CLUSTER

Trading Services

UNIT

Cleansing and Solid Waste

DEPARTMENT

Plant and Engineering

PROCUREMENT DOCUMENT

INFRASTRUCTURE

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

Contract No: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

Est. CIDB Grade/ Class: 8 CE

CLARIFICATION MEETING AND QUERIES

Clarification Meeting: Compulsory Clarification Meeting

Meeting Location, Date, Time: Western Waste Management Facility – On-site
On [23 January 2024] at [10h00]

Queries can be addressed to:
The Employer's Agent's Representative: Nash Dookhi; Wilson and Pass Incorporated
Tel: 082 823 3000 (m)
email: nash@wpice.co.za. Email queries to be submitted by 01 February 2024 and consolidated answers to questions will be uploaded 08 February 2024

TENDER SUBMISSION

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

Closing Date/ Time: Friday, 16 February 2024 at 11h00

FACSIMILE, eMAIL, or POSTED TENDERS WILL NOT BE ACCEPTED

Issued by:

ETHEKWINI MUNICIPALITY

Deputy Head: Plant and Engineering

Date of Issue: 14/11/2023

Document Version 24/02/2023(c)

FOR OFFICIAL USE ONLY

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

INDEX to PROCUREMENT DOCUMENT

PART T1: TENDERING PROCEDURES

T1.1.1: TENDER NOTICE AND INVITATION TO TENDER

Tenders are hereby invited for the works to construct landfill Cell 1 (approximately 33 500m^2 of landfill lining), a new leachate dam (Leachate Dam 1 of approximately 3 800m^2 lining), a new contaminated stormwater dam (approximately 9 200m^2 of lining) requiring some 42 500m^3 of bulk earthworks, stormwater and leachate drainage, selected layers from commercial sources for the lining as well as ancillary works at the Western Waste Management Facility (WWMF). The ancillary works are primarily infrastructure development including, platforms, building works, fencing and boreholes.

Subject	Description	Tender Data Ref.
Employer	The Employer is the eThekwini Municipality as represented by: **Logan Moodley** Deputy Head: **Plant and Engineering**	F.1.1.1
Tender Documents	Documents can only be obtained in electronic format, issued by the eThekwini Municipality. Documentation can be downloaded from the **National Treasury's eTenders website** or the **eThekwini Municipality's Website**. The entire document should be printed (on A4 paper) and suitably bound by the tenderer.	F.1.2
Eligibility	It is estimated that tenderers should have a CIDB contractor grading designation of **8 CE** (or higher). The CIDB provisions in relation to a Contractor's Potentially Emerging (PE) status do not apply.	F.2.1.1
Clarification Meeting	**Western Waste Management Facility – On-site** **On [23 January 2024] at [10h00]**	F.2.7
Seek Clarification	Queries relating to these documents are to be addressed to the Employer's Agent's Representative whose contact details are: **Nash Dookhi; Wilson and Pass Incorporated** **Tel: 082 823 3000 (m)** **email: nash@wpice.co.za. Email queries to be submitted by 01 February 2024 and consolidated answers to questions will be uploaded 08 February 2024**	F.2.8
Submitting a Tender Offer	Tender offers shall be delivered to: **The Tender Box in the foyer of the Municipal Building** **166 KE Masinga Road, Durban**	F.2.13
Closing Time	Tender offers shall be delivered on or before **Friday, 16 February 2024** at or before **11h00**.	F.2.15
Evaluation of Tender Offers	**Either the 80/20 or 90/10** Price Preference Point System, as specified in the PPPFA Regulations 2022 will be applied in the evaluation of tenders. Refer to Clause F.3.11 of the Tender Data for the **Specific Goal(S)** for the awarding of Preference Points, and other related evaluation requirements.	F.3.11

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

PART T1: TENDERING PROCEDURES

T1.2: TENDER DATA

T1.2.1 STANDARD CONDITIONS OF TENDER

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

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.

T1.2.2 TENDER DATA

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

F.1: GENERAL

F.1.1 **The employer**: The Employer for this Contract is the eThekwini Municipality as represented by:
Deputy Head: **Plant and Engineering**

F.1.2 **Tender documents**: The Tender Documents issued by the Employer comprise:

1) This procurement document.

2) "General Conditions of Contract for Construction Works – 3rd Edition 2015" issued by the South African Institution of Civil Engineering (GCC 2015). This document is obtainable separately, and Tenderers shall obtain their own copies.

3) "City of Durban Technical Specifications" hereinafter referred to as the Standard Engineering Specifications. This document is obtainable separately, and Tenderers shall obtain their own copies of the applicable Sections.

