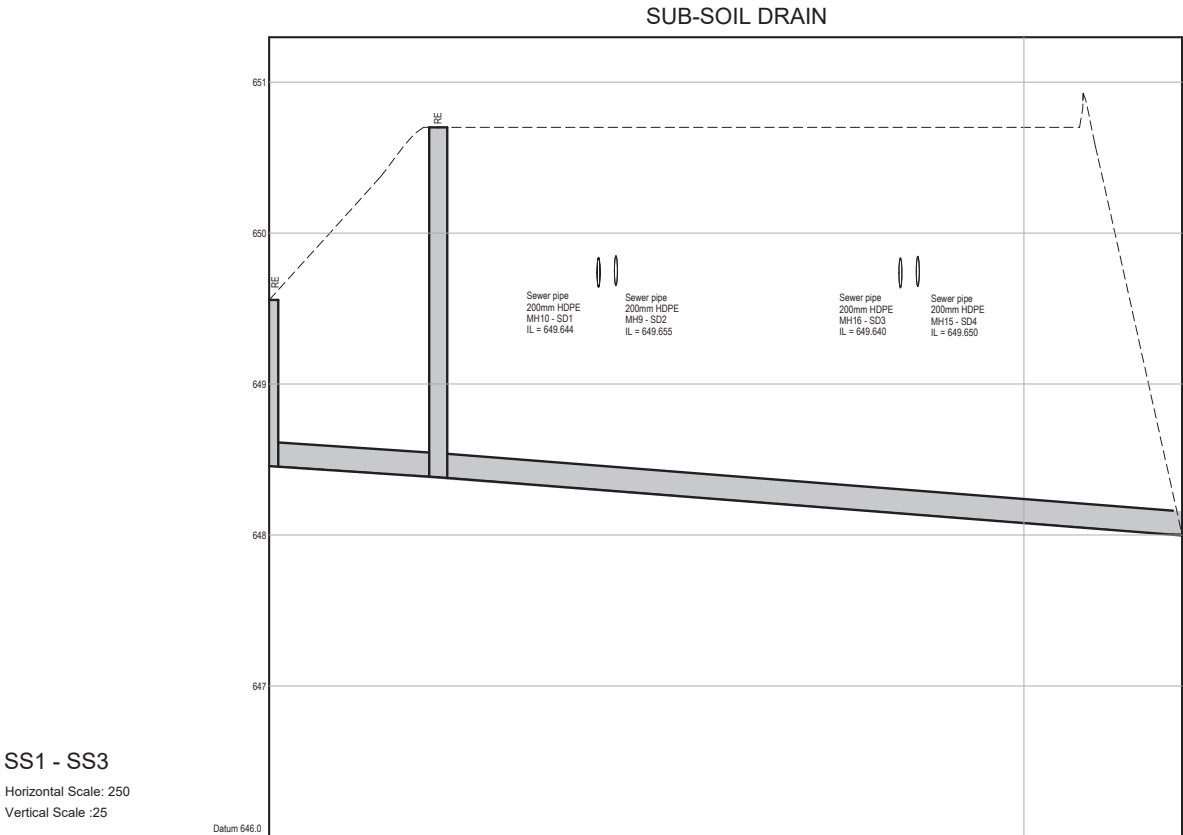
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PLAN No.

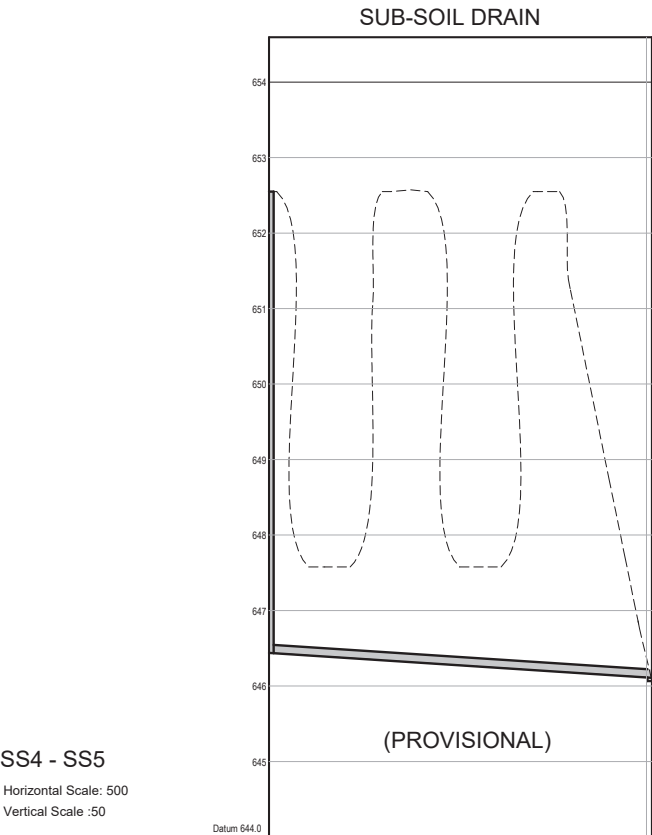
191



SS1 - SS3

Horizontal Scale: 250
Vertical Scale :25

Chainage	0.000	11.200	21.820	22.970	41.820	42.970	60.480
Ground Level	648.557	650.700					648.002
Manhole Name	SS1	SS2					SS3
Depth	1.997	2.315					0.002
Inlet Level / Outlet Level	648.460	648.385	648.385				648.000
Link Type / Link Size	PVC-U 160		PVC-U 160				
Length / Slope	11.200 m 1:150.000		49.280 m 1:127.889				
Design Flow	0.000 l/s		0.000 l/s				
Capacity (80% Flow)	15.409 l/s		16.688 l/s				
Velocity (Design Flow)	0.000 m/s		0.000 m/s				
Full Bore Velocity	0.000 m/s		0.000 m/s				
Hydraulic Grade	648.460	648.385					648.000



SS4 - SS5

Horizontal Scale: 500
Vertical Scale :50

Chainage	0.000	50.737
Ground Level	652.590	646.000
Manhole Name	SS4	SS5
Depth	6.110	0.043
Inlet Level / Outlet Level	646.440	646.110
Link Type / Link Size	PVC-U 110	
Length / Slope	50.737 m 1:153.748	
Design Flow	0.000 l/s	
Capacity (80% Flow)	5.621 l/s	
Velocity (Design Flow)	0.000 m/s	
Full Bore Velocity	0.000 m/s	
Hydraulic Grade	646.440	646.110

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description
REVISIONS			

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR

DATE:.....

ENGINEER

DATE:.....



Project leader:		Signature :
Date:		
CLIENT DRAWING NUMBER:		

PRETORIA
HARRISMITH
VANDERBIJLPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

012- 362 1473
058- 622 1297
016- 981 0591
011- 955 5334
035- 753 1063
017- 634 8895
034- 312 6464

RICHARDS BAY OFFICE,
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ASSOCIATED OFFICES:
BRITS : MTUBATUBA ; NELSPRUIT; DUNDEE.

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Designed :	D.Steenkamp	Date:		Signature :	
Drawn :	H.Jooste	Date:		Signature :	
Checked :	J.Scalliot	Date:		Signature :	
Approved: D.Steenkamp		Date:		Signature :	
Reg No: 2012/0171					

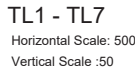
MELMOTH I ES EU PGAUD2 E
GHDI E N

MELMOTH S S TS RTEUW PGAUD2 E

DRAWING TITLE

LONGSECTIONS PLAN 4 OF 6

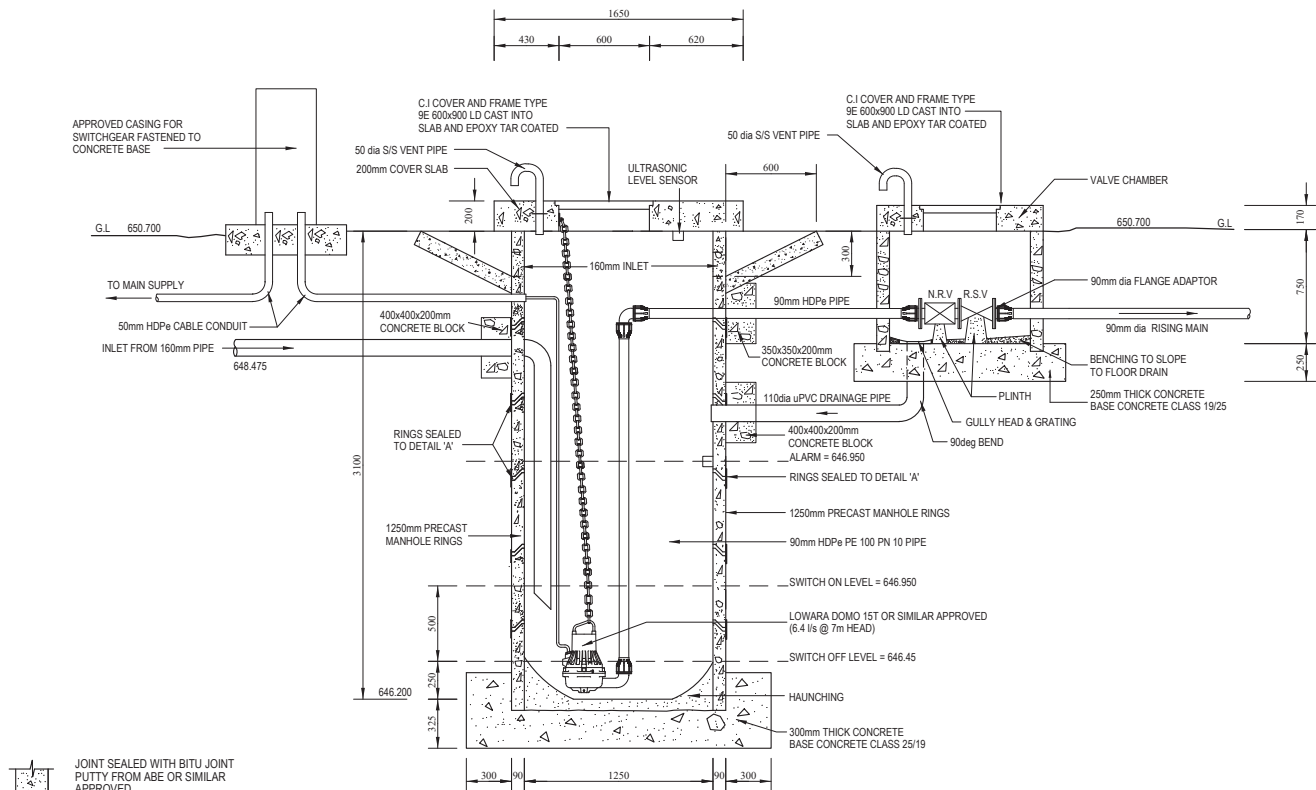
DATE: NOVEMBER 2020	SCALE: 1 : 250	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No: R11-024-20-00-LS04			Rev A



TL1 - TL7
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Vertical Scale :50

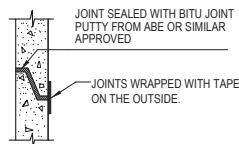
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TYPICAL SECTION OF PUMPSTATION INSTALLATION

SCALE 1:25



TYPICAL JOINT DETAIL
DETAIL A
N.T.S.

MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING					Eir
200mm Slab	2	10	Y10	1750	20	A01	35	1550					
		10		1750	20	A02	35	1550					
		16		500	32	A03	35	275					
		10		550	20	A04	35	330					
		10		750	20	A05	35	250					
		8		900	16	A06	20						
R	8	10	12	16	20	25	32	40	TOT	Date			
Y		22								Det. by			
TOT		22								Ref Dwg			
ILIFA Africa Engineers (PTY) Ltd.										Revision	0		
21 Kingfish Creek Meerensee, Richards Bay Tel: 035 753 1083 Fax: 035 753 1094 http://www.ilifa.biz										Schedule No	1		

Operational requirements on the pumping system;

General;

Briefly, the sewage pump system comprises of a submersible sewer pump units, MCC panel together with isolating and non-return valves. The pump installation will be designed to run automatically. In short, the operation of the systems is foreseen as follows:

Operating instructions;

- * Gate valves in the valve chamber must be open at all times.
- * The main isolator switch on the control panel is to be on at all times unless maintenance work or other emergency necessitates shutdown.
- * AC Voltmeter should read approximately 230 Volt.
- * Pump selector switches should be in Auto. The pump should operate automatically, controlling the pump level between the two floats switches.

Sump empty level (level at or below "stop" level) If the liquid level is below the stop level the "Pump Stopped" lamps and "Low Level" lamp should be on. The pumps will not operate in Manual or Auto with the level low.

Duty level (second from bottom):

Normally the sump level will fluctuate between the two levels i.e. level rises due to infl and the duty pump operates, dropping the level.

Pump trip light:

Should this light come on it indicates the relevant pump has tripped on overload - the pump must be removed, checked for blockages, faults or other problem and replaced prior to re-setting the overload.

Ammeter & Hour Meter:

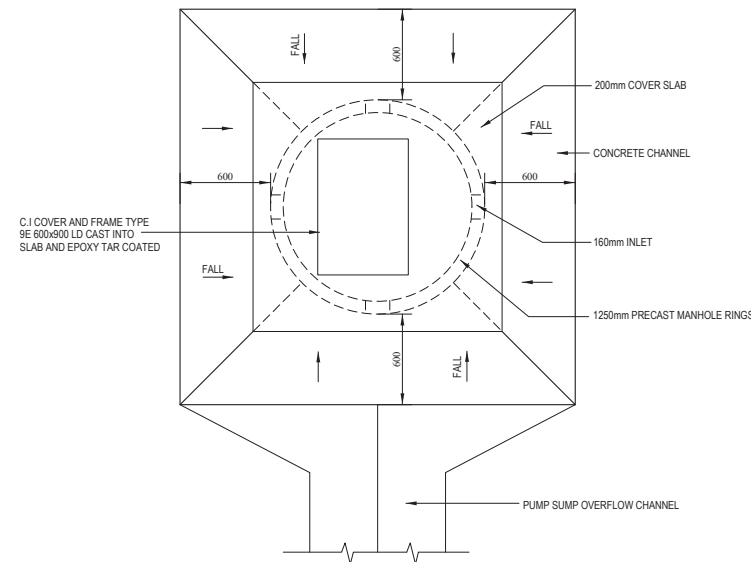
An ammeter (A) and Hour Meter (hrs) meter must be provided for the pump to indicate the electric motor load whilst in operation and operating hours.

Alarm Notification:

System must sound audible alarm when the pump is tripped or power outages occurs.

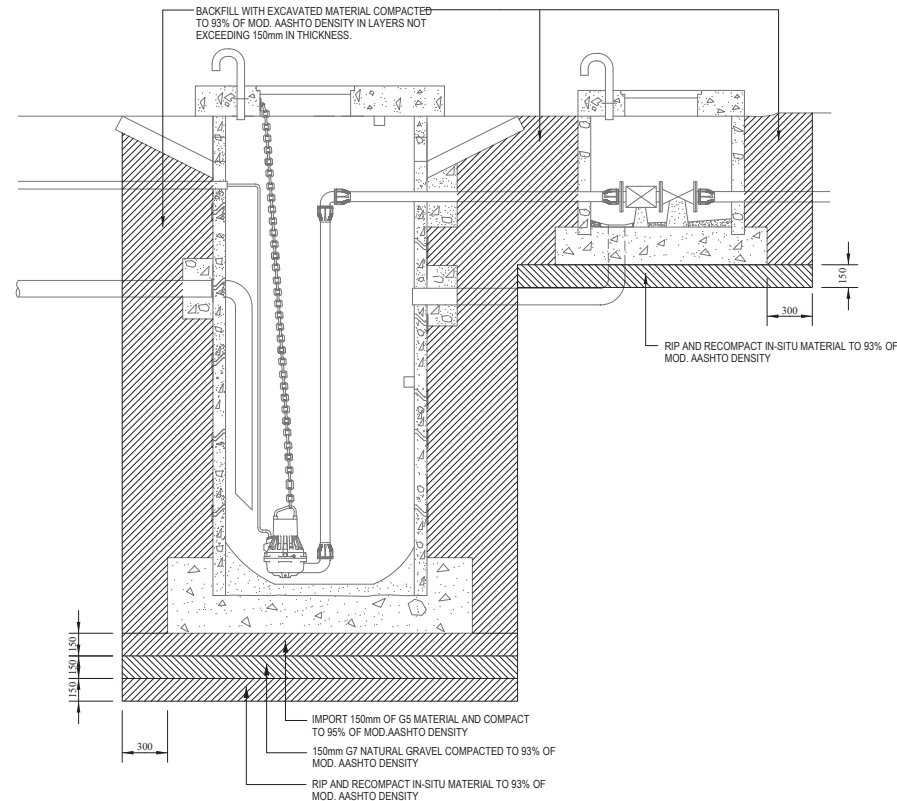
Generator Switch Over:

Control Board must provide plug and switch over switch incase of power failure.



TYPICAL PLAN VIEW OF PUMPSTATION

SCALE 1:25



TYPICAL EARTHWORKS LAYOUT FOR PUMPSTATION

SCALE 1:25

SLAB LAYOUT FOR PUMPSTATION (2 OFF)

SCALE 1:25

REINFORCING LAYOUT FOR PUMPSTATION SLAB (2 OFF)

SCALE 1:25

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description
REVISIONS			
AS BUILT DRAWINGS			
TECHNICAL CO-ORDINATOR		ENGINEER	
DATE:.....		DATE:.....	

CLIENT	
Project leader:	Signature :
Date:	
CLIENT DRAWING NUMBER:	

PRETORIA HARRISMITH VANDERSIJLPARK RICHARDSBAY SECUNDA NEWCASTLE	012- 362 1473 058- 622 1297 016- 981 0591 011- 955 5334 035- 753 1083 017- 634 8895 034- 312 6464
RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz	
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PRETORIA HARRISMITH VANDERSIJLPARK RICHARDSBAY SECUNDA NEWCASTLE	012- 362 1473 058- 622 1297 016- 981 0591 011- 955 5334 035- 753 1083 017- 634 8895 034- 312 6464	RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz	
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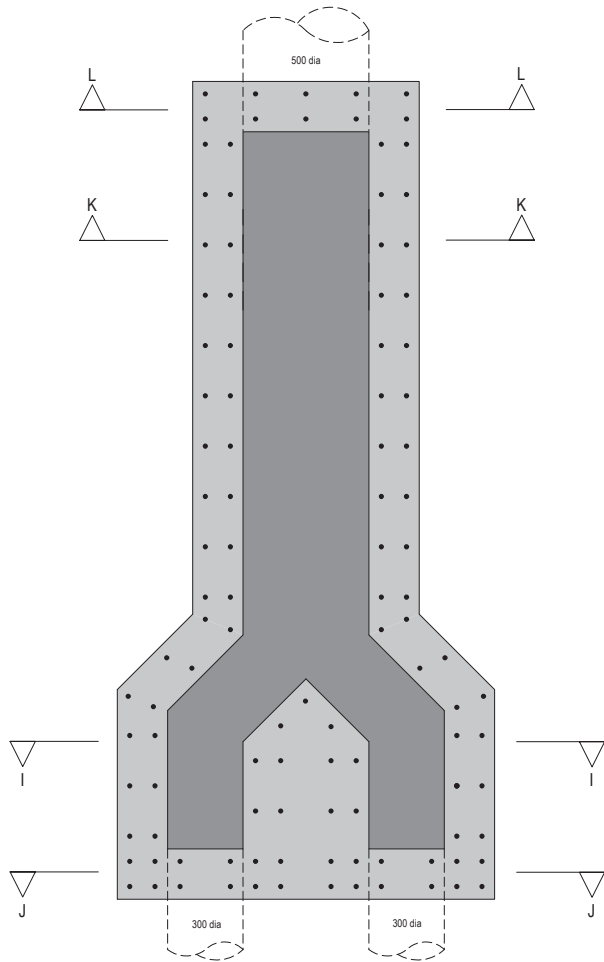
Designed :	D.Steenkamp	Date:	Signature :
Drawn :	H.Jooste	Date:	Signature :
Checked :	J.Scalet	Date:	Signature :
Approved: D.Steenkamp		Date:	Signature :
Reg No: 2012/7011			

PROJECT TITLE	
MELMOTH I ES EU PGAUD2E GHD I E N	

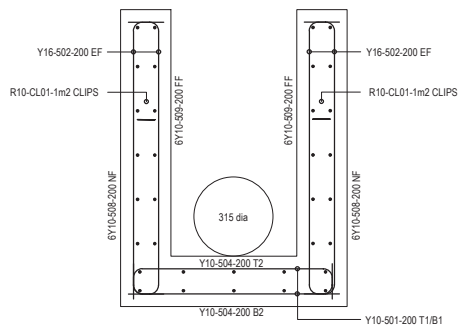
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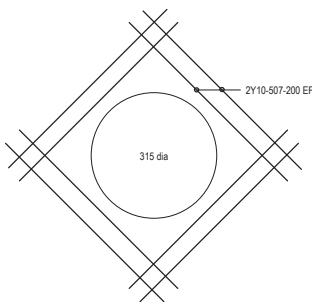
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CONSULTING ENG. Drawing No:			Rev
R11-024-20-00-PS01			A



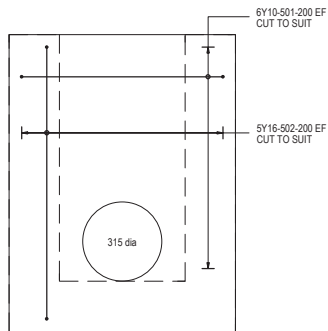
FLOW SPLITTER BOX
LAYOUT PLAN
SCALE 1:15