4) Drawings, issued separately from this document, or bound in Section C3.4 (as an Annexure).

5) In addition, Tenderers are advised, in their own interest, to obtain their own copies of the following acts, regulations, and standards referred to in this document as they are essential for the Tenderer to get acquainted with the basics of construction management, the implementation of preferential construction procurement policies, and the participation of targeted enterprise and labour.
   - The Employer's current (as at advertising date) Supply Chain Management Policy.
   - The Preferential Procurement Policy Framework Act No 5 of 2000, and the Preferential Procurement Policy Framework Act Regulations (2022).
   - The Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the Construction Regulations (2014).
   - The Construction Industry Development Board Act No 38 of 2000 and the Regulations issued in terms of the Act (July 2013).
   - SANS 1921:2004 – Construction and Management Requirements for Works Contract, Parts 1-3.
   - Any other eThekwini Policy documents referenced in the Tender Documents.

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

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

The entire downloaded document should be printed on white A4 paper (single-sided) and suitably bound by the tenderer.

F.1.4 **Communication and employer's agent**: The Employer's Agent's Representative is:

Nash Dookhi; Wilson and Pass Incorporated
Tel: 082 823 3000 (m)
email: nash@wpice.co.za. Email queries to be submitted by 01 February 2024 and consolidated answers to questions will be uploaded 08 February 2024

The Tenderer's contact details, as indicated in the Contract Data: Clause C1.2.2.2 "Data to Be Provided by Contractor", shall be deemed as the only valid contact details for the Tenderer for use in communications between the Employer's Agent and the Tenderer.

F.2: TENDERER'S OBLIGATIONS

F.2.1.1 Eligibility: General

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

(a) the Tenderer does not comply with the legal requirements as stated in the Employer's current SCM Policy.

(b) the Tenderer cannot provide proof that he is in good standing with respect to duties, taxes, levies and contributions required in terms of legislation applicable to the work in the contract.

(c) In the event of a Compulsory Clarification Meeting:
  i) the Tenderer fails to attend the Compulsory Clarification Meeting.
  ii) the Tenderer fails to have form "Certificate of Attendance at Clarification Meeting / Site Inspection" (in T2.2) signed by the Employer's Agent or his representative.

(d) in the case of JV submissions, two or more JV entities have common directors / shareholders or common entities tendering for the same works.

(e) at the time of closing of tenders, the Tenderer is not registered on the National Treasury Central Supplier Database (CSD) as a service provider. In the case of a Joint Venture, this requirement will apply individually to each party in the Joint Venture.

(f) The tenderer has not submitted, with this tender, a valid Letter of Good Standing from the Compensation Commissioner as proof of being registered and in good standing with the compensation fund. Reference is to be made to Returnable Document T2.2.13.

(g) The tender fails to complete and sign the Declaration of Municipal Fees in T2.2: "Returnable Documents" and submits the required documentation. Reference is to be made to Returnable Document T2.2.12.

SCM Policy (Cl.14(4)) requires suppliers/ service providers/ contractors to be registered on the eThekwini Municipality Central Supplier Database or be in a position to be so before the award.

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

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

The following are to be noted:

(a) The information for registration as in the possession of the eThekwini Municipality will apply.
(b) It is the Tenderer's responsibility to ensure that the details as submitted to the Municipality are correct.
(c) Tenderers are to register prior to the submission of tenders.

F.2.1.2 **Eligibility: CIDB**

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

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

It should be noted that this contract is not part of a Targeted Development Programme (TDP). The CIDB provisions in relation to a Contractor's Potentially Emerging (PE) status do not apply.

F.2.2.2 **The cost of the tender documents:** Replace this paragraph with the following:

"Documents are to be obtained, free of charge, in electronic format, from the **National Treasury's eTenders website** or the **eThekwini Municipality's Website**. The entire electronically downloaded document should be printed on white A4 paper (single-sided) and suitably bound by the tenderer.

F.2.6 **Acknowledge addenda:** Add the following paragraphs to the clause:

"Addenda will be published, in electronic format, on the websites specified in F.1.2. Tenderers are to ensure that the eTenders website is consulted for any published addenda pertaining to this tender up to three days before the tender closing time as stated in the Tender Data."

"Acknowledgement of receipt of the addenda will be by the return of the relevant completed, dated, and signed portion of the addenda, to the physical or email address as specified on the addenda. Failure of the tenderer to comply with the requirements of the addenda may result in the tender submission being made non-responsive."