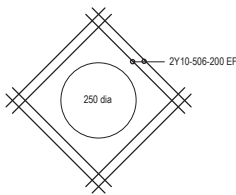
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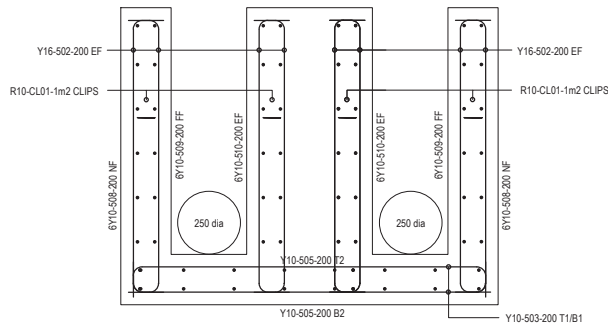
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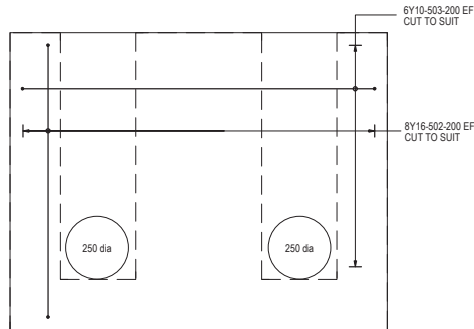
SECTION LL
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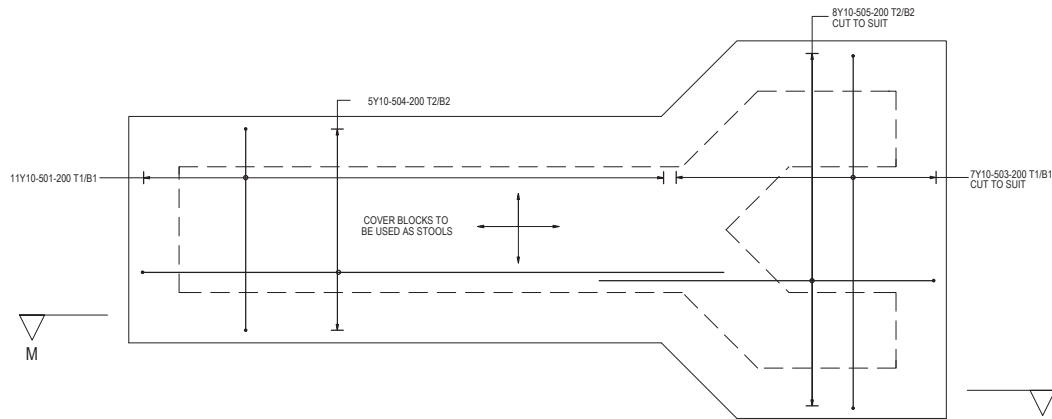
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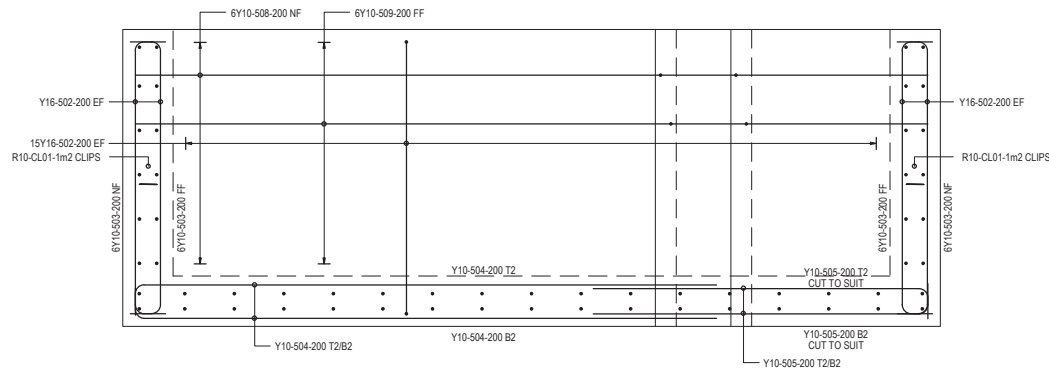
SECTION II
SCALE 1:15



SECTION JJ
SCALE 1:15



BASE REINFORCEMENT
SCALE 1:15



SECTION MM
SCALE 1:15

GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
2. MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR
FOUNDATIONS = 50mm, WATER RETAINING = 40mm.
3. CONCRETE SHOULD BE CURED (KEPT PERMANENTLY WET)
FOR 7 DAYS MIN.
4. FORMWORK (UNDERNEATH) FOR SLABS MUST STAY IN
POSITION FOR AT LEAST 7 DAYS.
5. TEMPORARY PROPS AT SOFFIT OF SLABS MUST STAY IN
POSITION FOR AT LEAST 21 DAYS. PROPS @ 1.8m c/c MAX.
6. FLOORS LABS MAY NOT BE USED TO STORE BUILDING
MATERIALS.
7. NO CONCRETE MAY BE PLACED BEFORE APPROVAL
OF THE REINFORCING BY THE ENGINEER.
8. WHERE CONCRETE IS SUPPORTED BY BRICKWORK, 2
LAYERS OF PVC ON HORIZONTAL PLANE AND 10mm
SOFTBOARD ON VERTICAL PLANE ARE REQUIRED.
9. LINING CONCRETE PLACED IN ALTERNATIVE PANELS AS
INDICATED AND WITH FLEXIBLE SEALING BANDAGE.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR

ENGINEER

DATE:

DATE:

CLIENT



Project leader:	Signature :
Date:	

CLIENT DRAWING NUMBER:

ilifa
AFRICA ENGINEERS

PRETORIA
HARRISMITH
VANDERBIJLPARK
KRUGERSDORP
RICHARDSBAY
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REFERS

Designed :	D. Steenkamp	Date:		Signature :	
Drawn :	H. Jooste	Date:		Signature :	
Checked :	J. Scalliet	Date:		Signature :	
Approved: D. Steenkamp		Date:		Signature :	
Reg No.:	2012/0171				

PROJECT TITLE

**MELMOTH I ES EU PGAUD2 E
GHD I E N**

PROJECT DESCRIPTION

MELMOTH S S TS WRTUUM PGAUD2 E

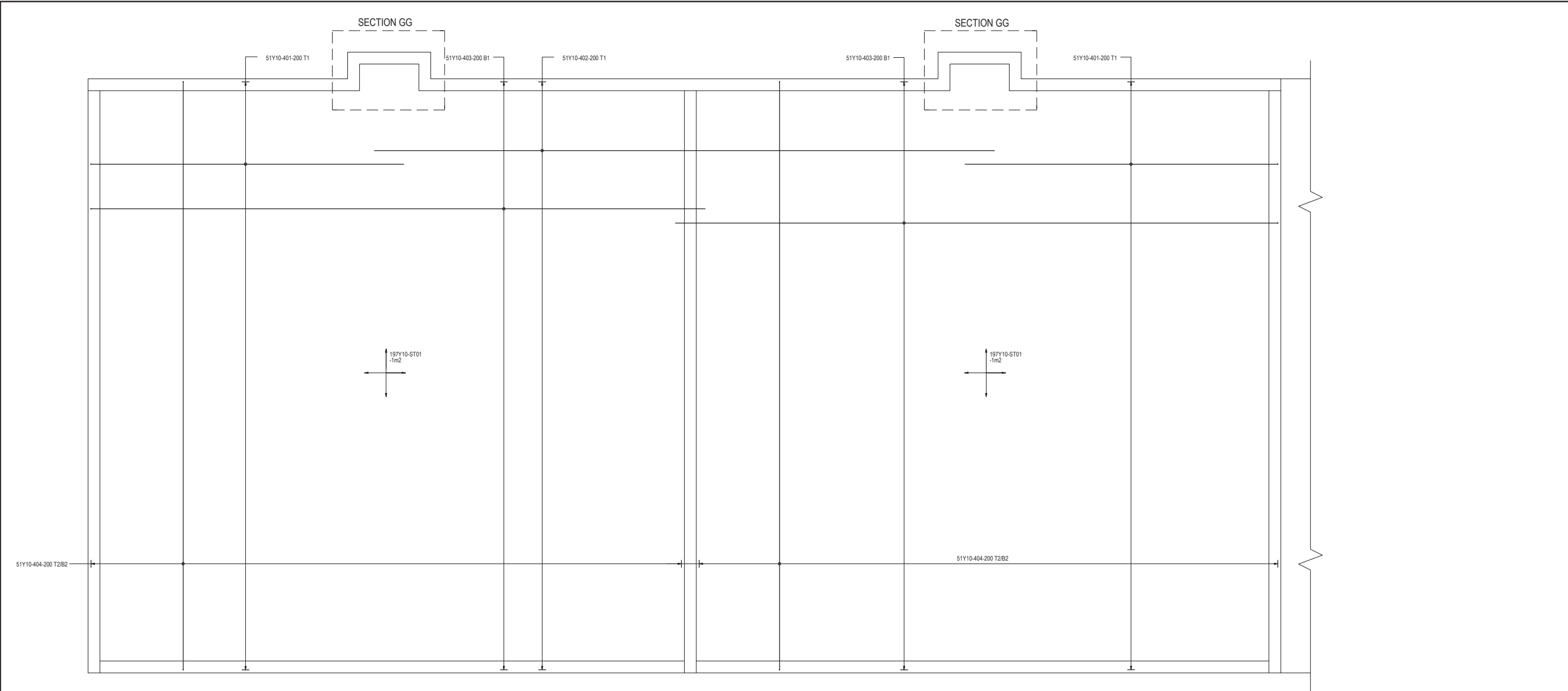
DRAWING TITLE

FLOW SPLITTER BOX REINFORCING

DATE NOVEMBER 2020	SCALE N.T.S	A1	SHEET No 1 OF 1

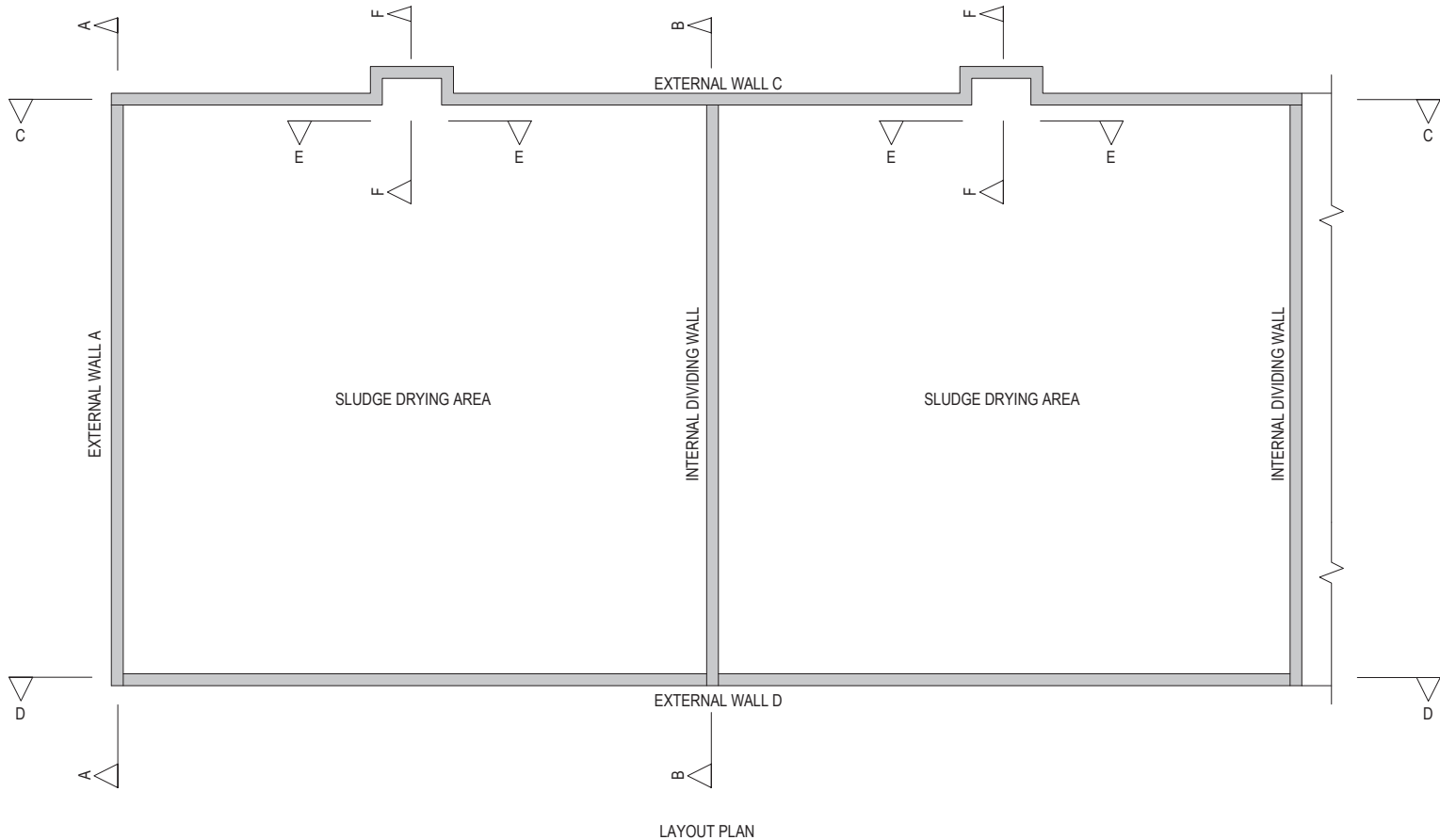
PLAN No.

CONSULTING ENG. DRAWING No. R11-024-20-00-R001	Rev A



MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING				
								A	B	C	D	E/r
External Wall A and B	2	52	Y16	2000	104	001	37	200				
		50	Y16	1650	100	002	37	200				
		8	Y10	10100	16	003	35	9900				
		2	Y10	5000	4	004	35	4800				
		4	Y10	1000	8	005	35	810				
		13	R10	350	26	CL01	33	100				
Internal Walls	3	8	Y10	10100	24	101	35	9900				
		102	Y16	1300	306	102	37	200				
		9	R10	350	27	CL01	33	100				
Wall C	2	198	Y16	1150	392	201	37	200				
		198	Y10	1700	392	202	34	1600				
	4	24	Y10	4950	48	203	35	4470				
		12	Y10	9550	24	204	35	8850				
	8	90	R10	350	180	CL01	33	100				
		12	Y10	1000	48	205	35	1300				
	10	10	Y16	1150	40	201	37	200				
		10	Y10	1700	40	202	34	1600				
	12	4	Y16	1150	32	201	37	200				
		4	Y10	1700	32	202	34	1600				
	12	12	Y10	750	96	206	35	550				
		12	Y10	750	96	206	35	550				
Wall D	2	3	Y10	10450	6	301	20					
		6	Y10	5400	12	302	34	5270				
	6	6	Y10	10350	12	303	34	10250				
		196	Y12	850	392	304	37	200				
	10	10	R10	300	20	CL01	33	70				
		102	Y10	5400	204	401	34	5270				
Sludge drying bed	2	51	Y10	10450	102	402	20					
		102	Y10	10450	204	403	34	10350				
	4	204	Y10	10100	408	404	35	9900				
		394	Y10	750	788	ST01	83	200	120	200		
	16	3	Y10	2050	12	405	60	1300				
		16	Y10	1000	40	406	34	900				
Flow splitter box	1	34	Y10	1000	34	501	35	800				
		112	Y16	1350	112	502	35	1080				
	26	26	Y10	1600	26	503	35	1400				
		10	Y10	2400	10	504	34	2310				
	16	16	Y10	1450	16	505	34	1330				
		32	Y10	550	32	506	20					
	16	16	Y10	900	16	507	20					
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	6	6	Y10	3300	12	508	41	2088	424		300	
		6	Y10	3300	12	509	41	2130	424		300	
	12	12	Y10	1000	24	510	62	700	495			
		12	Y10	1000	24	510	62	700	495			
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Y		7024	296	2297					9617	Ref Dwg		
TOT		7080	296	2297					9673	Job No		
ILIFA Africa Engineers (Pty) Ltd									Revision			
(035) 753 1083									Schedule No			
FAX (035) 753 1094												

SLUDGE DRYING BED



GENERAL NOTES:

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MASS. CONCRETE = 20MPa/19mm
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4. FORMWORK (UNDERNEATH) FOR SLABS MUST STAY IN POSITION FOR AT LEAST 7 DAYS.
5. TEMPORARY PROPS AT SOFFIT OF SLABS MUST STAY IN POSITION FOR AT LEAST 21 DAYS. PROPS @ 1.8m c/c MAX.
6. FLOORSLABS MAY NOT BE USED TO STORE BUILDING MATERIALS.
7. NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
8. WHERE CONCRETE IS SUPPORTED BY BRICKWORK, 2 LAYERS OF PVC ON HORIZONTAL PLANE AND 10mm SOFTBOARD ON VERTICAL PLANE ARE REQUIRED.
9. LINING CONCRETE PLACED IN ALTERNATIVE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS	
AS BUILT DRAWINGS	
TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT	
	
DISTRICT MUNICIPALITY	
CLIENT APPROVAL	
Project leader:	Signature :
Date:	
CLIENT DRAWING NUMBER:	



PRETORIA 012- 362 1473
HARRISMITH 059- 622 1297
VANDERBULPARK 016- 981 0591
KRUGERSDORP 011- 955 5334
RICHARDSBAY 035- 753 1083
SECUNDA 017- 634 8895
NEWCASTLE 034- 312 6464

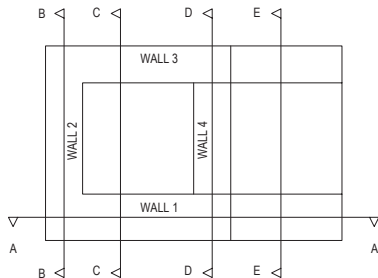
RICHARDS BAY OFFICE,
21 Kingfish Creek,
MEERENSEE,
PO Box 10812,
Meerensee, 3901.
email: rbay@ilifa.biz
Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.

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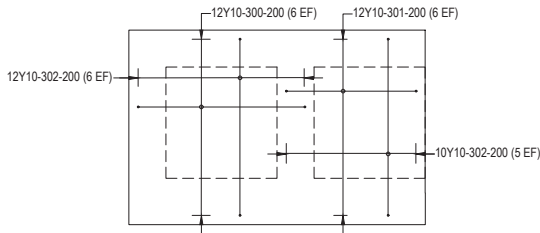
Designed : D.Steenkamp	Date:	Signature :
Drawn : H.Jooste	Date:	Signature :
Checked : J.Scailliet	Date:	Signature :
Approved: D.Steenkamp	Date:	Signature :
Reg No: 2012/0171		

PROJECT TITLE			
MELMOTH I ES EU PGAUD2E GHDI E N			
PROJECT DESCRIPTION			
MELMOTH S S TS WTEUVM PGAUD2E			
DRAWING TITLE			
SLUDGE DRYING BED REINFORCING			
DATE: NOVEMBER 2020	SCALE: N.T.S	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No:			Rev:
R11-024-20-00-R003			A



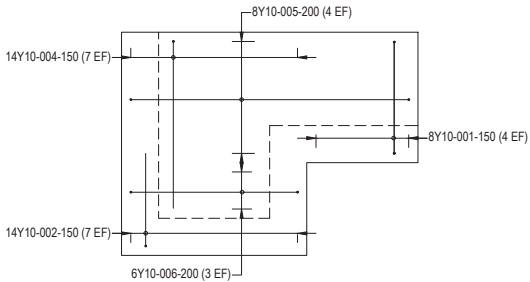
CHAMBER LAYOUT

SCALE 1:20



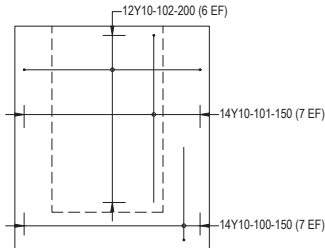
BASE REINFORCMENT LAYOUT

SCALE 1:20



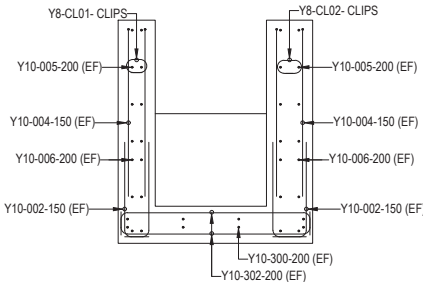
WALL 1 & 3 - SECTION A-A

SCALE 1:20



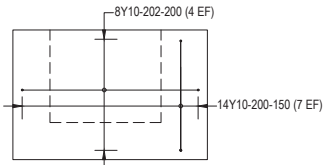
WALL 2 - SECTION B-B

SCALE 1:20



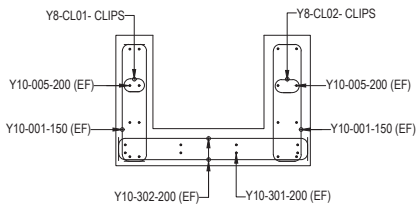
SECTION C-C

SCALE 1:20



WALL 4 - SECTION D-D

SCALE 1:20



SECTION E-E

SCALE 1:20

MEMBER	No OF	BARS PER MEMB	DIA.	LENGTH	TOTAL NUM-BER	MARK	S C	BENDING				
								A	B	C	D	E/r
Walls 1 and 3	2	8	Y10	800	16	001	37	200				
		14	Y10	700	28	002	37	200				
		14	Y10	1100	28	004	35	904				
		8	Y10	1700	16	005	35	1500				
		6	Y10	1100	12	006	35	900				
		2	Y8	300	4	CL01	33	100				
Wall 2	1	14	Y10	700	14	100	37	200				
		14	Y10	1000	14	101	34	500				
		12	Y10	1150	12	102	35	950				
		2	Y8	300	2	CL01	33	100				
Wall 4	1	14	Y10	800	14	200	35	600				
		8	Y10	1150	8	202	35	950				
Base	1	12	Y10	1100	12	300	35	900				
		12	Y10	900	12	301	35	700				
		22	Y10	1150	22	302	35	950				
		4	Y8	750	4	ST02	83	200	120	200		
R	8	10	12	16	20	25	32	40	TOT			
Y	2	130							132			
TOT	2	130							132			

GENERAL NOTES:

- MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
- MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR FOUNDATIONS = 50mm ; WATER RETAINING = 40mm
- CONCRETE SHOULD BE CURED (KEPT PERMANENTLY WET) FOR 7 DAYS MIN.
- FORMWORK (UNDERNEATH) FOR SLABS MUST STAY IN POSITION FOR AT LEAST 7 DAYS.
- TEMPORARY PROPS AT SOFFIT OF SLABS MUST STAY IN POSITION FOR AT LEAST 21 DAYS. PROPS @ 1.8m c/c MAX.
- FLOORSLABS MAY NOT BE USED TO STORE BUILDING MATERIALS.
- NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
- WHERE CONCRETE IS SUPPORTED BY BRICKWORK, 2 LAYERS OF PVC ON HORIZONTAL PLANE AND 10mm SOFTBOARD ON VERTICAL PLANE ARE REQUIRED.
- LIVING CONCRETE PLACED IN ALTERNATIVE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.

A	03-12-2020	D.S.	FOR TENDER
No.	Date	By	Description

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR

ENGINEER

DATE:.....

DATE:.....

CLIENT



Project leader: _____		Signature : _____
Date: _____		

CLIENT DRAWING NUMBER:



PRETORIA HARRISMITH VANDERBIJLPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE	012- 362 1473 058- 622 1297 016- 981 0591 011- 955 5334 035- 753 1083 017- 634 8895 034- 312 6464	RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.

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Designed : D.Steenkamp	Date:	Signature :
Drawn : H.Boote	Date:	Signature :
Checked : J.Scaaliet	Date:	Signature :
Approved: D.Steenkamp Reg No: 2012/70171	Date:	Signature :

PROJECT TITLE

MELMOTH SEWER UPGRADE
PHASE 2

PROJECT DESCRIPTION

MELMOTH WWTW INTERIM UPGRADE

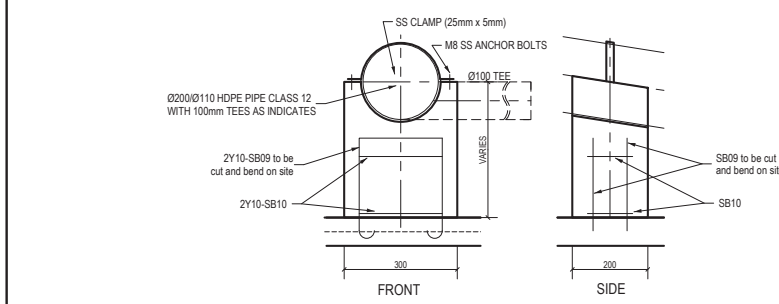
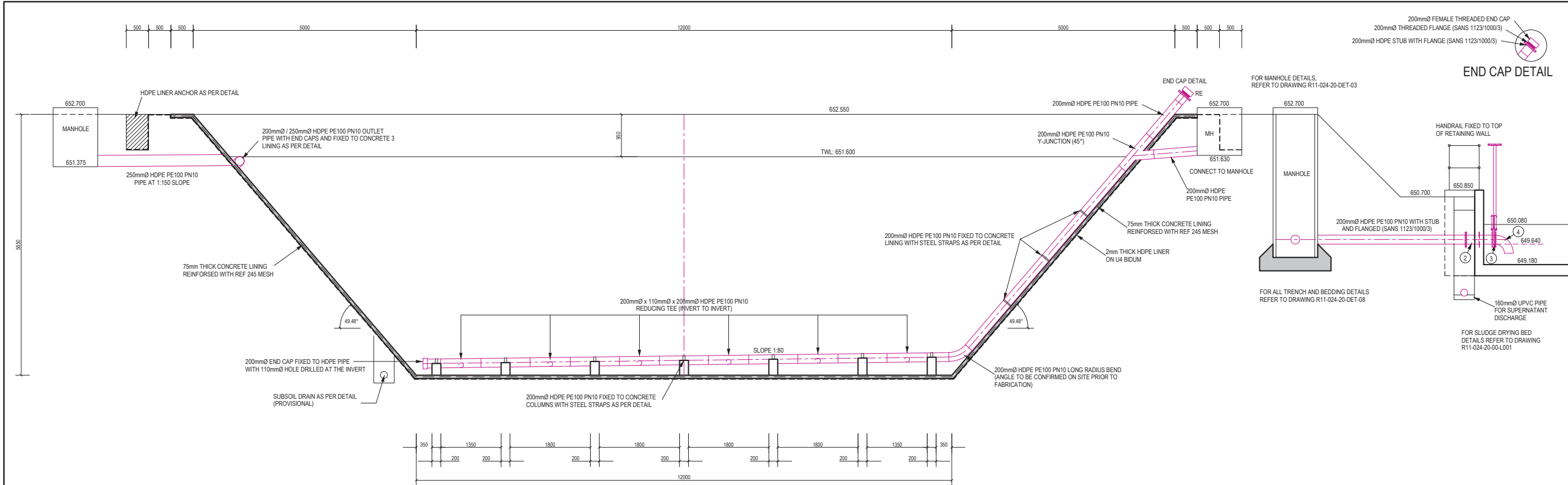
DRAWING TITLE

NEW CHAMBER REINFORCEMENT
LAYOUT AND SECTIONS

DATE: NOVEMBER 2020	SCALE: N.T.S	A1	SHEET No: 1 OF 1

PLAN No.

CONSULTING ENG. DRAWING No: R11-024-20-00-R004	Rev: A



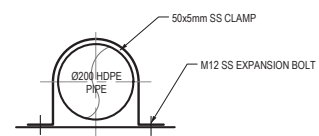
TYPICAL PIPE SUPPORT DETAIL (10-off / POND)

SCALE 1:10

SCHEDULE FOR SUPPORTS OF 1 POND ONLY

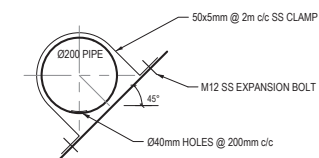
MEMBER	BAR		NO. IN EACH	TOTAL	LENGTH	Shape code	BENDING			
	MK	NO	MK	DIA			A	B	C	D
PIPE SUPPORT EACH POND	10	SB09	Y10	2	20	1660	72	500	200	to be cut and bend on site
	SB10	Y10	2	20	2080	60	120	220		
NOTE: ALL TO BE VERIFIED ON SITE										

SECTION A-A
SCALE 1:50



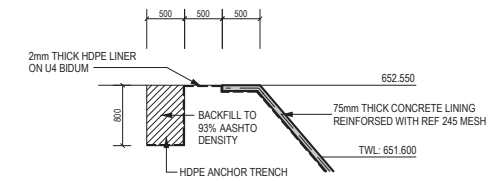
TYPICAL PIPE CLAMP DETAIL

SCALE 1:5



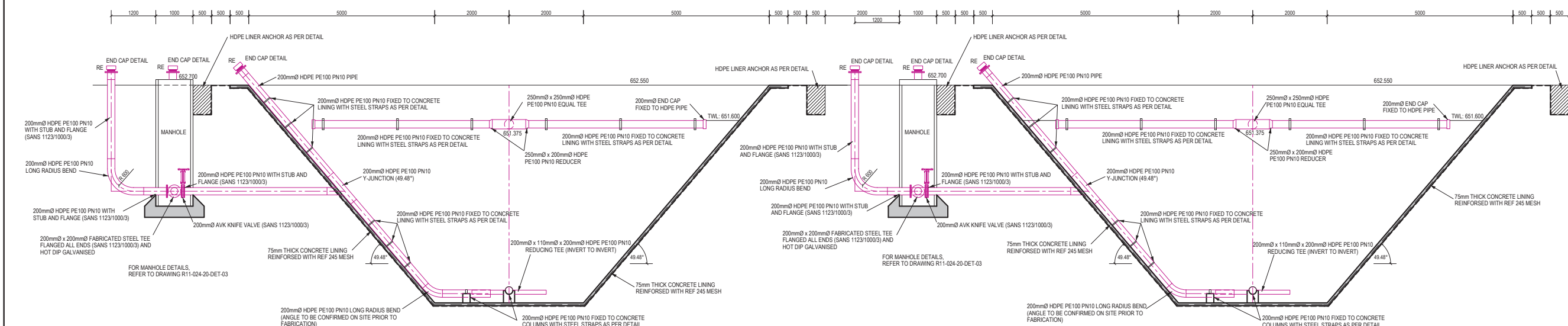
OUTLET PIPE CLAMP DETAIL

SCALE 1:10



TYPICAL LINER ANCHOR DETAIL

SCALE 1:50



SECTION B-B
SCALE 1:50

GENERAL NOTES:

- MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
- MINIMUM CONCRETE COVER = 25mm. EXCEPT FOR FOUNDATIONS = 50mm ; WATER RETAINING = 50mm
- CONCRETE SHOULD BE CURED (KEPT PERMANENTLY WET) FOR 7 DAYS MIN.
- FLOORS/SLABS MAY NOT BE USED TO STORE BUILDING MATERIALS.
- NO CONCRETE MAY BE PLACED BEFORE APPROVAL OF THE REINFORCING BY THE ENGINEER.
- LINING CONCRETE PLACED IN ALTERNATIVE PANELS AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.
- JOINT FILLER TO BE CLOSED CELL-EXPANDED POLYETHYLENE FOAM OR SIMILAR APPROVED.
- JOINT SEALER TO BE Sika FLEX PRO 3 1-CURE POLYURETHANE SEALANT OR SIMILAR APPROVED.
- ALL CONCRETE EDGES MUST BE NOSED WITH NOISING TOOL.
- WOOD FLOAT FINISH.
- SANS 1200 GA SHALL PREVAIL WITH SPECIAL REFERENCE TO CLAUSE 5.4.8.3
- CONCRETE MUST HAVE A NEAT SMOOTH EVEN & UNIFORM FINISH.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description

REVISIONS

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT

KING CETSHWAYO
DISTRICT MUNICIPALITY

CLIENT APPROVAL

Project leader: _____ Signature: _____

Date: _____

CLIENT DRAWING NUMBER: _____

ilifa
AFRICA ENGINEERS

PRETORIA
HARRISMITH
VANDERBIJLPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

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email: rbay@ilifa.biz
Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.

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Designed :	D. Steenkamp	Date:		Signature:	
Drawn :	H. Jooste	Date:		Signature:	
Checked :	J. Scaffiat	Date:		Signature:	

Approved: D. Steenkamp
Reg No.: 2012/0171

Date: _____ Signature: _____

PROJECT TITLE

**MELMOTH I ES EU PGAUD2E
GHDI E N**

PROJECT DESCRIPTION

MELMOTH S S TS WTEUM PGAUD2E

DRAWING TITLE

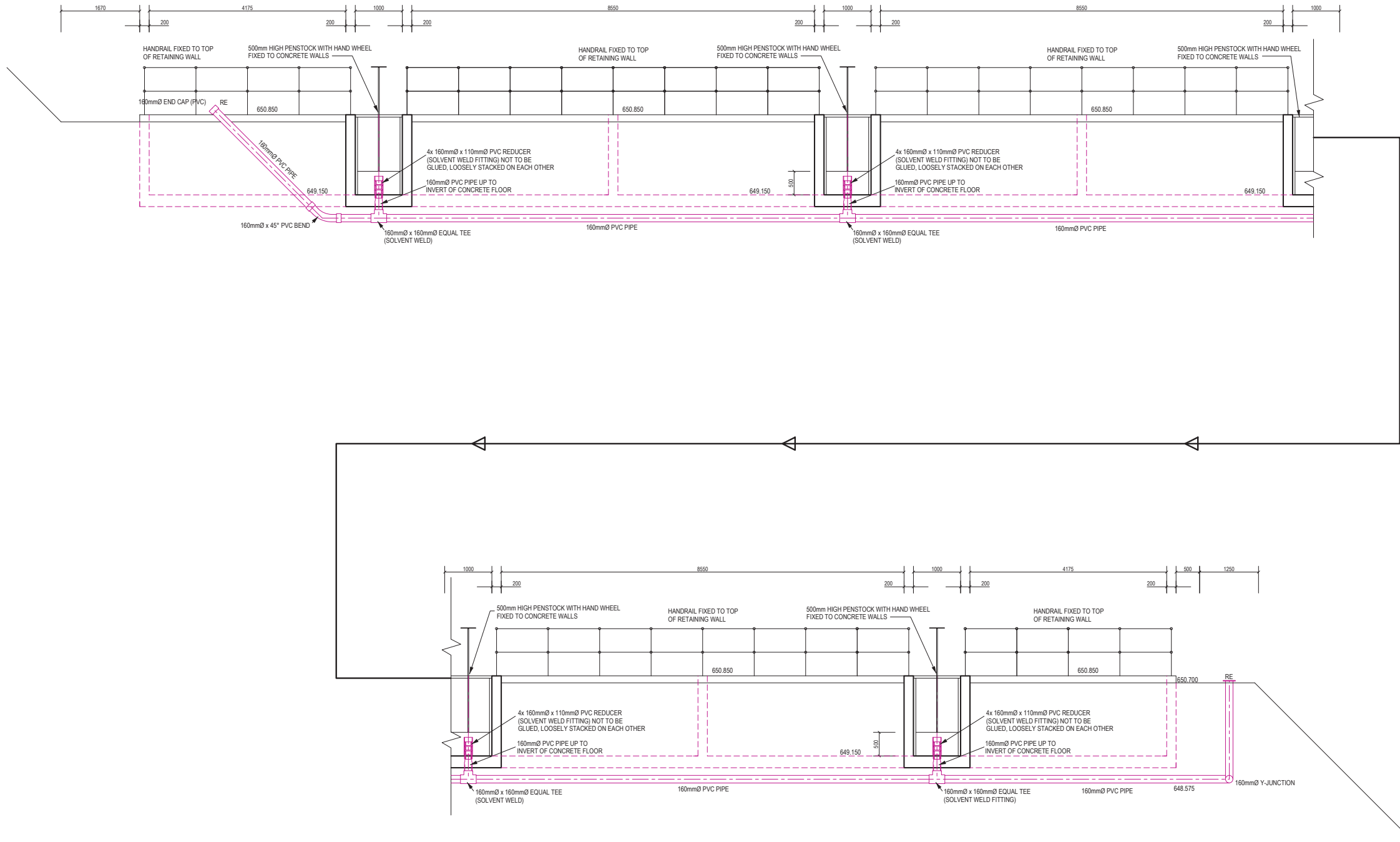
SLUDGE PONDS SECTION

DATE: NOVEMBER 2020	SCALE: 1: 250	A1	SHEET No: 1 OF 1

PLAN No.

CONSULTING ENG. DRAWING No: **R11-024-20-00-SEC01**

Rev **A**



TYPICAL SECTION WALL "C" THROUGH SLUDGE DRYING BEDS
SCALE 1:50

GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS. CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
2. MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR
FOUNDATIONS = 50mm; WATER RETAINING = 50mm
3. CONCRETE SHOULD BE CURED (KEPT PERMANENTLY
WET) FOR 7 DAYS MIN.
4. FLOOR SLABS MAY NOT BE USED TO STORE BUILDING
MATERIALS.
5. NO CONCRETE MAY BE PLACED BEFORE APPROVAL
OF THE REINFORCING BY THE ENGINEER.
6. LINING CONCRETE PLACED IN ALTERNATIVE PANELS
AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.
7. JOINT FILLER TO BE CLOSED CELL-EXPANDED
POLYETHYLENE FOAM OR SIMILAR APPROVED.
8. JOINT SEALER TO BE SIKAFLEX-PRO 3 1-CURE
POLYURETHANE SEALANT OR SIMILAR
APPROVED.
9. ALL CONCRETE EDGES MUST BE NOSED WITH
NOSING TOOL.
10. WOOD FLOAT FINISH.
11. SANS 1200 GA SHALL PREVAIL WITH SPECIAL
REFERENCE TO CLAUSE 5, 4, 8, 3
CONCRETE MUST HAVE A NEAT SMOOTH EVEN
& UNIFORM FINISH.

A	16-11-2020	D.S	FOR TENDER
No.	Date	By	Description
REVISIONS			

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT	
	
DISTRICT MUNICIPALITY	
CLIENT APPROVAL	
Project leader:	Signature :
Date:	
CLIENT DRAWING NUMBER:	



PRETORIA 012- 362 1473 **RICHARDS BAY OFFICE,**
HARRISMITH 056- 622 1297 **21 Kingfish Creek,**
VAN DER BIJLPARK 016- 981 0591 **MEERENSEE,**
KRUGERSDORP 011- 955 5334 **PO Box 10812,**
RICHARDSBAY 035- 753 1083 **Meerensee, 3901.**
SECUNDA 017- 634 8895
NEWCASTLE 034- 312 6464 **email: rbay@ilifa.biz**
Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS : MTUBATUBA ; NELSPRUIT; DUNDEE.

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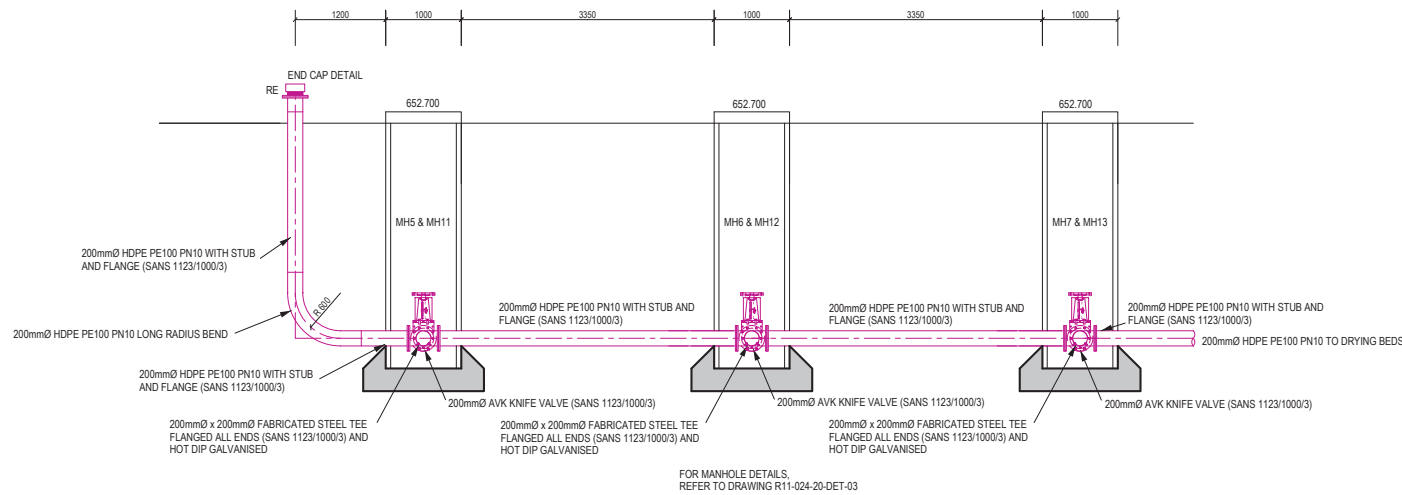
Designed :	D.Steenkamp	Date:	Signature :
Drawn :	H.Jooze	Date:	Signature :
Checked :	J.Scallet	Date:	Signature :
Approved: D.Steenkamp		Date:	Signature :
Reg No. : 201270171			

MELMOTH I ES EU PGAUD2E
GHDI E N

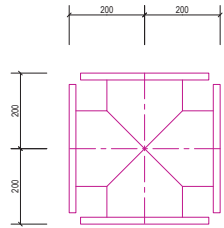
MELMOTH S S TS WTEUW PGAUD2E

SECTION WALL C THROUGH
SLUDGE DRYING BED

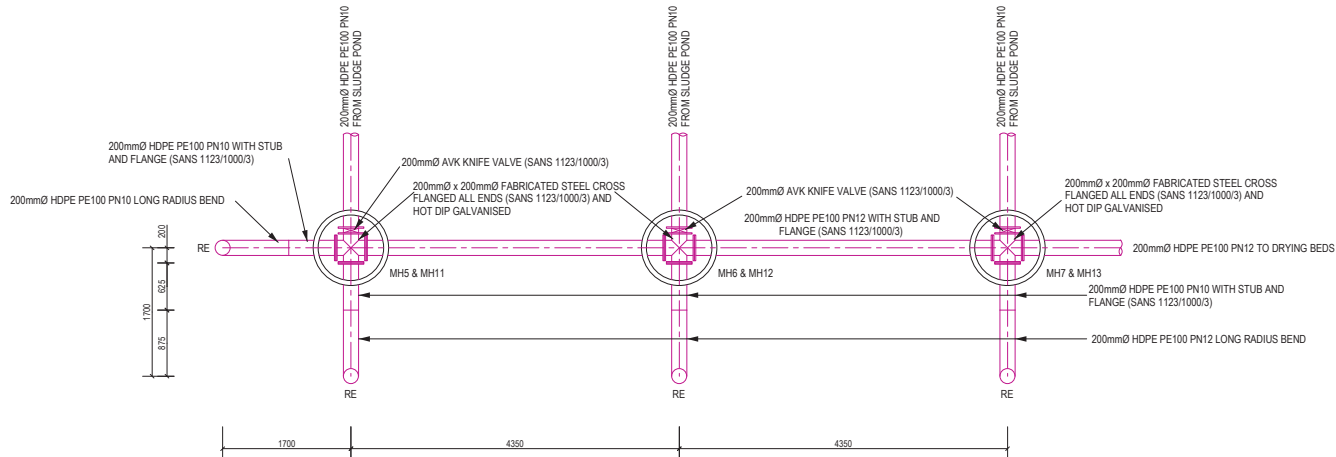
DATE: NOVEMBER 2020	SCALE: 1 : 250	A1	SHEET No: 1 OF 1
PLAN No.			
CONSULTING ENG. DRAWING No: R11-024-20-00-SEC02			Rev A