F.2.7 **Clarification meeting:**
Western Waste Management Facility – On-site
On [23 January 2024] at [10h00]
In the event of a Compulsory Clarification Meeting, Tenderers must sign the attendance register in the name of the tendering entity. The Tenderer's representative(s) at the clarification meeting must be able to clearly convey the discussions at the meeting to the person(s) responsible for compiling the entity's tender offer.

F.2.12 **Alternative tender offers**: No alternative tender offers will be considered.

F.2.13 **Submitting a tender offer**: Submissions must be submitted on official submission documentation issued (either in hard copy or in electronic format) by the eThekwini Municipality.

Identification details to be shown on each tender offer package are:

- Contract No. : **23115-6W**
- Contract Title : **WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction**

The Employer's address for delivery of tender offers is:

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

Tenderers are to include, with their paper ("hard copy") submission, a memory-stick containing an electronically scanned (300 dpi resolution) Public Document Format (PDF) copy of their complete bid submission. This PDF file should be named using the contract number and the Tenderer's name, eg. "**23115-6W – Tenderers Name.PDF**". The memory-stick must be labelled with the Tenderer's name and securely fixed to the paper submission.

Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.

F.2.15 **Closing time**: The closing time for delivery of tender offers is:

- Date : **Friday, 16 February 2024**
- Time : **11h00**

F.2.16 **Tender offer validity**: The Tender Offer validity period is 120 Days from the closing date for submission of tenders.

F.2.20 **Submit securities, bonds, policies:** The tenderer is required to submit with his tender a letter of intent from an approved insurer undertaking to provide the Performance Bond to the format included in T2.2 of this procurement document.

F.2.23 **Certificates**: Refer to T2.1 for a listing of certificates that must be provided with the tender. All certificates must be valid at the time of tender closing.

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

The Form of Offer (C1.1.1), Data to be provided by the Contractor (C1.2.2.2), and the Bill of Quantities (C2.2) are also required to be completed in full.

Tax Clearance
Reference is also to be made to returnable form T2.2.3: "Tax Compliance Status PIN/ Tax Clearance Certificate".

SARS has introduced a new Tax Compliance Status System. Tenderers must submit a **Tax Compliance Status PIN** (TCS PIN) instead of an original Tax Clearance Certificate. This TCS PIN can be used by third parties to certify the taxpayer's real-time compliance status. This TCS PIN is to be entered on Returnable Document T2.2.1: "Compulsory Enterprise Questionnaire". Separate Tax Clearance Certificates / TCS PINs are required for each entity in a Joint Venture.

Failure to comply will make the tender non-responsive.

Compensation Commissioner
Reference is also to be made to returnable form T2.2.13: "Eligibility: Registration with Compensation Commissioner".

The tenderer is to supply proof of being registered and in good standing with the compensation fund by submitting a valid **Letter of Good Standing** from the Compensation Commissioner.

Failure to comply will make the tender non-responsive.

Central Supplier Database (CSD)
Reference is also to be made to returnable form T2.2.14: "Eligibility: CSD Registration Report".

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

Separate CSD Registration Reports are required for each entity in a Joint Venture.

CIDB Registration
Reference is also to be made to returnable form T2.2.15: "Eligibility: Verification of CIDB Registration and Status".

Registration with the CIDB must be reflected as "Active" at time of tender closing.

Tenderers are to include with their submission a printout of their **CIDB Registration**, obtained from the CIDB website (https://registers.cidb.org.za/PublicContractors/ContractorSearch).

The Joint Venture Grading Designation Calculator should be used when submitting as a Joint Venture (https://registers.cidb.org.za/PublicContractors/JVGradingDesignationCalc).

The date of obtaining the CIDB printout(s) is to be indicated on the printout.

F.3: THE EMPLOYER'S UNDERTAKINGS

F.3.1.1 **Respond to requests from the tenderer:** Replace the words "five working days" with "three working days".

F.3.2 **Issue addenda:** Add the following paragraph: "Addenda will be published, in electronic format, on the same platform(s) as the Tender Notification (refer to F.1.2).

F.3.4 **Opening of Tender Submissions:** Tenders will be opened immediately after the closing time for tenders. The public reading of tenders will take place in the SCM Boardroom, 6th Floor, Engineering Unit Building, 166 KE Masinga Road, Durban.

F.3.11 Evaluation of Tender Offers:

Eligibility

Tenders will be checked for compliance with the ELIGIBILITY requirements, as specified in T1.2.2 Clause F.2.1. Tenderers not in compliance will be deemed non-responsive.