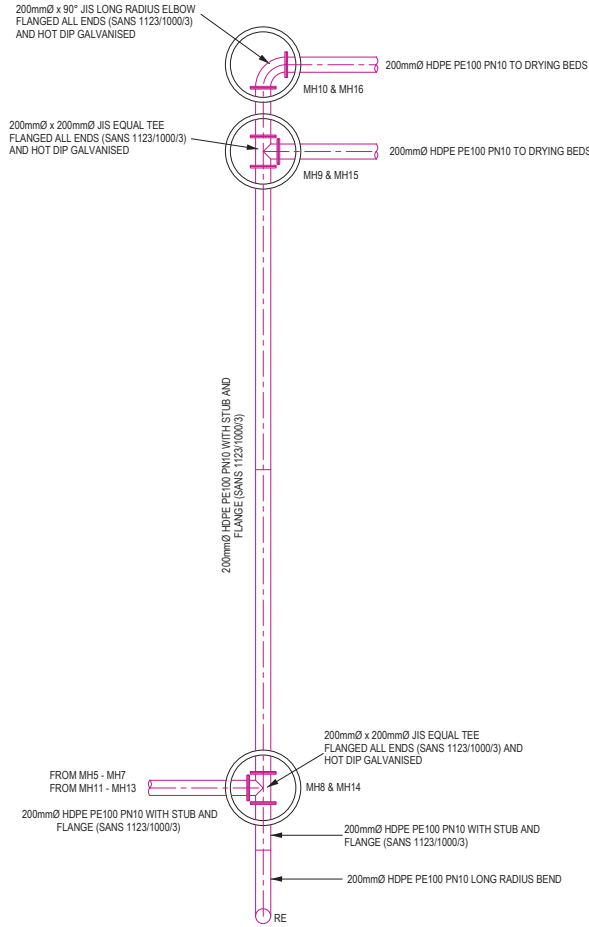
TYPICAL SECTION MH5 TO MH7 AND MH11 TO MH13
SCALE 1:50



FABRICATED STEEL CROSS DIMENSIONS
SCALE 1:10



PLAN LAYOUT MH5 TO MH7 AND MH11 TO MH13
SCALE 1:50



PLAN LAYOUT MH8 TO MH10 AND MH14 TO MH16
SCALE 1:50

GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH (28 DAYS)
REINFORCED CONCRETE = 30MPa/19mm
MASS CONCRETE = 20MPa/19mm
WATER RETAINING CONCRETE = 35 MPa.
2. MINIMUM CONCRETE COVER = 25mm, EXCEPT FOR
FOUNDATIONS = 50mm : WATER RETAINING = 50mm
3. CONCRETE SHOULD BE CURED (KEPT PERMANENTLY
WET) FOR 7 DAYS MIN.
4. FLOORSLABS MAY NOT BE USED TO STORE BUILDING
MATERIALS.
5. NO CONCRETE MAY BE PLACED BEFORE APPROVAL
OF THE REINFORCING BY THE ENGINEER.
6. LINING CONCRETE PLACED IN ALTERNATIVE PANELS
AS INDICATED AND WITH FLEXIBLE SEALING BANDAGE.
7. JOINT FILLER TO BE CLOSED CELL-EXPANDED
POLYETHYLENE FOAM OR SIMILAR APPROVED.
8. JOINT SEALER TO BE SIKAFLEX-PRO 3 I-CURE
POLYURETHANE SEALANT OR SIMILAR
APPROVED.
9. ALL CONCRETE EDGES MUST BE NOSED WITH
NOSING TOOL.
10. WOOD FLOAT FINISH.
11. SANS 1200 GA SHALL PREVAIL WITH SPECIAL
REFERENCE TO CLAUSE 5.4.8.3
CONCRETE MUST HAVE A NEAT SMOOTH EVEN
& UNIFORM FINISH.

No.	Date	By	Description
A	16-11-2020	D.S	FOR TENDER

REVISIONS
AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR
DATE:.....

ENGINEER
DATE:.....



Project leader:	Signature :
Date:	

CLIENT DRAWING NUMBER:

ilifa
AFRICA ENGINEERS

PRETORIA
HARRISMITH
VANDERBIJLPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

012- 362 1473
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MEERENSEE,
PO Box 10812,
Meerensee, 3901.

email: rbay@ilifa.biz
Web: www.ilifa.biz

ASSOCIATED OFFICES:
BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.

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OTHER THAN THAT FOR WHICH IT IS SPECIALLY FURNISHED, AND/OR
THE INSTALLATION AND/OR MAINTENANCE OF EQUIPMENT TO WHICH ITS
REFERS

Designed :	D.Steenkamp	Date:		Signature :	
Drawn :	H.Jooste	Date:		Signature :	
Checked :	J.Scallet	Date:		Signature :	
Approved: D.Steenkamp		Date:		Signature :	
Reg No. 2012070171		Date:		Signature :	

PROJECT TITLE
**MELMOTH I ES EU PGAUD2E
GHD I E N**

PROJECT DESCRIPTION
MELMOTH S S TS WTEUM PGAUD2E

DRAWING TITLE
TYPICAL SECTION

DATE: NOVEMBER 2020	SCALE: 1 : 250	A1	SHEET No: 1 OF 1

PLAN No.

CONSULTING ENG. DRAWING No:
R11-024-20-00-SEC03

Rev
A

MUNICIPALITY EMBLEM

PROJECT NAME

ILIFA EMBLEM

CONTRACTOR EMBLEM

PROJECT NAME

EPWP EMBLEM


KING CETSHWAYO
DISTRICT MUNICIPALITY

PROJECT DESCRIPTION


ilifa
AFRICA ENGINEERS

PROJECT TYPE


EXPANDED PUBLIC WORKS PROGRAMME
Creating opportunities towards human fulfilment

KING CETSHWAYO
DISTRICT MUNICIPALITY

MELMOTH SEWER UPGRADE - PHASE 2
MELMOTH WWTW INTERIM UPGRADE

CONSULTING ENGINEERS:
ILIFA AFRICA ENGINEERS (Pty) Ltd

CONTRACTOR :

PROJECT TYPE INFRASTRUCTURE

CONSTRUCTION NAME BOARD

SCALE 1:10

- No REQUIRED: 2
- BACKGROUND: AS PER EPWP COLOUR PALETTE.
- BORDER: 12 mm BLACK.
- LETTERS: CAPITAL LETTERS, SERIES "C", MATT-BLACK. EXCEPT FOR EMBLEMS (COINCIDES WITH THE SOUTH AFRICAN ROAD TRAFFIC SIGNS MANUAL.)
- EMBLEMS: MAY ONLY BE USED BY MEMBERS AND MUST BE DISPLAYED IN FULL COLOUR.
- NOTES: SITTING AND ERECTION METHODS, AS DIRECTED BY THE PROJECT MANAGER

A

16/11/2020

D.S

FOR TENDER

No.

Date

By

Description

: 2017 P 7

AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR

ENGINEER

DATE:.....

DATE:.....

CLIENT


KING CETSHWAYO
DISTRICT MUNICIPALITY

CLIENT APPROVAL

Project leader

Signature

Date

CLIENT DRAWING NUMBER


ilifa
AFRICA ENGINEERS

PRETORIA

012- 362 1473

RICHARDS BAY OFFICE,

HARRISMITH

058- 622 1297

21 Kingfish Creek,

VANDERBULPARK

016- 981 0591

MEERENSEE,

KRUGERSDORP

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Meerensee, 3901.

SECUNDA

017- 634 8895

NEWCASTLE

034- 312 6464

email: rbay@ilifa.biz

Web: www.ilifa.biz

ASSOCIATED OFFICES:

BRITS ; MTUBATUBA ; NELSPRUIT; DUNDEE.

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Designed

G.T.M. nka L

Date

Signature

Drawn

m.pooladi

Date

Signature

Checked

p.7.ikadi

Date

Signature

g.LLaEVI 30.T.M nka L

Date

Signature

PROJECT TITLE

MELMOTH SEWER UPGRADE
PHASE 2

PROJECT DESCRIPTION

MELMOTH WWTW INTERIM UPGRADE

DRAWING TITLE

TYPICAL DETAIL:
CONTRACTOR SIGN BOARD

DATE

NOVEMBER 2020

SCALE

AS SHOWN

A3

SHEET NO.

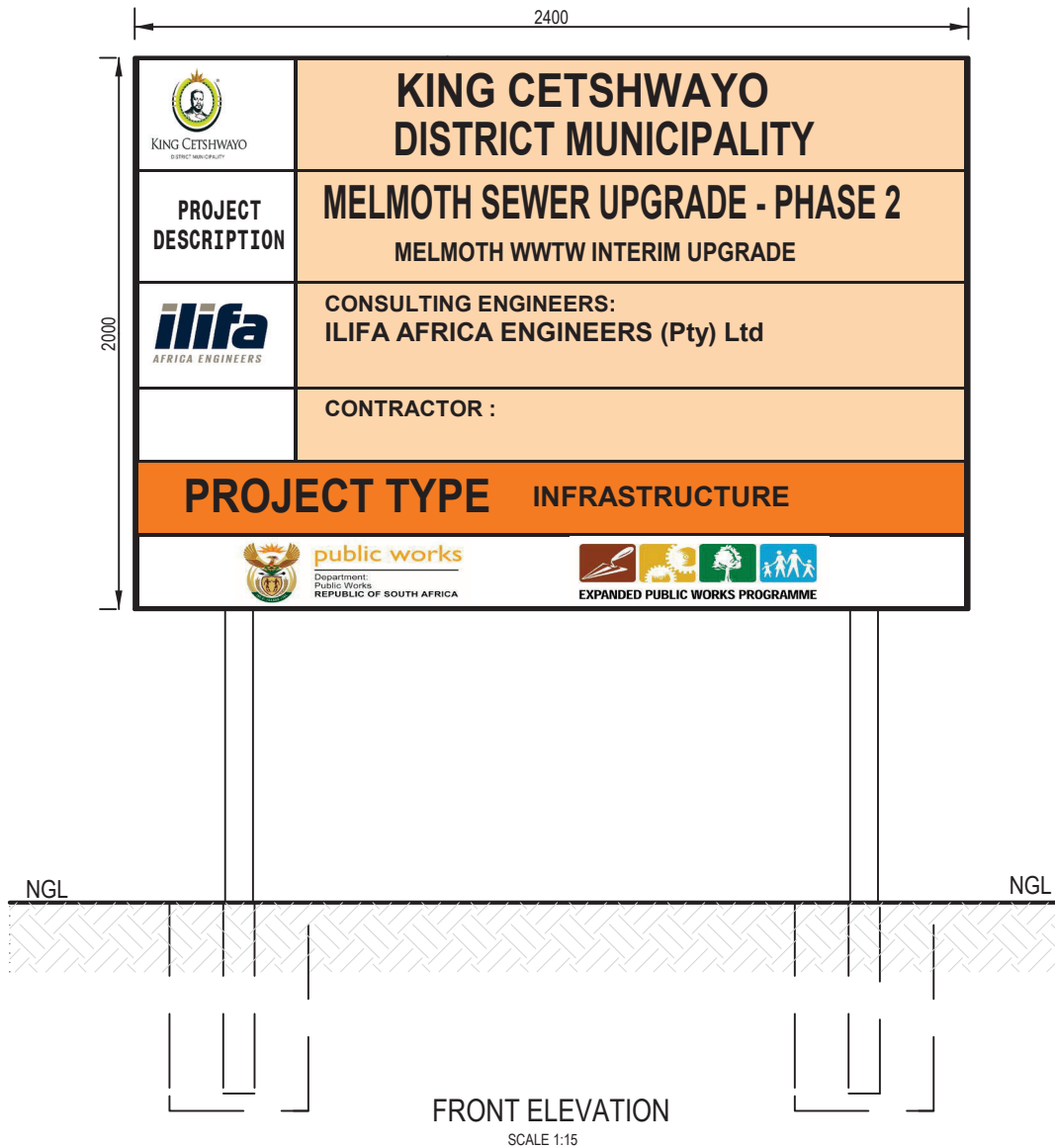
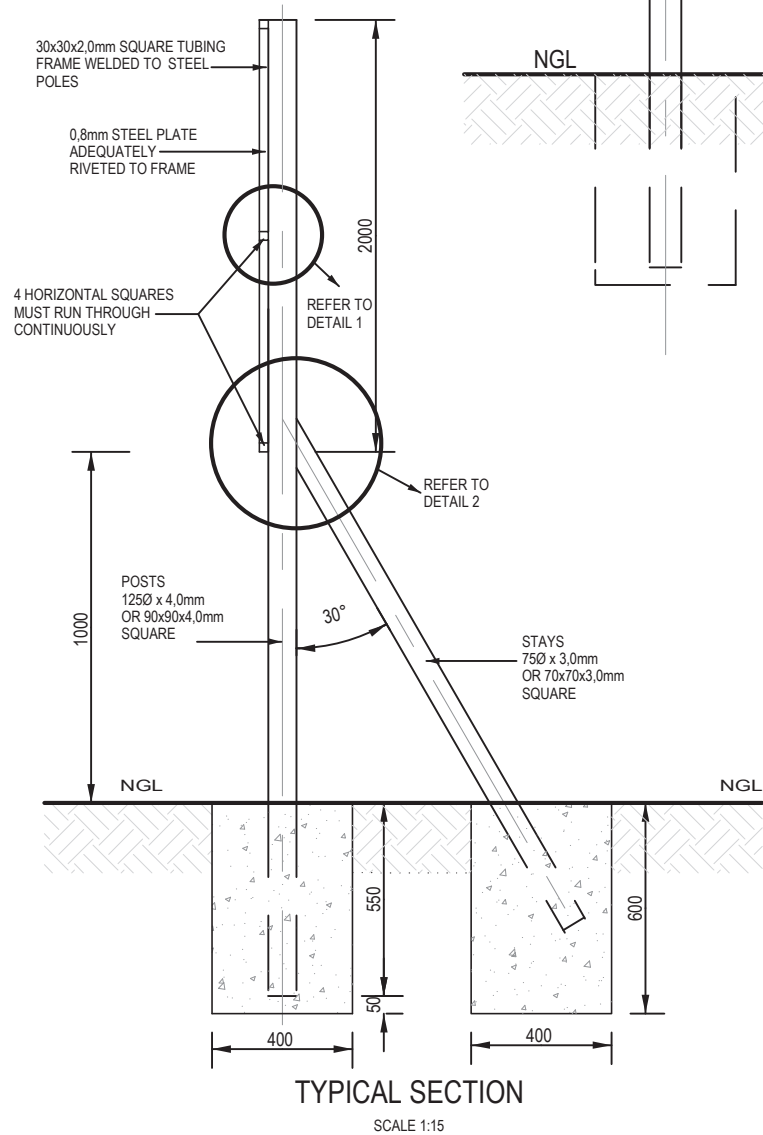
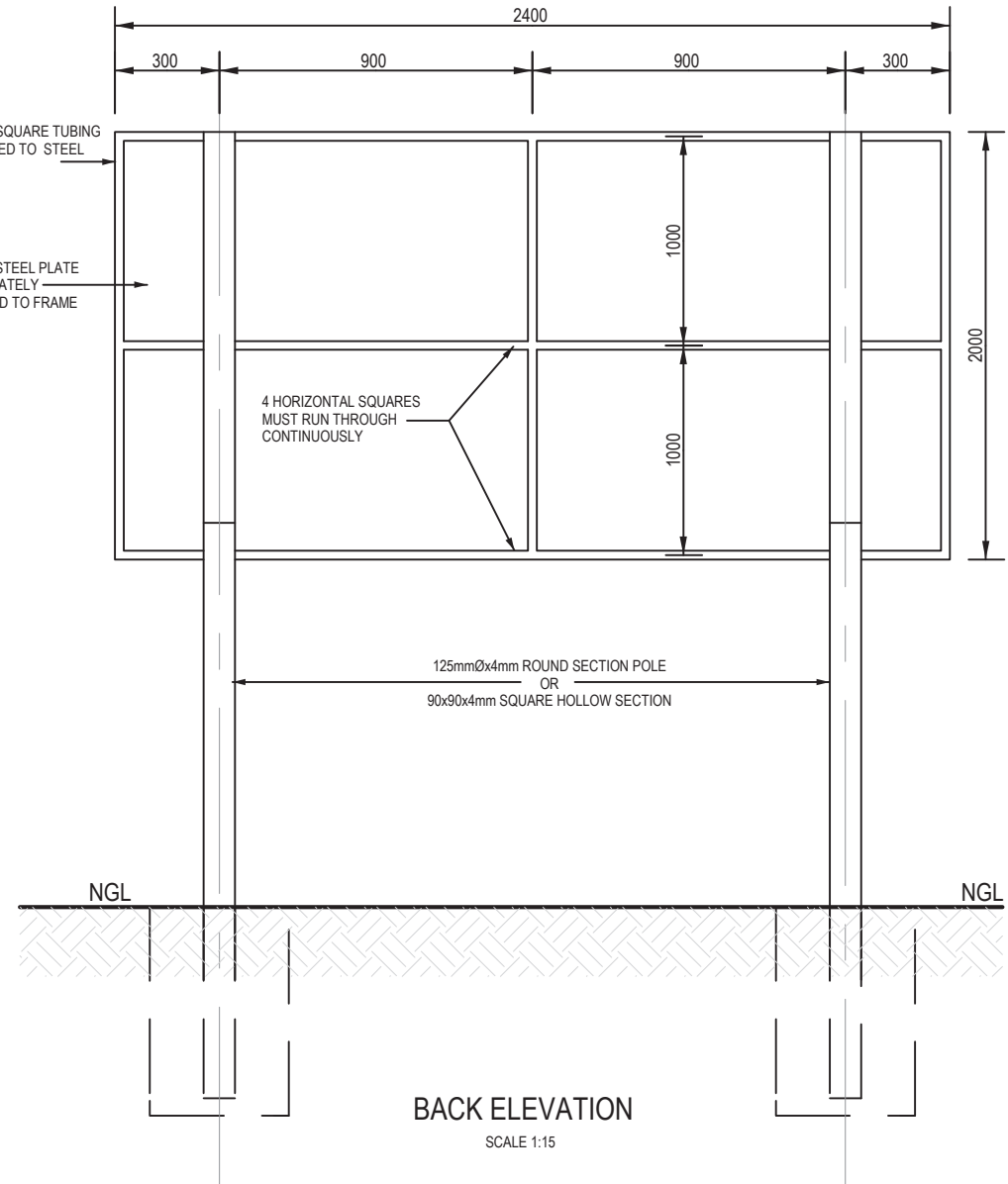
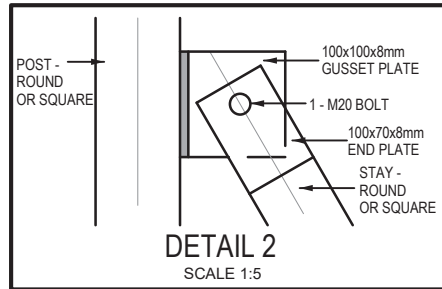
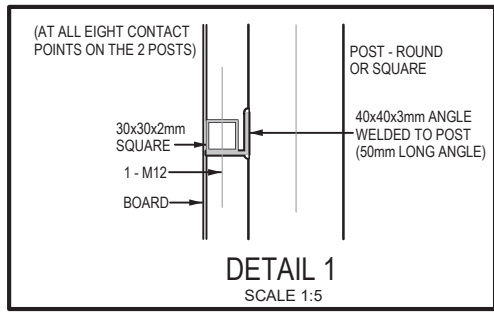
1 OF 1

CONSULTING ENG. DRAWING NO.

R11-024-20-DET-01

Rev

A



NOTES:

1. TYPE FACE TO BE USED SHALL BE HELVETICA MEDIUM.
2. SIZES OF LETTERING & DIMENSIONS ARE INDICATED ON THE DIAGRAM AND SHALL BE STRICTLY ADHERED TO.
3. PROJECT NAME & OWNER SHALL BE WHITE, LETTERING ON MIDDLE BLUE BACKGROUND. SURROUNDING BORDER SHALL ALSO BE IN MIDDLE BLUE.
4. PROFESSIONAL TITLES & LINES THEREUNDER SHALL BE IN BLACK, ON WHITE BACKGROUND.
5. PROFESSIONAL CRESTS & COMPANY NAMES SHALL BE IN BLACK, ON WHITE BACKGROUND.
6. PROFESSIONAL CRESTS SHALL BE PLACED CENTRAL ON SPACE PROVIDED AS SHOWN ON DIAGRAM.
7. PAINT COLOURS ARE BASED ON PLASCON-EVANS: VELVAGLO POLYURETHANE VELVET ENAMEL: WHITE VLO 1
TEQUILLA VLO 10
ACRYLIC ROAD SIGN PAINTS: BLACK REF. 266
MIDDLE BLUE REF. 290
8. PROJECT BOARD TO RECEIVE FIXTURE TOP LAYER TO PREVENT REMOVAL OF OR DAMAGE TO LETTERING.
9. THE BOARD WILL BE SUPPLIED COMPLETE WITH ALL POSTS (MINIMUM 50mm Ø) AND BRACKETS REQUIRED FOR ERECTION.

A	16/11/2020	D.S.	FOR TENDER
No.	Date	By	Description
2017 P 7			

AS BUILT DRAWINGS	
TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT	
	
KING CETSHWAYO DISTRICT MUNICIPALITY	
CLIENT APPROVAL	
Project leader:	Signature :
Date:	
CLIENT DRAWING NUMBER:	

ilifa
AFRICA ENGINEERS

PRETORIA 012- 362 1473
HARRISMITH 058- 622 1297
VANDERBULPARK 016- 981 0591
KRUGERSDORP 011- 555 5334
RICHARDSBAY 035- 753 1083
SECUNDA 017- 634 8895
NEWCASTLE 034- 312 6464

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Designed: 0.7BW nka L	Date:	Signature:
Drawn: m.pooHDV	Date:	Signature:
Checked: p.T. nka L	Date:	Signature:
g.L.A.B. 30.7BW nka L	Date:	Signature:

PROJECT TITLE	
MELMOTH SEWER UPGRADE PHASE 2	

PROJECT DESCRIPTION	
MELMOTH WWTW INTERIM UPGRADE	

DRAWING TITLE	
TYPICAL DETAIL: SIGN SUPPORT STRUCTURE	

DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
Reg. No.			
CONSULTING ENG. DRAWING NO: R11-024-20-DET-01A			
Rev. A			

ABREVIATIONS:

V = VALVE

AV= AIR VALVE

FH = FIRE HYDRANT

SV = SCOUR VALVE

E = ELECTRICAL

G = GAS

S = SEWER

W = WATER

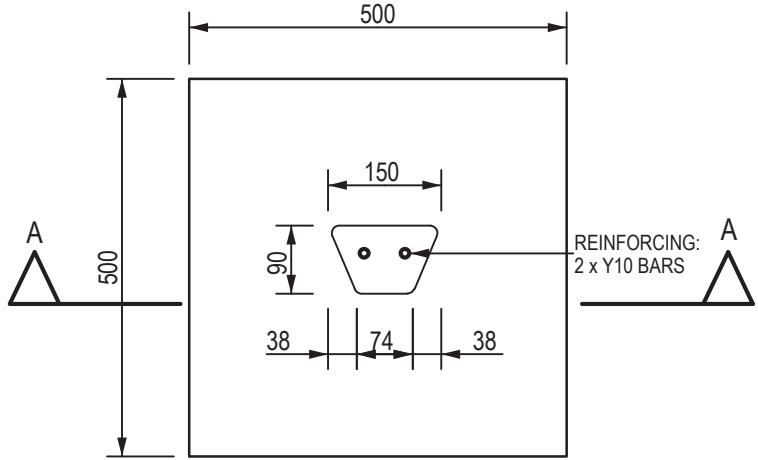
SD = SUB-SOIL DRAINAGE

T = TELKOM

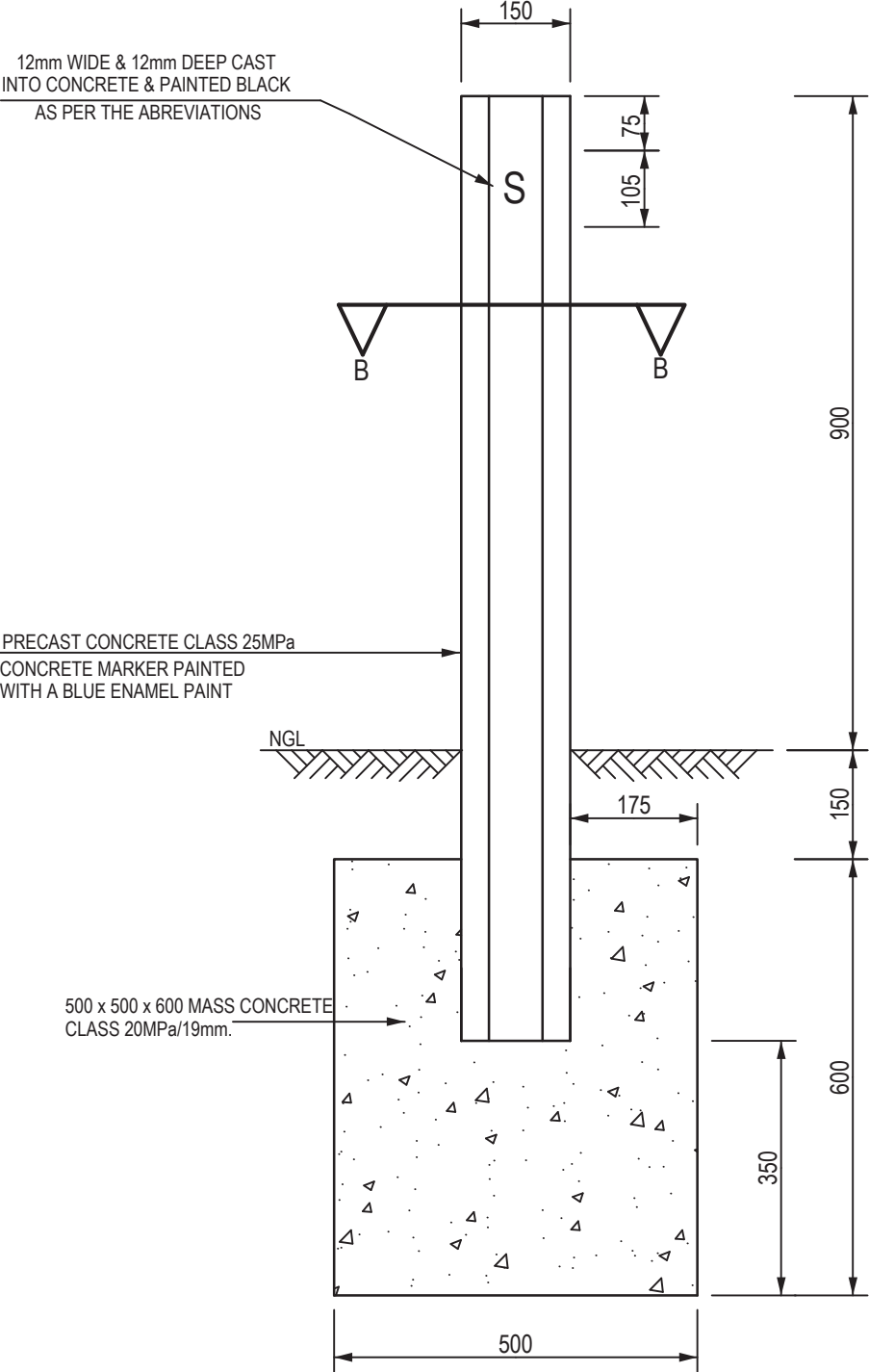
IT = INFORMATION TECHNOLOGY

N = NEOTEL

ALL EXPOSED PIPES TO BE COLOUR COATED
AS PER SABS 0140-1



SECTION B-B
SCALE 1:10



SECTION A-A
PIPE LINE MARKER
(ON ALL THE BENDS AND EVERY 100m)
SCALE 1:10

NOTES:
MARKERS MUST ALWAYS BE PLACED 1.5m TO
THE LEFT OF THE PIPELINE WHEN FACING
DOWNSTREAM.

WHEN THE PIPELINE LIES NEXT TO A ROAD,
THE MARKER MUST BE PLACED ON THE SIDE
FURTHEST AWAY FROM TH EROAD

A	16/11/2020	D.S	FOR TENDER
No.	Date	By	Description
: 2017 P 7			
AS BUILT DRAWINGS			
TECHNICAL CO-ORDINATOR		ENGINEER	
DATE:.....		DATE:.....	

CLIENT	
 	
KING CETSHWAYO DISTRICT MUNICIPALITY	
CLIENT APPROVAL	
Project leader:	Signature:
Date:	
CLIENT DRAWING NUMBER:	



PRETORIA
HARRISMITH
VANDERBULPARK
KRUGERSDORP
RICHARDSBAY
SECUNDA
NEWCASTLE

012-362 1473
058-622 1297
016-981 0591
011-955 5334
035-753 1063
017-634 8895
034-312 6464

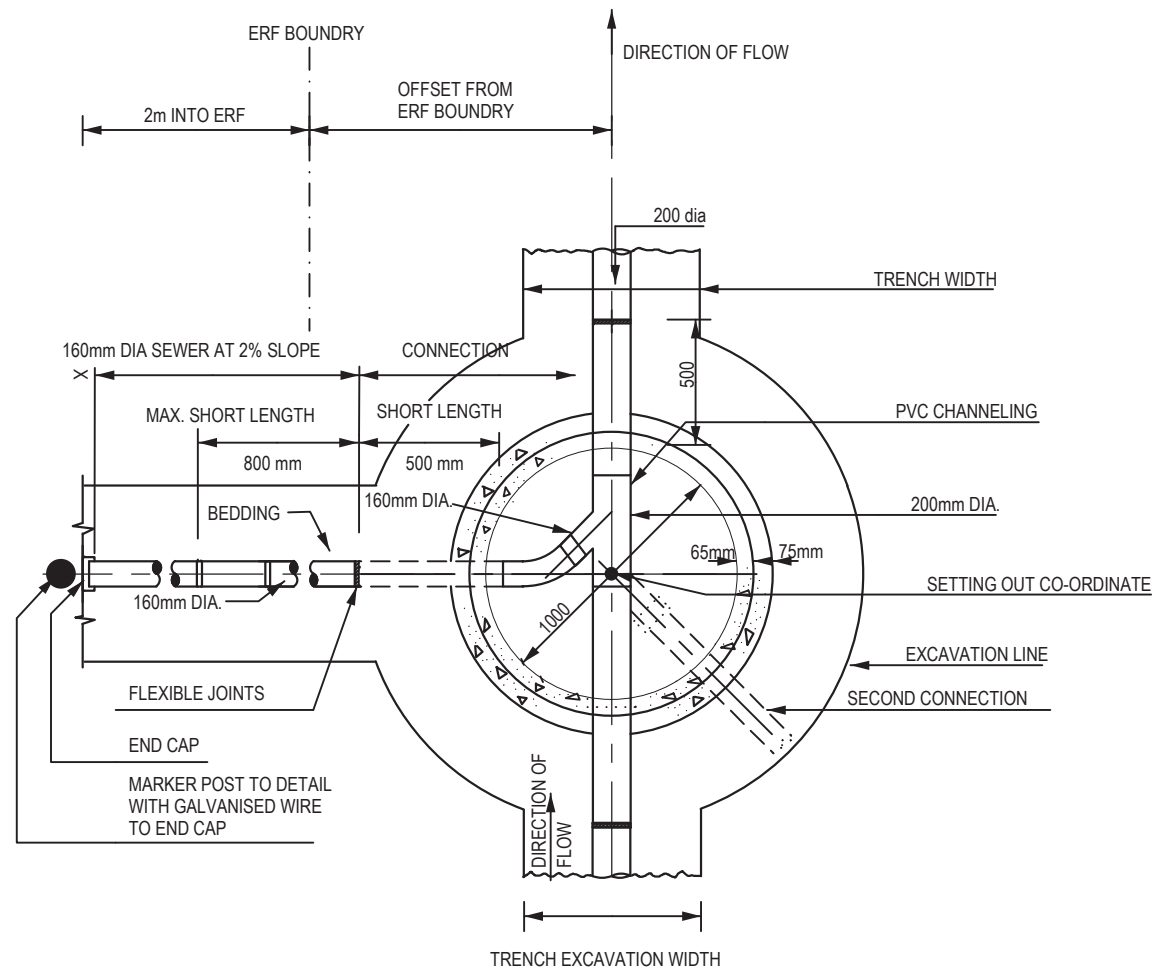
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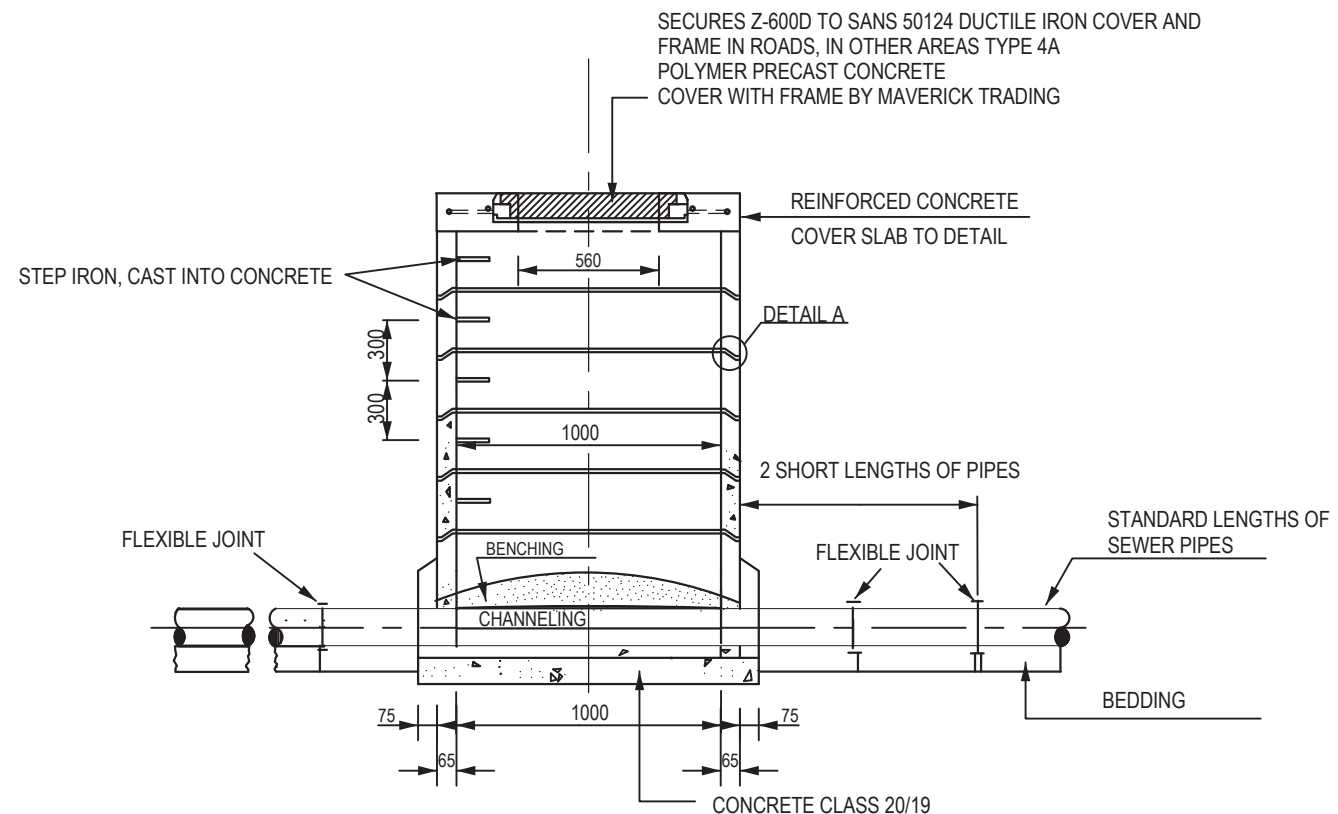
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Designed :	O.T.M rika L	Date :		Signature :	
Drawn :	m.pooch D	Date :		Signature :	
Checked :	p.T. J. ad D	Date :		Signature :	
g.L.L. ad D	30.7.DM rika L	Date :		Signature :	
W. N. S. rika L	ad D	Date :		Signature :	

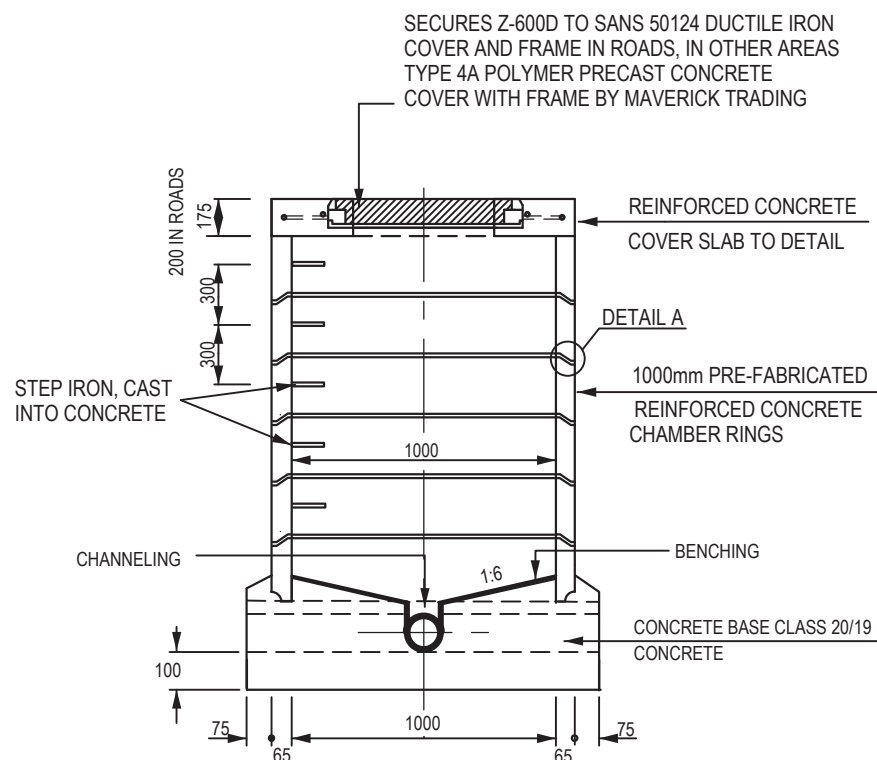
PROJECT TITLE			
MELMOTH SEWER UPGRADE PHASE 2			
PROJECT DESCRIPTION			
MELMOTH WWTW INTERIM UPGRADE			
DRAWING TITLE			
TYPICAL DETAIL: PIPE LINE MARKERS			
DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
Reg. No.			
CONSULTING ENG. DRAWING NO: R11-024-20-DET-02			Rev: A



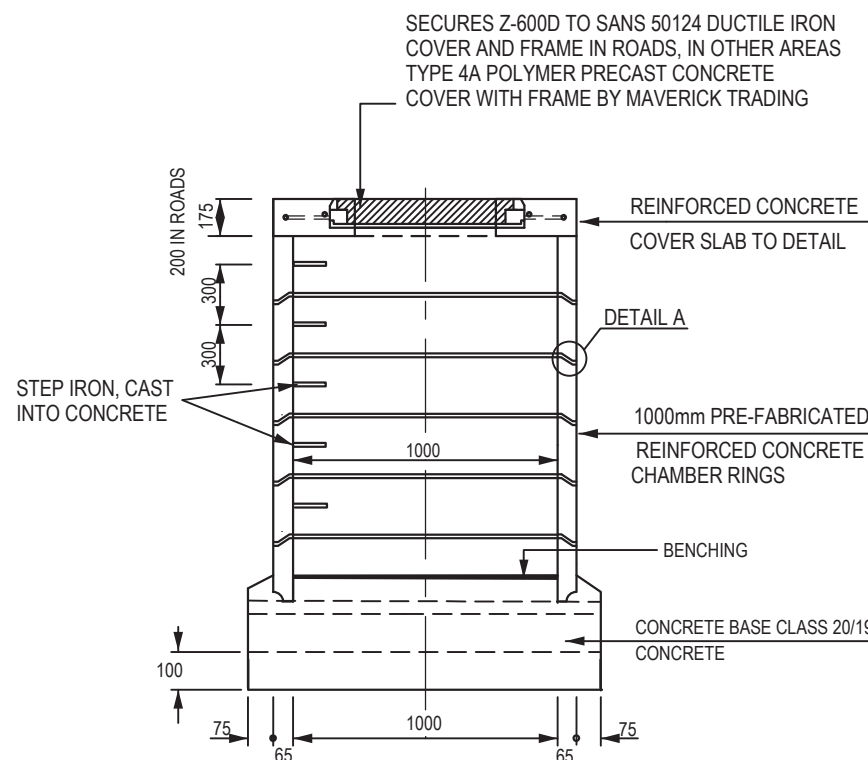
TYPICAL PLAN OF MANHOLE WITH ERF CONNECTION
SCALE 1: 30



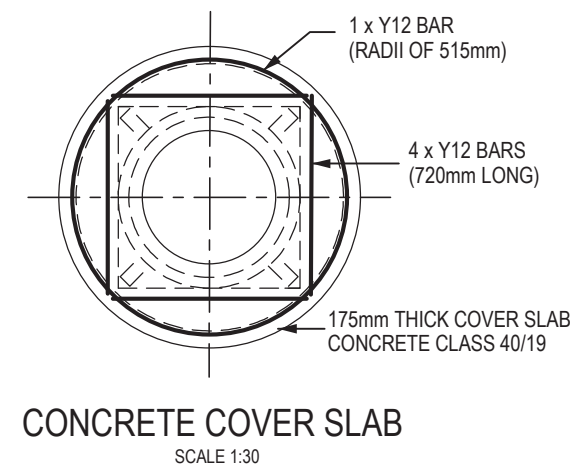
TYPICAL SECTION OF MANHOLE
SCALE 1: 30



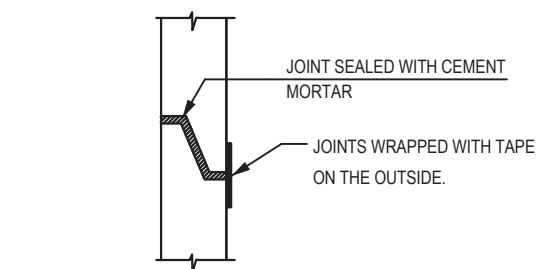
TYPICAL SECTION OF MANHOLE
SCALE 1:30



TYPICAL SECTION OF SERVICE MANHOLE
SCALE 1:30



CONCRETE COVER SLAB
SCALE 1:30



DETAIL A
TYPICAL JOINT DETAIL
N.T.S.

NOTE:

1. MANHOLES TOP OF FRAME MUST BE 150mm PROUD OF NATURAL GROUND LEVEL
2. CONCRETE SECTIONS TO BE SEALED WITH BITU JOINT PUTTY FROM ABE OR SIMILAR APPROVED.
3. FACTORY FABRICATED MANHOLE RINGS MUST COMPLY WITH SABS 1294-1981.
4. OVEREXCAVATION TO BE BACKFILLED WITH BEDDING MATERIAL ACCORDING TO SPESIFICATION FOR BEDDING MATERIAL.

THE FOLLOWING CODES OF SABS 1200 SHALL PREVAIL.
a) SANS 1200 DB PIPE TRENCHES.
b) SANS 1200 LB BEDDING PIPES.
c) SANS 1200 LD SEWERS.
THE BOTTOM SECTION OF THE CHAMBER IS SET INTO A FRESHLY CAST CONCRETE BASE INTO WHICH THE SEWER PIPES HAVE BEEN LAID.