Functionality

FUNCTIONALITY will be evaluated to determine the responsiveness of tenders received. The minimum score for FUNCTIONALITY is 60 points. Those tenders not achieving the minimum score will be deemed non-responsive.

The functionality Criteria, Sub-Criteria, Points per Criteria/ Sub-Criteria, Returnable Documentation and Schedules, Method of Evaluation, and Prompts for Judgement are as specified in T1.2.3.5: "Additional Conditions of Tender".

Preference Point System

The financial offer will be reduced to a comparative basis using the **Tender Assessment Schedule**.

The procedure for the evaluation of responsive tenders is **PRICE AND PREFERENCE** in accordance with the Employer's current SCM Policy, the Preferential Procurement Policy Framework Act (5 of 2000), and the Preferential Procurement Policy Framework Act Regulations (2022).

Price Points

It is unclear (at the time of advertising) which of the two preference point systems applies, **90/10** preference point system will apply, determined by the price offered by the lowest acceptable tender.

Preference Points

Reference is also to be made to T2.2.7: "MBD 6.1: Preference Points Claim".

The Preference Points 10 will be derived from points allocated/ claimed for **Specific Goals** as indicated in the table(s) below, according to the specified **Goal/ Category Weightings**.

- **Ownership Goal**
  Goal Weighting: 50%

The tendering entity's **Percentage Ownership**, in terms of the **Ownership Category(s)** listed below, is to be used in the determination of the tenderer's claim for **Preference Points**.

Ownership Categories	Criteria	80/20	90/10
Race: Black (w1=80)	Equals 0%	n/a	0
	Between 0% and 51%	n/a	2
	Greater or equal to 51% and less than 100%	n/a	4
	Equals 100%	n/a	5
Gender: Female (w2=20)	Equals 0%	n/a	0
	Between 0% and 51%	n/a	2
	Greater or equal to 51% and less than 100%	n/a	4
	Equals 100%	n/a	5
	Maximum Goal Points:	n/a	10

The **Weightings** of the **Ownership Categories** will be: w1 = 80%, w2=20%, w3=0% (where: w1 + w2 + w3 = 100%)
Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status) • Companies and Intellectual Property Commission registration document (CIPC) • CSD report. • B-BBEE Certificate of the tendering entity. • Consolidated BBBEE Certificate if the tendering entity is a Consortium, Joint Venture, or Trust (Issued by verification agency accredited by the South African Accreditation System). • Agreement for a Consortium, Joint Venture, or Trust.

- **RDP Goal: The promotion of South African owned enterprises**
  Goal Weighting: 25%

  The tendering entity's **Address** (as stated on the National Treasury Central Supplier Database (CSD) or on the eThekwini Municipality Vendor Portal) is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal.

Location	80/20	90/10
Not in South Africa	n/a	0
South Africa	n/a	2.5
Kwa Zulu Natal	n/a	5
eThekwini Municipality	n/a	10
Maximum Goal Points:	n/a	10

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status) • CSD report

- **RDP Goal: Creation of new jobs to address black youth unemployment**
  Goal Weighting: 25%

  The tendering entity's **Commitment to Appointment or Actual Appointment**, in terms of the categories below, is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal.

Number of jobs created	80/20	90/10
0 – 49	n/a	2.5
50 – 100	n/a	5
Over 100	n/a	10
Maximum Goal Points:	n/a	10

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status) • Commitment letter to appoint youth from local ward (for a year or more) • Appointment letters signed by local councillor or chief (for a year or more) • Consider other evidence etc Copies of IDs and proof of address in Ethekwini

F.3.13 **Acceptance of tender offer:** In addition to the requirements of Clause F.3.13 of the Standard Conditions of Tender, tender offers will only be accepted if:

(a) The tenderer submits a **valid Tax Clearance Certificate OR Tax Compliance Status PIN**, issued by the TCS System of the South African Revenue Services, or has made arrangements to meet outstanding tax obligations.

(b) The tenderer is **registered, and "Active", with the Construction Industry Development**

Board, at time of tender closing, in an appropriate contractor grading designation.

(c) The tenderer or any of its directors/shareholders is n**ot 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) The tenderer has not:
- Abused the Employer's Supply Chain Management System; or
- Failed to perform on any previous contract and has been given a written notice to this effect.

(e) The tenderer has completed the **Compulsory Enterprise Questionnaire** and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the Employer or potentially compromise the tender process.

(f) The tenderer is **registered and in good standing with the compensation fund or** with a **licensed compensation insurer**.