No.	Date	By	Description
A	16/11/2020	D.S.	FOR TENDER

2017 P 7
AS BUILT DRAWINGS

TECHNICAL CO-ORDINATOR	ENGINEER
DATE:	DATE:

CLIENT	CLIENT APPROVAL
	
KING CETSHWAYO DISTRICT MUNICIPALITY	ILIFA AFRICA ENGINEERS
Project leader:	Signature:
Date:	Signature:
CLIENT DRAWING NUMBER:	Signature:

ilifa
AFRICA ENGINEERS

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SECUNDA: 017-634 8895
NEWCASTLE: 034-312 6464

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PO Box 10812,
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ASSOCIATED OFFICES:
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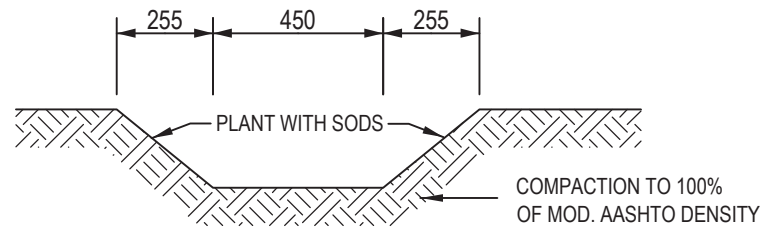
Designed: O.T.M. nka L	Date:	Signature:
Drawn: m.pooH	Date:	Signature:
Checked: p.J. nka L	Date:	Signature:
g.L.L. nka L	Date:	Signature:

PROJECT TITLE
**MELMOTH SEWER UPGRADE
PHASE 2**

PROJECT DESCRIPTION
MELMOTH WWTW INTERIM UPGRADE

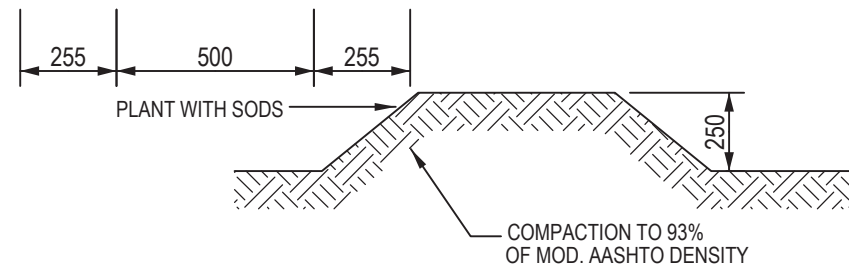
DRAWING TITLE
**STANDARD DETAILS
SEWER MANHOLES**

DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
Reg. No.			Rev.
R11-024-20-DET-03			A



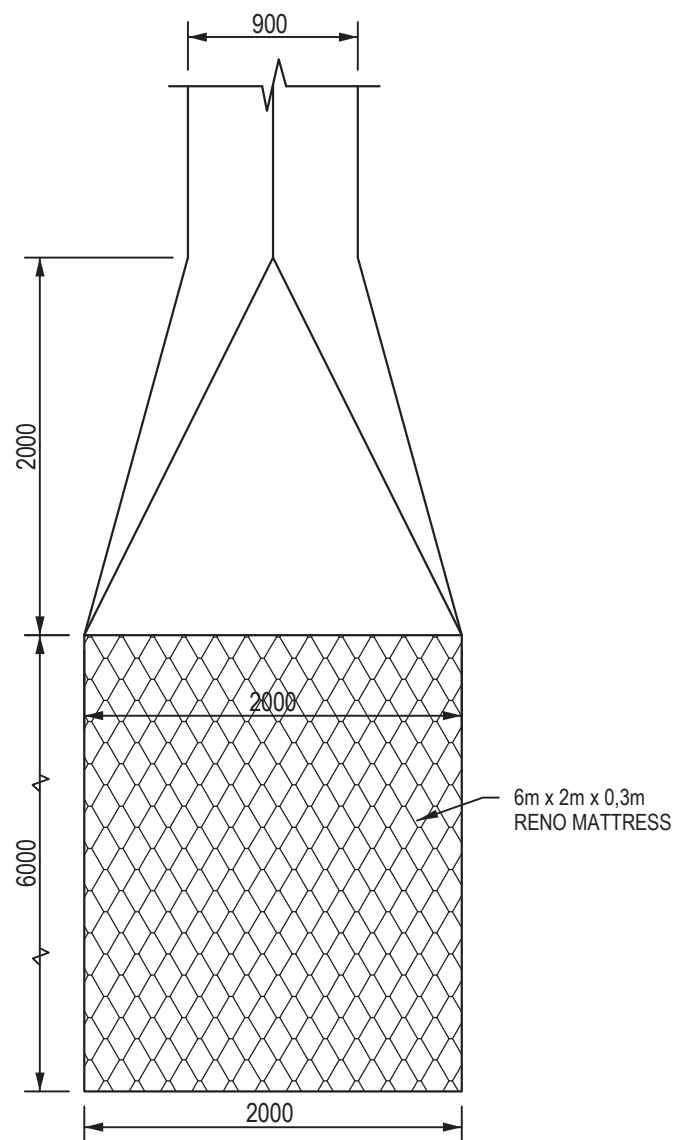
TYPICAL TRAPIZODAL
EARTH CHANNEL

SCALE 1:25



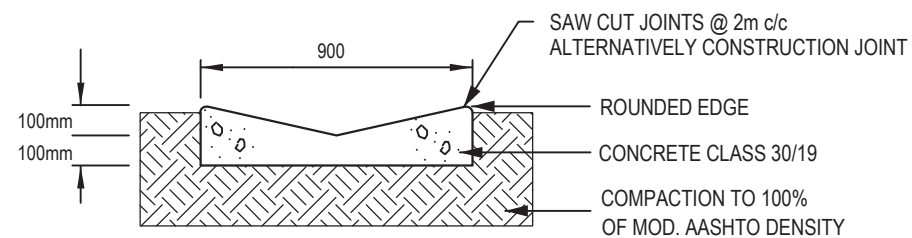
TYPICAL SECTION
OF EARTH BERM

SCALE 1:25



STORMWATER
CHANNEL OUTLET

SCALE 1:40



TYPICAL SECTION
900 V CHANNEL

SCALE 1:25

NOTES:

1) ALL CONCRETE TO BE CLASS 30/19 UNLESS OTHERWISE SHOWN

CONCRETE WALKWAYS & APRONS

- ALL CONCRETE TO BE 30 MPa AT 28 DAYS STRENGTH
 - SAW-CUT JOINTS AT 2000 c/c
 - EXPANSION JOINTS AT 16000 c/c
 - JOINT FILLER TO BE FLEXELL OR SIMILAR APPROVED
 - JOINT SEALER TO BE SIKAFLEX-PRO 2HP OR SIMILAR APPROVED
 - ALL CONCRETE EDGES MUST BE NOSED WITH NOSING TOOL
 - WOOD FLOAT FINISH
 - SANS 1200 GA SHALL PREVAIL WITH SPECIAL REFERENCE TO CLAUSE 5, 4, 8, 3
- CONCRETE MUST HAVE A NEAT SMOOTH EVEN & UNIFORM FINISH

A	16/11/2020	D.S	FOR TENDER
No.	Date	By	Description
: 2017 P 7			
AS BUILT DRAWINGS			
TECHNICAL CO-ORDINATOR		ENGINEER	
DATE:		DATE:	
CLIENT			
 			
CLIENT APPROVAL			
Project leader:		Signature:	
Date:		Date:	
CLIENT DRAWING NUMBER:			
			
PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE 012-362 1473 058-622 1297 016-981 0591 011-955 5334 035-753 1063 017-534 8895 034-312 6464 RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz			
ASSOCIATED OFFICES: BRITS; MTUBATUBA; NELSPRUIT; DUNDEE.			
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Designed: O.7 DM rka L Date: Signature: Drawn: m.pooch D Date: Signature: Checked: p.7 J. J. D Date: Signature: gLLaEM 30.7 DM rka L Date: Signature:			
PROJECT TITLE			
MELMOTH SEWER UPGRADE PHASE 2			
PROJECT DESCRIPTION			
MELMOTH WWTW INTERIM UPGRADE			
DRAWING TITLE			
TYPICAL DETAIL: STORMWATER			
DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
Rev. No.			
CONSULTING ENG. DRAWING NO: R11-024-20-DET-04			Rev. A

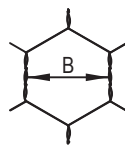


FIGURE 1
THE MESH

TABLE 1: MESH CHARACTERISTICS						
MESH TYPE	b (mm)	TOLERANCE (%)	WIRE DIAMETER (mm)			
			MESH		SELVEDGE	
			GALV	GALV/PVC	GALV	GALV/PVC
60	60	+5, -2	2,2	2,2 / 3,2	2,7	2,7 / 3,7
80	80	+5, -2	2,2	2,7 / 3,7	3,4	3,4 / 4,4

SPECIFICATIONS: ALL LACING WIRE - 2,2mm FOR GALVANISED MESH AND 2,2 / 3,2mm FOR PVC COATED MESH

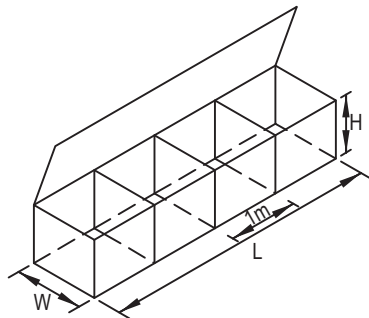


FIGURE 2
GABIONS

TABLE 2: GABIONS						
NOMINAL DIMENSIONS			NUMBER OF CELLS	CAPACITY (m³)	UNITS PER BUNDLE	
LENGTH (L) (m)	WIDTH (W) (m)	HEIGHT (H) (m)			GALV	GALV / PVC
1,0	1,0	1,0	1	1,0	74	64
1,5	1,0	1,0	1	1,5	74	62
2,0	1,0	1,0	2	2,0	44	38
3,0	1,0	1,0	3	3,0	32	26
4,0	1,0	1,0	4	4,0	24	20
2,0	0,5	0,5	2	0,5	100	80
2,0	1,0	0,5	2	1,0	60	50
3,0	1,0	0,5	3	1,5	40	34
4,0	1,0	0,5	4	2,0	32	30

TOLERANCES: HEIGHT (H) : ±5%; WIDTH (W) : ±5%; LENGTH (L) : ±10%

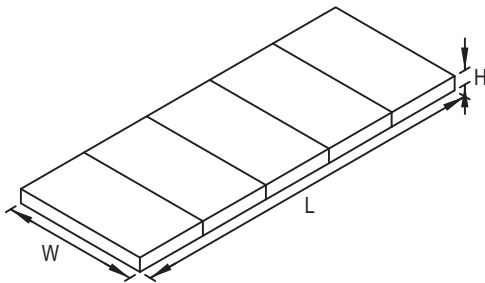


FIGURE 3
RENO MATTRESSES

TABLE 3: RENO MATTRESSES						
NOMINAL DIMENSIONS			NUMBER OF CELLS	CAPACITY (m³)	UNITS PER BUNDLE	
LENGTH (L) (m)	WIDTH (W) (m)	HEIGHT (H) (m)			GALV	GALV / PVC
* 2,0	1,0	0,30	2	0,6	80	60
* 3,0	1,0	0,30	3	0,9	60	40
6,0	2,0	0,17	6	2,04	25	20
6,0	2,0	0,23	6	2,76	25	20
6,0	2,0	0,30	6	3,60	25	20

TOLERANCES: HEIGHT (H) : ±5%; WIDTH (W) : ±5%; LENGTH (L) : ±10%

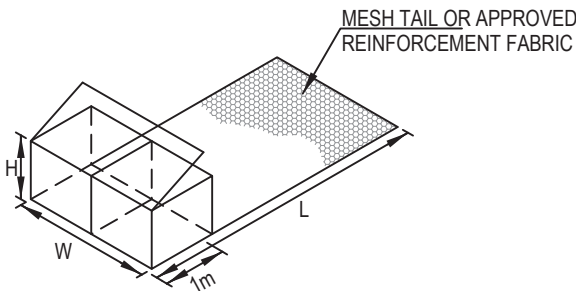


FIGURE 4
EARTH REINFORCEMENT

TABLE 4: EARTH REINFORCEMENT SYSTEMS				
NOMINAL DIMENSIONS			FRONT FACE CAPACITY (m³)	UNITS PER BUNDLE
LENGTH (L) (m)	WIDTH (W) (m)	HEIGHT (H) (m)		
3,0	2,0	0,5	1,0	20
4,0	2,0	0,5	1,0	20
5,0	2,0	0,5	1,0	20
6,0	2,0	0,5	1,0	20
3,0	2,0	1,0	2,0	20
4,0	2,0	1,0	2,0	20
5,0	2,0	1,0	2,0	20
6,0	2,0	1,0	2,0	20

TOLERANCES: HEIGHT (H) : ±5%; WIDTH (W) : ±5%; LENGTH (L) : ±10%

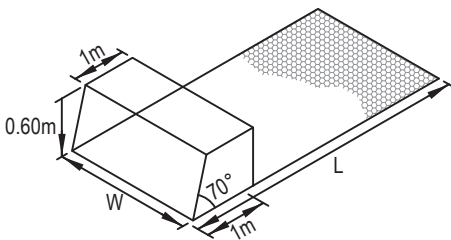


FIGURE 5
GREEN TERRAMESH

TABLE 5: ENVIRONMENTALLY FRIENDLY EARTH REINFORCEMENT SYSTEMS			
NOMINAL DIMENSIONS			UNITS PER BUNDLE
LENGTH (L) (m)	WIDTH (W) (m)	HEIGHT (H) (m)	
2,0	2,0	0,6	20
3,0	2,0	0,6	20
4,0	2,0	0,6	20
5,0	2,0	0,6	20
6,0	2,0	0,6	20

TOLERANCES: HEIGHT (H) : ±5%; WIDTH (W) : ±5%; LENGTH (L) : ±10%

A	16/11/2020	D.S	FOR TENDER
No.	Date	By	Description
			2017 P 7

AS BUILT DRAWINGS	
TECHNICAL CO-ORDINATOR	ENGINEER
DATE:.....	DATE:.....

CLIENT	
	
CLIENT APPROVAL	
Project leader:	Signature :
Date:	



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RICHARDSBAY
SECUNDA
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ASSOCIATED OFFICES:
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Drawn :	m.poofo	Date:	Signature :
Checked :	p.7.ikad	Date:	Signature :
gLLAEM 30.7DM nka L		Date:	Signature :
V N a.30 v d v d v		Date:	Signature :

PROJECT TITLE	
MELMOTH SEWER UPGRADE PHASE 2	

PROJECT DESCRIPTION	
MELMOTH WWTW INTERIM UPGRADE	

DRAWING TITLE	
STANDARD DETAILS : GABION & RENO MATTRESS DETAIL (SHEET 1 OF 2)	

DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1
Rev. No.			
CONSULTING ENG. DRAWING NO: R11-024-20-DET-05			Rev. A

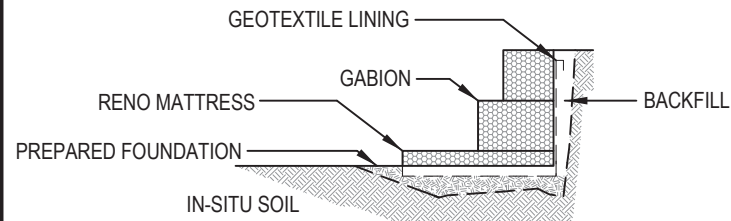


FIGURE 1
TYPICAL ARRANGEMENT OF GABION STRUCTURE

NOTES: FOUNDATION PREPERATION

1. THE FOUNDATIONS SHOULD BE LEVEL AND GRADED TO THE ELEVATIONS AS SPECIFIED BY THE ENGINEER
2. THE FOUNDATIONS SHOULD BE SMOOTH AND FREE FROM SURFACE IRREGULARITIES, LOOSE MATERIAL AND VEGETATION
3. THE COMPACTION OF THE GABION FOUNDATIONS SHOULD BE AT LEAST 90% OF THE MOD AASHTO DENSITY.
4. CAVITIES BETWEEN ROCK PROTRUSIONS IN FOUNDATIONS SHOULD BE FILLED AND LEVELED USING 15 MPa CONCRETE
5. A CONCRETE LEVELLING PAD AND DOWEL ANCHORS SHOULD BE USED WHEN FOUNDING ON ROCK.

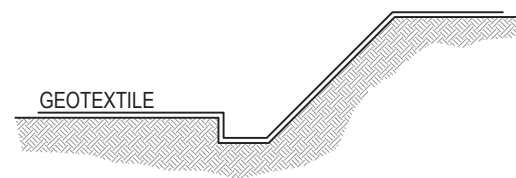


FIGURE 2
GEOTEXTILE PLACING

NOTES: GEOTEXTILE PLACING

1. FILTER FABRIC SHOULD BE PLACED AT ALL SOIL-GABION INTERFACES TO PREVENT LOSS OF FINES FROM THE SOIL BEHIND THE GABION.
2. THE FILTER FABRIC SHALL BE A GRADE 3 GEOTEXTILE ACCORDING TO THE SPECIFICATIONS STIPULATED UNDER CLAUSE 2104 (a)(iii) OF THE COLTO STANDARD
3. THE GEOTEXTILE SHOULD BE PLACED IN STRIPS ON THE PREPARED FOUNDATION (FIGURE 2) WITH A MINIMUM OVERLAP OF 300mm AT THE JOINTS AND SHOULD BE PROPERLY FASTENED TO PREVENT ANY MOVEMENT OR SLIPPING WHEN THE GABIONS ARE BEING PLACED OR PACKED.

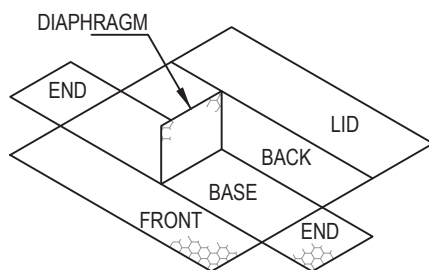


FIGURE 3
UNFOLDING OF UNITS FOR ASSEMBLY PURPOSES

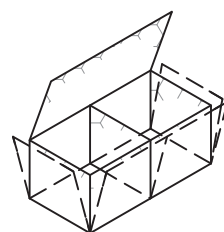


FIGURE 4
FOLDING OF UNITS FOR ASSEMBLY PURPOSES

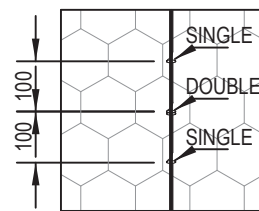


FIGURE 5
LACING OF UNITS DURING ASSEMBLY

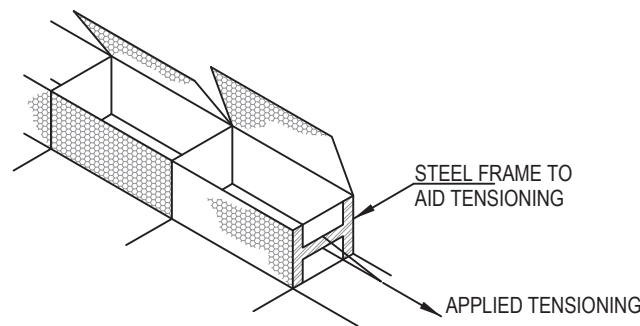


FIGURE 6
TENSIONING OF GABION STRUCTURES DURING PLACING

NOTES: ASSEMBLY

1. UNFOLD EACH INDIVIDUAL UNIT ON A HARD FLAT SURFACE AND PRESS THE GABION OUT TO ITS ORIGINAL SHAPE. (FIGURE 3)
2. LIFT THE FRONT, BACK AND END PANELS INTO AN UPRIGHT POSITION TO FORM AN OPEN BOX (FIGURE 4)
3. FASTENED THE PANELS TOGETHER WITH WIRE BY FIRMLY WRAPPING THE SELVEDGE WIRE AROUND THE SELVEDGE OR EDGE OF INTERSECTING PANELS. THE INNER DIAGRAMS SHALL BE LIFTED VERTICALLY AND SECURED IN THE SAME MANNER.
4. LACE THE EDGES OF PANELS TO BE JOINED USING THE DOUBLE AND SINGLE LOOP TECHNIQUE ALONG THE WIRE MESH OPENINGS WITH 100mm BETWEEN LOOPS. (FIGURE 5)
5. FOR TYING EDGES, PIECES OF WIRE APPROXIMATELY 1.5 TIMES THE LENGTH OF THE EDGES SHOULD BE USED. THE MAXIMUM LENGTH OF EDGE TO BE JOINED SHOULD NOT EXCEED 1m. LONGER EDGES SHOULD BE JOINED BY SEVERAL LENGTHS OF WIRES.

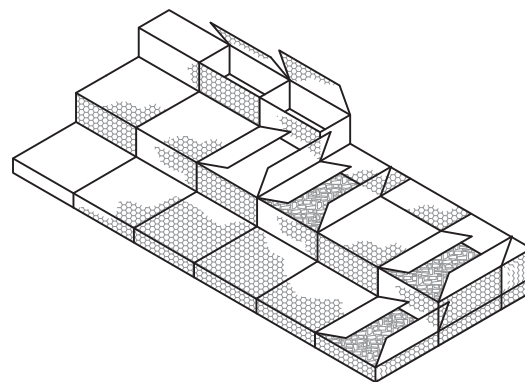


FIGURE 7
PLACING OF UNITS IN GABION STRUCTURE

NOTES: PLACING THE UNITS

1. PLACE A NUMBER OF INDIVIDUALLY LACED UNITS SIDE BY SIDE IN THE REQUIRED POSITION TAKING CARE NOT TO DAMAGE THE GEOTEXTILE. THE ALLIGNMNET OF THE UNITS SHOULD BE DONE USING STANDARD ENGINEERING METHODS, I.E. FISH LINES, DUMPY LEVELS AND FORMWORK.
2. LACE SMALL GROUPS OF GABION BOXES TOGETHER AS COMPLETE SECTIONS BEFORE JOINING TO THE REST OF THE STRUCTURE, USING EXACTLY THE SAME METHOD AS FOR ASSEMBLING SINGLE BOXES. PLACE THEM FRONT TO FRONT AND BACK TO BACK, SO THAT PAIRS OF FACING LIDS CAN LATER BE LACED DOWN TOGETHER.
3. LACE THE INDIVIDUAL UNITS TOGETHER IN A SIMILAR MANNER AS WHEN LACING UP THE EDGE OF EACH UNIT AS DESCRIBED ABOVE.
4. THE CORNERS OF THE INDIVIDUAL UNITS SHOULD BE FIRMLY WIRED TOGETHER TO FORM A UNIFORM SURFACE.
5. TENSION THE UNITS LONGITUDINALLY USING A FENCING WIRE TENSIONER. THE GABIONS SHOULD REMAIN IN TENSION DURING FILLING TO ENSURE GOOD ALLIGNMNET AND FINISH. (FIGURE 6)

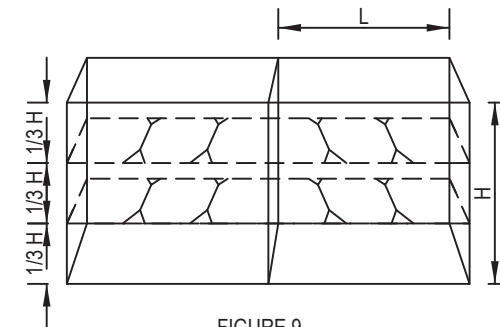


FIGURE 9
BRACING OF UNITS

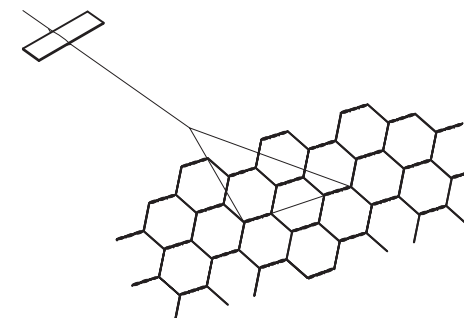


FIGURE 10
BRACING OF GABIONS

NOTES: GABION FILLING AND BRACING

1. ONLY USE STONE AS SPECIFIED IN TABLE 6 OF DRAWING 558/VV/17Td TAKING PARTICULAR CARE IN PACKING THE VISIBLE FACES TO ENSURE A EVEN-FACED FINISH.
2. FILL EACH GABION CELL TO 1/3 H. INSTALL BRACING WIRES AT THIS HEIGHT (FIGURE 9) A MINIMUM OF FOUR BRACING WIRES PER SQUARE METRE OF GABION FRONT FACE SHOULD BE USED. BRACE EACH GABION OF THE UNIT BEFORE PROCEEDING TO FILL THE GABIONS FURTHER.
3. USE APPROXIMATELY 2,3 - 2,7m OF BINDING WIRE PER BRACE FOR A 1M GABION AND 3,3 - 3,7m FOR A 1,5m GABION. THREAD THE WIRE AROUND TWO MESH OPENINGS ON THE FRONT AND THE REAR FACES OF THE BASKET AND TWIST THE ENDS TOGETHER IN THE MIDDLE. TENSION THE BRACE BY WINDLASSING WITH A PLIER HANDLE UNTIL THE FRONT FACE IS IN LINE. (FIGURE 10)
4. FILL THE GABIONS UP TO 2/3 H. AGAIN BRACE ALL THE GABIONS IN A SIMILAR MANNER.
5. FILL THE GABIONS TO THE TOP. EACH GABION SHOULD BE OVERFILLED BY APPROXIMATELY 25 - 50mm TO ALLOW FOR NATURAL SETTLEMENT.

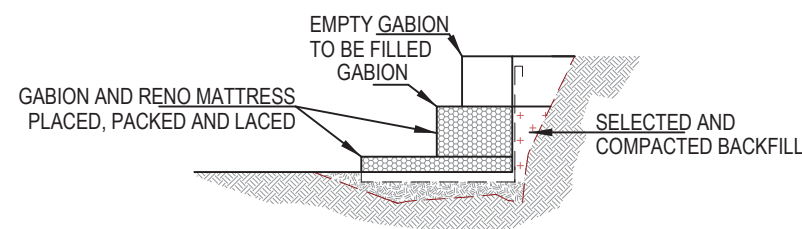


FIGURE 11
BACKFILLING BEHIND GABION STRUCTURES

NOTES: BACKFILLING

1. COMPACTION OF THE BACKFILL MUST BE DONE SIMULTANEOUSLY WITH EVERY ROW OF GABIONS LAID IN MAXIMUM 200mm LAYERS (FIGURE 11). CARE MUST BE TAKEN NOT TO DAMAGE THE GEOTEXTILE DURING PLACING AND COMPACTION OF THE BACKFILL. ONLY SMALL HAND HELD COMPACTION EQUIPMENT MAY BE USED ADJACENT TO THE GABION BASKET UP TO A DISTANCE OF 1m.

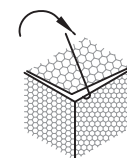
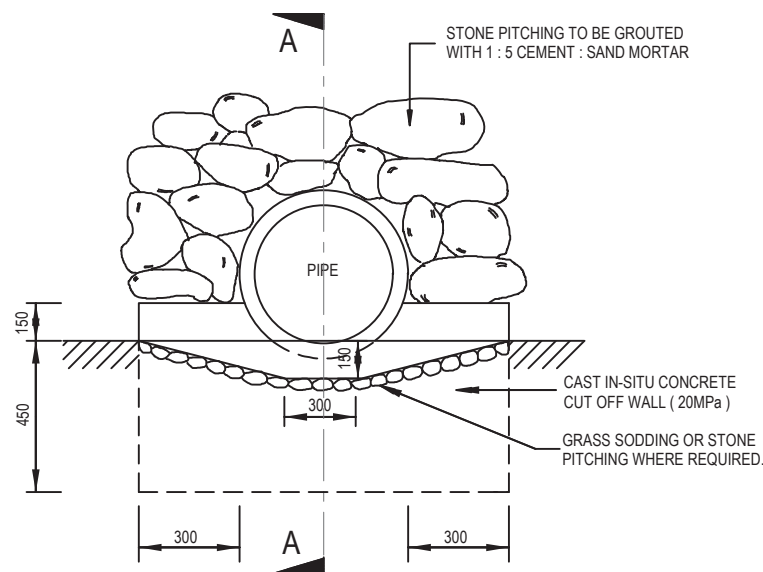


FIGURE 12
CLOSING OF THE GABION UNITS

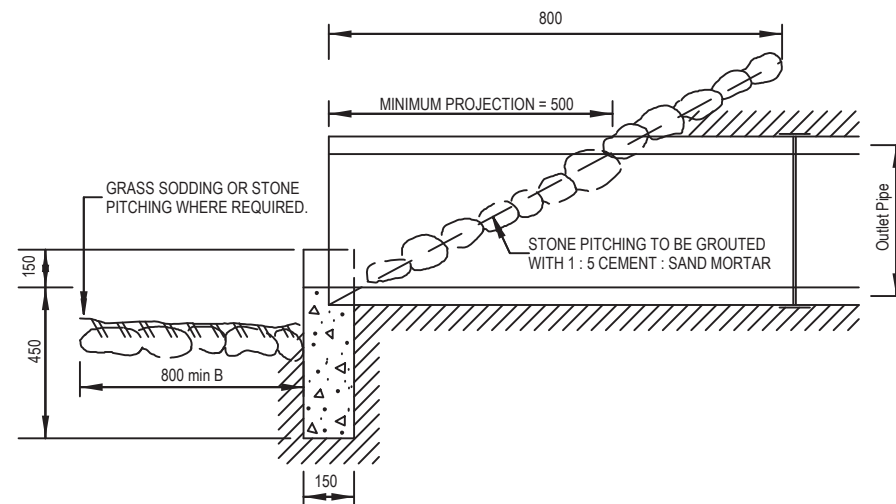
NOTES: CLOSING

1. FOLD THE LID DOWN AND STRETCH IT INTO POSITION WITH A SUITABLE TOOL. LACE THE DOWN THE LID FRONT AND ENDS AS WELL AS THE TOP IF THE DIAPHRAGM AS DESCRIBED ABOVE. (FIGURE 12)

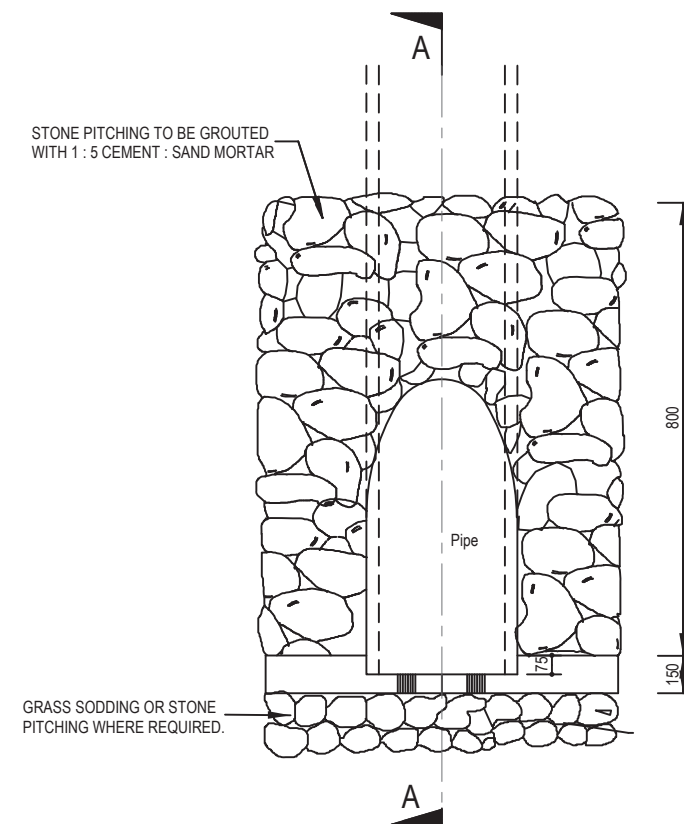
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PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE				012- 362 1473 058- 622 1257 016- 981 0591 011- 955 5334 035- 753 1083 017- 634 8895 034- 312 6464				RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz							
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PROJECT TITLE															
MELMOTH SEWER UPGRADE PHASE 2															
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MELMOTH WWTW INTERIM UPGRADE															
DRAWING TITLE															
STANDARD DETAILS : GABION & RENO MATTRESS DETAIL (SHEET 2 OF 2)															
DATE: NOVEMBER 2020				SCALE: AS SHOWN				A3				SHEET NO: 1 OF 1			
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R11-024-20-DET-06														A	



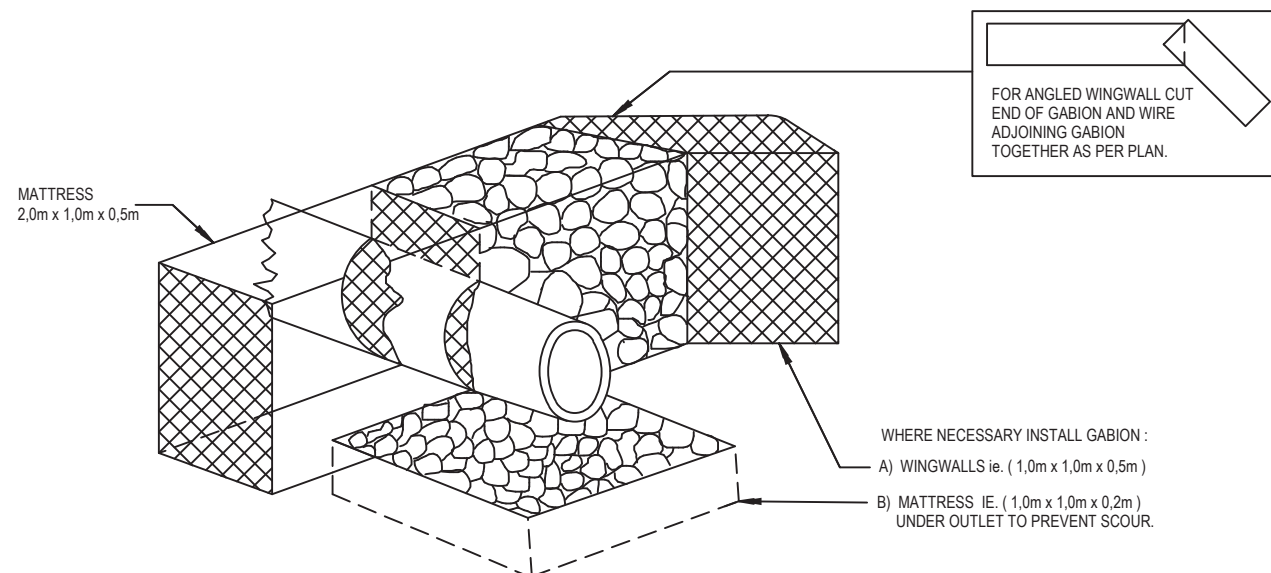
FRONT ELEVATION OF OTLET STRUCTURE
STONE PITCHED HEADWALL



OUTLET STRUCTURE SECTION A - A



PLAN OF OUTLET STRUCTURE
STONE PITCHED HEADWALL



OUTLET STRUCTURE GABION HEADWALL

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TECHNICAL CO-ORDINATOR

ENGINEER

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DATE:.....



Project leader:	Signature :
Date:	

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017-634 8895
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Checked :	p.7.8.8.8	Date		Signature	
g.L.L.8.8.8.8	O.T.M rika L	Date		Signature	

PROJECT TITLE
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PHASE 2**

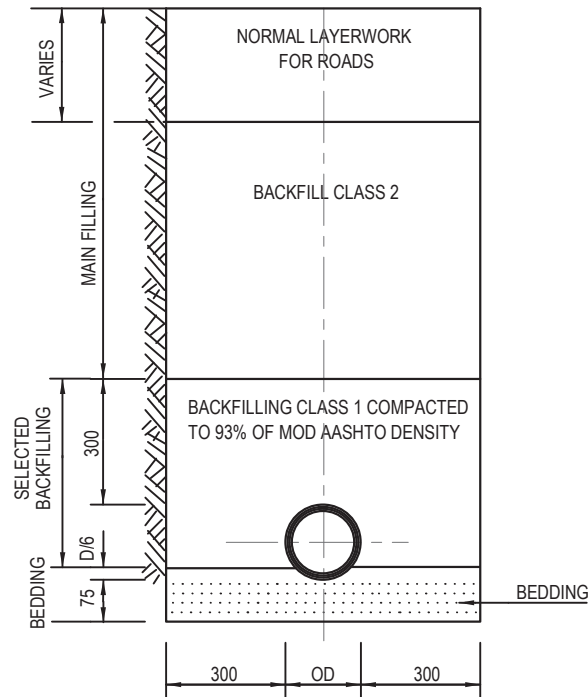
PROJECT DESCRIPTION
MELMOTH WWTW INTERIM UPGRADE

DRAWING TITLE

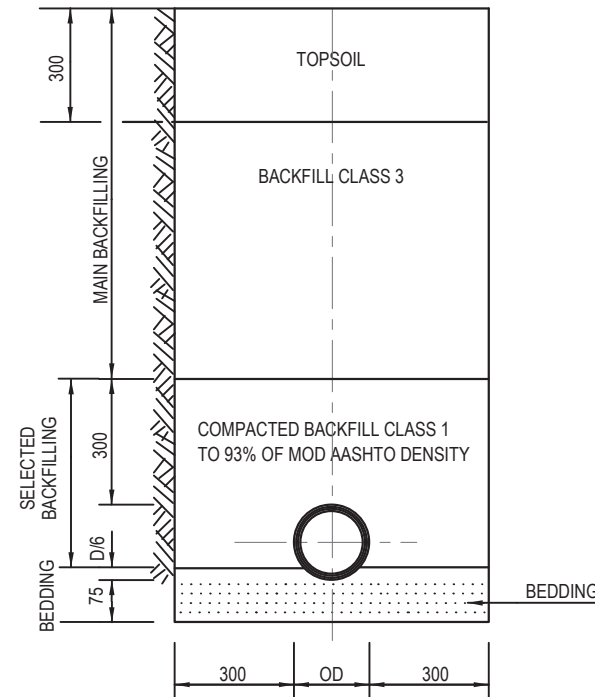
**STANDARD DETAILS :
HEADWALL OUTLET
(GABION / PITCHED)**

DATE: NOVEMBER 2020	SCALE: AS SHOWN	A3	SHEET NO: 1 OF 1

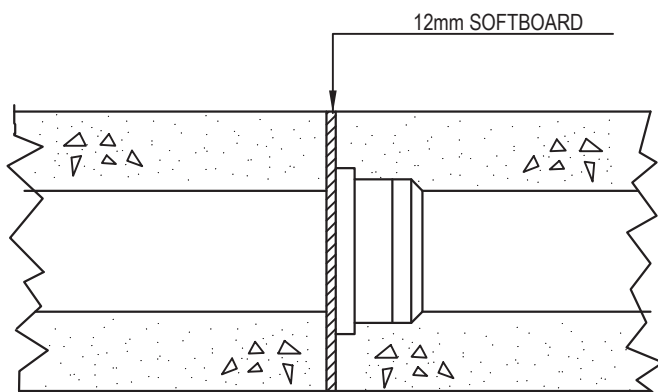
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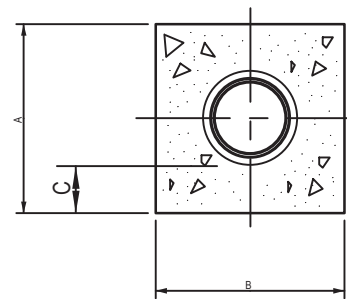
PVC SEWER PIPES
UNDER ROADS & PARKING AREAS



PVC SEWER PIPES IN
MTD BLOCKS & ROAD RESERVES



SECTION OF FLEXIBLE JOINT
IN CONCRETE ENCASING
N.T.S.



CONCRETE ENCASING OF
SEWER PIPES
N.T.S.

1. BEDDING MATERIAL

THE BEDDING MATERIAL MUST BE SELECTED GRANULAR MATERIAL WITH PI < 6 AND MUST BE WITHOUT STONE > 20mm, ORGANIC MATTER OR LUMPS OF CLAY.

THE BEDDING MATERIAL MUST BE COMPACTED UNDERNEATH AND ON BOTH SIDES OF THE SEWER PIPE TO 93% OF MOD. AASHTO DENSITY.

IN EXCESSIVE WATER CONDITIONS (SWAMPY AREAS, HIGH WATER TABLE) A 150mm BEDDING LAYER OF 19mm SINGLE DIAMETER STONE MAY BE USED. (BY WRITTEN INSTRUCTION OF THE ENGINEER ONLY)

2. BACKFILL CLASS I

THE BACKFILL MATERIAL MUST BE HOMOGENEOUS, AND MUST BE COMPACTED TO 100% OF MOD. AASHTO DENSITY, IN LAYERS NOT EXCEEDING 100mm.

THE FOLLOWING MAY NOT BE PRESENT:

- a) TREE ROOTS, BUILDING RUBBLE AND/OR ORGANIC MATTER.
- b) LUMPS OF CLAY > 75mm
- c) STONES > 20mm

3. BACKFILLING CLASS 2

SELECTED BACKFILLING MATERIAL WITH CBR > 7 AT 100% OF MOD. AASHTO DENSITY.

MAX. PI < 12

MAX. LAYER THICKNESS = 100mm.

COMPACTED TO 100% OF MOD. AASHTO DENSITY.

4. BACKFILLING CLASS 3

BACKFILL FROM TRENCH EXCAVATIONS COMPACTED TO 93% OF MOD. AASHTO DENSITY. (95% FOR NON-COHESIVE SOIL)

5. SANS 1200 CODES.

THE FOLLOWING CODES OF SANS 1200 SHALL PREVAIL.

- a) SANS 1200 DB PIPE TRENCHES.
- b) SANS 1200 LD SEWERS.
- c) SANS 1200 LB BEDDING PIPES.

NOTE:

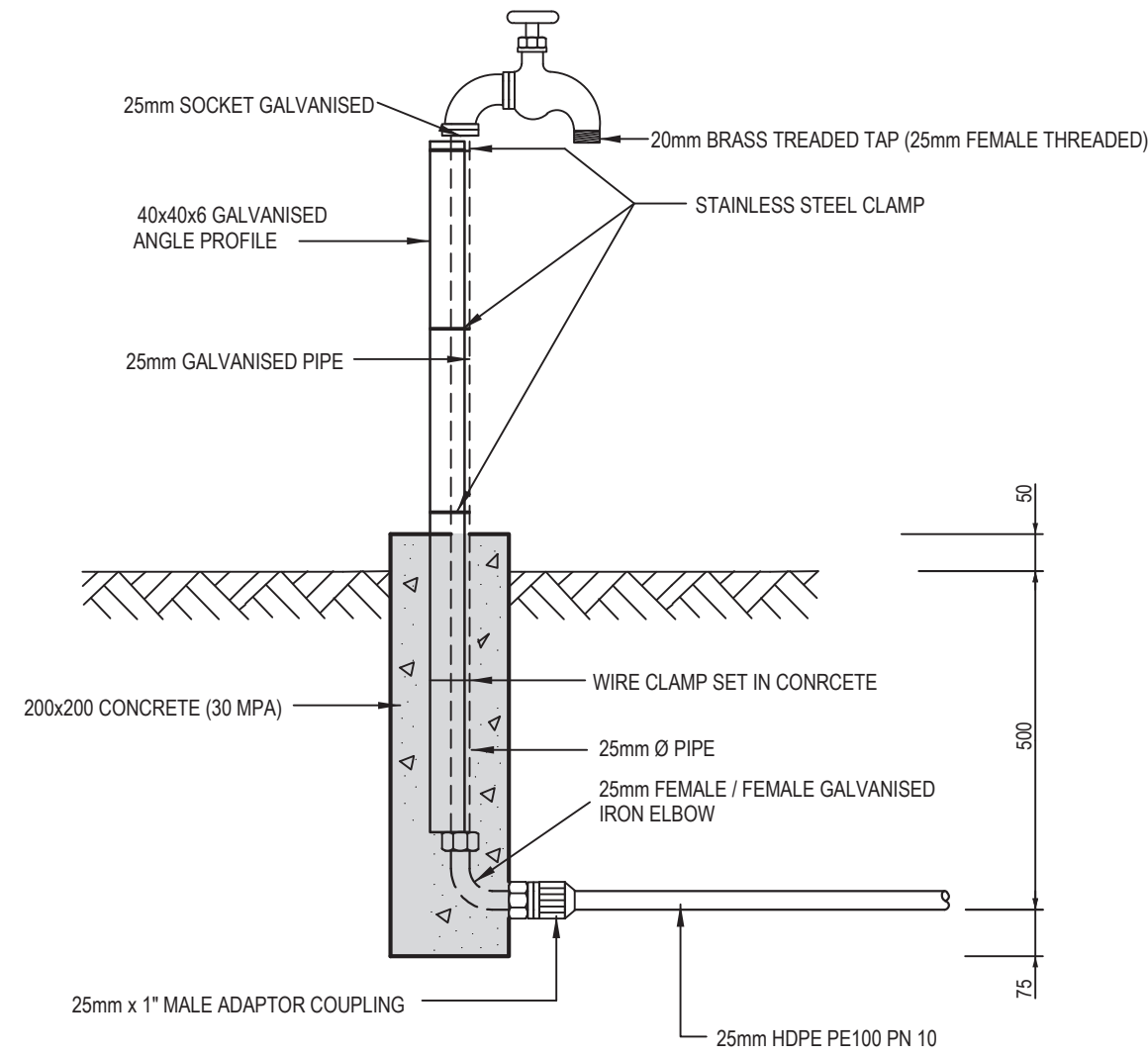
THE CONTRACTOR MUST AT ALL TIMES COMPLY WITH THE SAFETY REGULATIONS IMPOSED IN CLAUSE 5.1.1.2 OF SANS 1200D WHICH STIPULATES THE PRECAUTIONS TO BE TAKEN IN ALL TRENCH EXCAVATIONS

PIPE CONCRETE ENCASING		
Ø (mm)	A & B	C
100	250	75
150	325	75
200	400	75

NOTES:

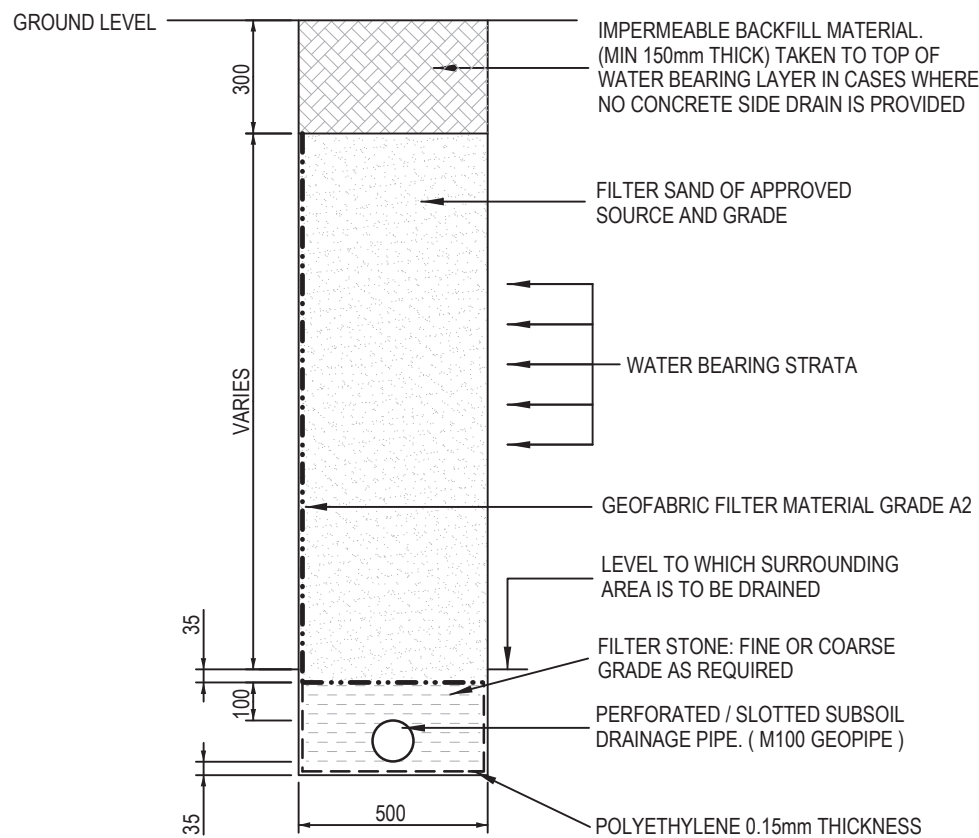
CONCRETE CLASS 30/19 FOR ENCASING OR BEDDING OF PIPES.
ONLY VERTICAL CONSTRUCTION JOINTS ARE USED.

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PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE		012-362 1473 058-822 1297 016-981 0591 011-955 5334 035-753 1083 017-534 8895 034-312 6464	
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PROJECT DESCRIPTION			
MELMOTH WWTW INTERIM UPGRADE			
DRAWING TITLE			
TYPICAL DETAIL: SEWER PIPE BACKFILL DETAIL			
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SUBSOIL DRAIN WITH POLYETHYLENE LINING
SCALE 1:20

FILTER CRITERIA

A. FILTER SAND (FS) IN RELATION TO WATER BEARING STRATA (WS)

- FOR $D^{85}_{(WS)} > 0.05\text{mm}$:
 - TO PREVENT BLOCKING OF FILTER SAND:
 $D^{15}_{(FS)} < 5 \times D^{85}_{(WS)}$
 $D^{50}_{(FS)} < 25 \times D^{50}_{(WS)}$
 - FOR PERMEABILITY OF FILTER SAND:
 $D^{15}_{(FS)} > 5 \times D^{15}_{(WS)}$

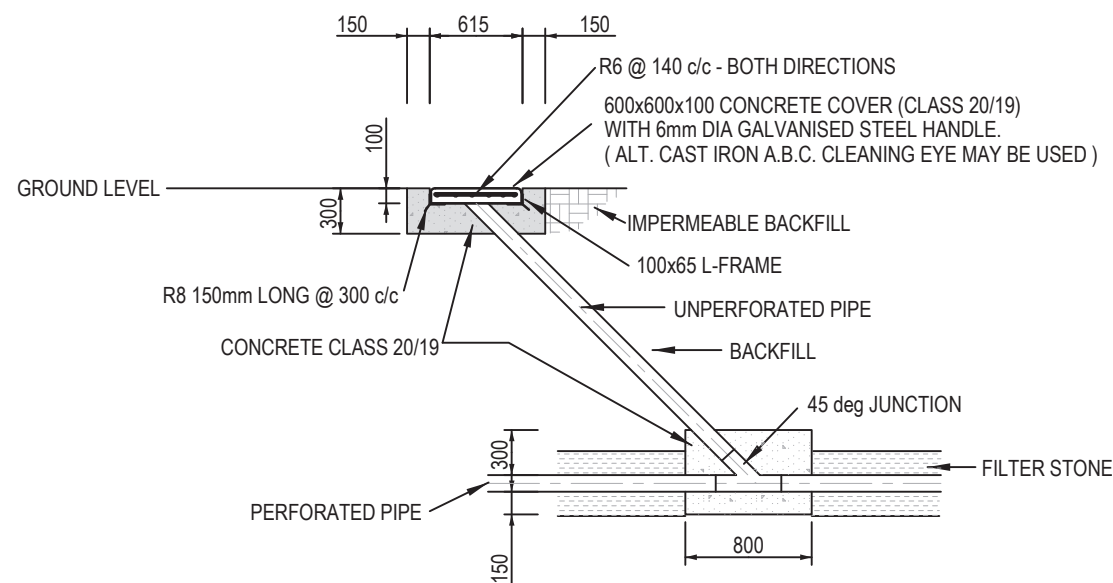
- FOR $D^{85}_{(WS)} < 0.05\text{mm}$:
 - TO PREVENT BLOCKING OF FILTER SAND:
 $D^{15}_{(FS)} < 0.25\text{mm}$
 $D^{50}_{(FS)} > 0.075\text{mm}$
 - PERMEABILITY REQUIREMENTS NOT NECESSARY

B. FILTER STONE (FNS) IN RELATION TO FILTER SAND (FS)

- TO PREVENT BLOCKING OF FILTER STONE:
 $D^{15}_{(FNS)} < 5 \times D^{85}_{(FS)}$
 $D^{50}_{(FNS)} < 25 \times D^{50}_{(FS)}$
- PERMEABILITY: FILTER STONE MUST BE COARSER THEN SAND AT ALL PERCENTAGES

NOTE:

- ALL CRITERIA ASSUMES THAT FILTER SAND AND FILTER STONE ARE CONTINUOUSLY GRADED FROM COARSE TO FINE.
- USE THE ENVELOPE CURVES FOR THE WATER BEARING STRATA, FILTER SAND AND FILTER STONE GRADINGS AND APPLY TO MOST CRITICAL COMBINATIONS.
- WHERE SUBSOIL DRAINAGE IS INSTALLED IN SOLID ROCK, THE POLYETHELENE LINING MAY BE OMITTED.
- TYPE A OUTLET PREFERABLY TO BE USED WHERE THE NATURAL GROUND LEVELS ALLOW IT. OUTLETS MAY ALSO BE COMBINED WITH CULVERT INLETS OR OUTLETS
- SPACING OF CLEANING EYES TO BE AS FOLLOW:
 - 40m MAY ON STRAIGHT SECTIONS.
 - AT ALL BENDS.
 - OR AS DIRECTED BY THE ENGINEER.



CLEANING EYE IN SUBSOIL DRAIN
SCALE 1:50

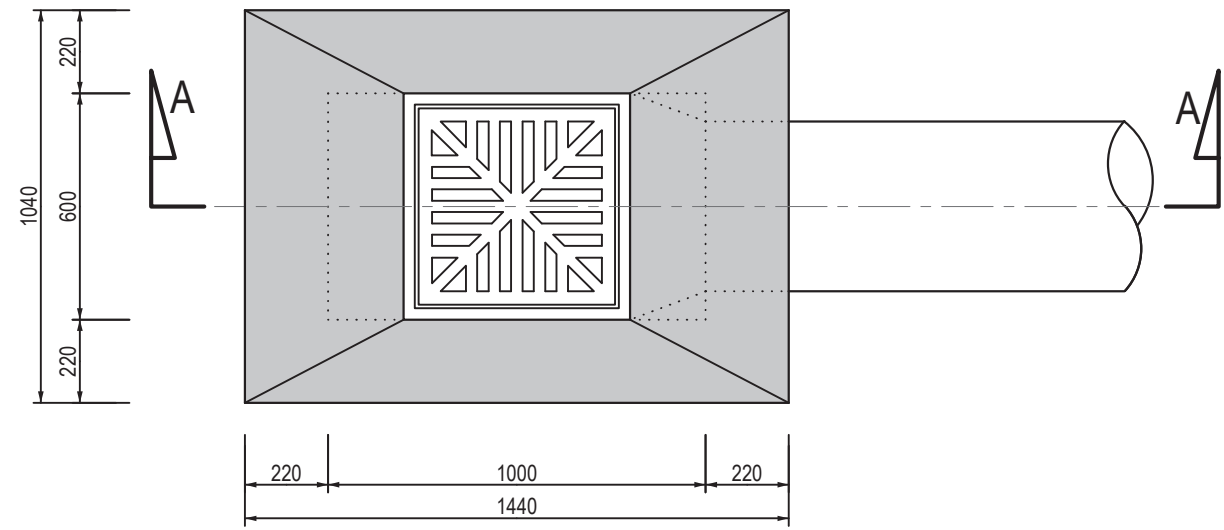
C. FILTER STONE (FSN) IN RELATION TO PERFORATIONS IN PIPES

- TO PREVENT BLOCKING OF PERFORATIONS IN PIPES:
- $D^{85}_{(FNS)} > 1.2 \times \text{DIAMETER ROUND PERFORATIONS}$
 - $D^{85}_{(FNS)} > x \text{ WIDTH OF SLOTS}$

D. SYNTHETIC FIBRE FILTER FABRIC (SF) IN RELATION TO FILTER SAND (FS)

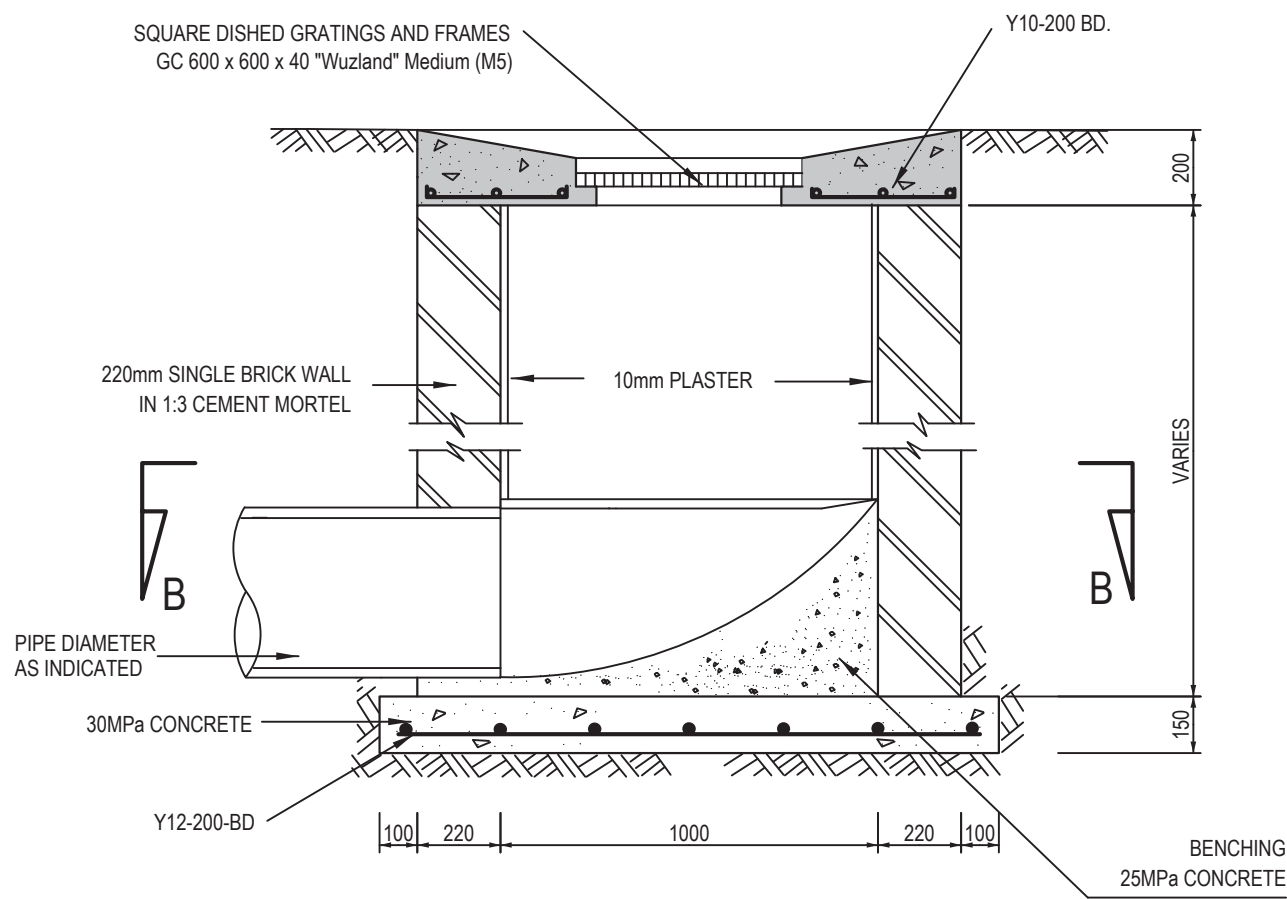
- TO PREVENT CLOGGING OF SYNTHETIC FIBRE FILTER FABRIC:
 $D^{50}_{(SF)} < D^{85}_{(FS)}$
- FOR PERMEABILITY OF SYNTHETIC FIBRE FILTER FABRIC:
 $D^{50}_{(SF)} > D^{15}_{(FS)}$

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AS BUILT DRAWINGS							
TECHNICAL CO-ORDINATOR				ENGINEER			
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CLIENT							
CLIENT APPROVAL							
Project leader:				Signature:			
Date:				Date:			
CLIENT DRAWING NUMBER							
PRETORIA HARRISMITH VANDERBULPARK KRUGERSDORP RICHARDSBAY SECUNDA NEWCASTLE 058-822 1257 016-981 0591 011-955 5334 035-753 1083 017-534 8895 034-312 6464							
RICHARDS BAY OFFICE, 21 Kingfish Creek, MEERENSEE, PO Box 10812, Meerensee, 3901. email: rbay@ilifa.biz Web: www.ilifa.biz							
ASSOCIATED OFFICES: BRITS: MTUBATUBA; NELSPRUIT; DUNDEE.							
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MELMOTH SEWER UPGRADE PHASE 2							
PROJECT DESCRIPTION							
MELMOTH WWTW INTERIM UPGRADE							
DRAWING TITLE							
TYPICAL DETAIL: SUBSOIL DRAIN DETAIL							
DATE: NOVEMBER 2020		SCALE: AS SHOWN		A3		SHEET NO: 1 OF 1	
Reg. No.							
CONSULTING ENG. DRAWING NO: R11-024-20-DET-10							
Rev: A							



STORMWATER GRID INLET

SCALE 1:20



SECTION A-A

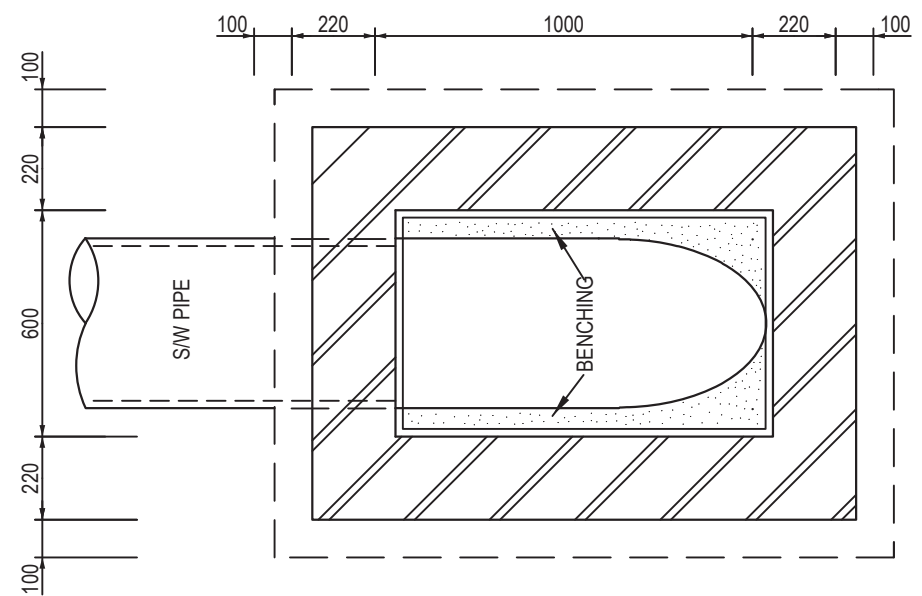
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NOTES FOR RIGID PIPES:

1. ALL PIPES SHALL COMPLY WITH SANS 667-2003, "STANDARD SPECIFICATIONS FOR CONCRETE NON-PRESSURE PIPES", AND SHALL BE INSTALLED IN ACCORDANCE WITH SANS 10102-2-2011, "CODE OF PRACTICE FOR DESIGN AND INSTALLATION OF PRECAST CONCRETE PIPES."
2. JOINTS SHALL BE SPIGOT AND SOCKET WITH RUBBER RING,
3. THE MINIMUM COVER OVER ANY PIPE CULVERT SHALL BE 600mm. IN EXCEPTIONAL CASES PIPES MAY BE ENCASED IN CONCRETE AND THE COVER REDUCED TO 200mm.
4. ALL PIPE LIFTING HOLES MUST BE PLUGGED TO THE SATISFACTION OF THE ENGINEER.

NOTES FOR FLEXIBLE PIPES:

1. ALL PIPES TO BE SWP (STRUCTURED WALL PIPES) WEHOLITE OR SIMILAR APPROVED. PIPES SHALL COMPLY WITH EN 13776 AND SANS 21138.
2. SWP HDPe PIPES SUPPLIED AS STORMWATER TYPE.
3. SANDTIGHT MALE - FEMALE COUPLING, NO SEAL = OGGE JOINT
4. PIPE DIAMETERS AS INDICATED.
5. PIPE STIFFNESS SN4 UNLESS OTHERWISE INDICATED.
6. STANDARD PIPE LENGTHS, 3m , 6m & 12m



SECTION B-B

SCALE 1:20

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Project leader: Signature: Date: CLIENT DRAWING NUMBER:															
PRETORIA 012-362 1473 HARRISMITH 058-822 1297 VANDERBULPARK 016-981 0591 KRUGERSDORP 011-955 5334 RICHARDSBAY 035-753 1083 SECUNDA 017-534 8695 NEWCASTLE 034-312 6464 email: rbay@ilifa.biz Web: www.ilifa.biz															
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PROJECT TITLE															
MELMOTH SEWER UPGRADE PHASE 2															
PROJECT DESCRIPTION															
MELMOTH WWTW INTERIM UPGRADE															
DRAWING TITLE															
TYPICAL DETAIL: STORMWATER GRID INLET DETAIL															
DATE: NOVEMBER 2020				SCALE: AS SHOWN				A3				SHEET NO: 1 OF 1			
Reg. No.															
CONSULTING ENG. DRAWING NO: R11-024-20-DET-11															
Rev: A															