(g) The Employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the **necessary competencies and resources to carry out the work safely**.

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

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

F.3.15 **Complete adjudicator's contract:** Refer to the General Conditions of Contract and the Contract Data.

F.3.17 **Copies of contract:** The number of paper copies of the signed contract to be provided by the Employer is ONE (1).

Tenderers are to include, with their "hard copy" submission, a memory-stick containing an electronically scanned (300 dpi resolution) Public Document Format (PDF) copy of their complete bid submission. This PDF file should be named using the contract number and the Tenderer's name, eg. "**23115-6W – Tenderers Name.PDF**". The memory-stick must be labelled with the Tenderer's name and securely fixed to the paper submission.

T1.2.3 ADDITIONAL CONDITIONS OF TENDER

T1.2.3.1 Appeals

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

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

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

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

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

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

T1.2.3.3 Code of Conduct and Local Labour

The Tenderers shall make themselves familiar with the requirements of the following policies that are available on web address: ftp://ftp.durban.gov.za/cesu/StdContractDocs/:

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

T1.2.3.4 Targeted Procurement

Targeted Procurement provisions are not applicable to this tender.

T1.2.3.5 Functionality Specification

F.3.11.9 The value of W_2 is 100. The Functionality criteria (and sub criteria if applicable) and maximum score in respect of each of the criteria are as follows:

Functionality Criteria / Sub Criteria		**Maximum Points Score**
Tenderer's Experience		40
Experience of Key Staff	Contracts Manager	15
	Site agent	15
	Foremen	10
Preliminary Programme		10
Construction Methodology & Quality Control		10
	Maximum possible score for Functionality (M_s)	100

The minimum number of evaluation points for Functionality is **60**. Only those tenderers who achieve the minimum number of Functionality evaluation points (or greater) will be eligible to have their tenders further evaluated.

Functionality shall be scored by not less than three evaluators and the scores of each of the evaluators will be averaged, weighted and then totalled to obtain the final score for Functionality. Each evaluation criteria will be assessed in terms of six indicators and scores allocated according to the following table:

Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
0	20	40	60	80	100

Evaluation criteria will be adjudicated according to submissions made in accordance with the following schedules, which are found in Part T2.2: Returnable Schedules:

Functionality Criteria	Returnable Schedules
Tenderer's Experience	• Experience of Tenderer
Project Organogram and Experience of Key Staff	• Proposed Organisation and Staffing • Key Personnel • CV's with Experience of Key Personnel
Preliminary Programme	• Preliminary Programme
Construction Methodology & Quality Control	• Construction Approach, • Methodology, and Quality Control • Schedule of Proposed Subcontractors • Plant and Equipment

Unless otherwise stated, evaluation criteria will be adjudicated with respect to the contract specific Scope of Work, as specified in Part C.3. In this regard the following definitions apply to the evaluation criteria prompts for judgement:

- "**successfully completed**" implies a project has been completed on time and to specification;
- "**similar nature**" implies projects that were of a value of at least 70% of this tender's value, and had a comparable Scope of Work in terms of technical requirements and operations;
- "**experience**" implies experience on projects of a similar nature;
- "**accredited degree / diploma**" implies a minimum 3 year qualification within the built environment, from a registered University or Institute of Technology.

Criterion: Tenderer's Experience Note: Projects of a similar nature that will be considered shall be one, or a combination of, **Landfill Lining Project** and **Bulk Earthworks Projects**.	
Level 0	No information provided; OR submission of no substance / irrelevant information provided
Level 1	To have successfully completed 1 project of a similar nature within the past 7 years.
Level 2	To have successfully completed 2 projects of a similar nature within the past 7 years.
Level 3	To have successfully completed 3 to 5 projects of a similar nature within the past 7 years.
Level 4	To have successfully completed 6 to 8 projects of a similar nature within the past 7 years.
Level 5	To have successfully completed 9 or more projects of a similar nature within the past 7 years.

Criterion: Project Organogram and Experience of Key Staff

Note1 : "experience" implies experience within the same role on projects of a similar nature with respect to the Scope of Works and relates to **landfill lining** and/or **bulk earthworks** projects

Note 2: "accredited degree/diploma" implies a minimum 3 year qualification within the built environment, from a registered University or Institute of Technology.

	CONTRACTS MANAGER	SITE AGENT	FOREMAN
Level 0	No information provided OR submission of no substance / irrelevant information provided OR less than 2 year's experience OR Relevant accredited diploma / degree and less than 1 year's experience.	No information provided OR submission of no substance / irrelevant information provided OR less than 2 year's experience. OR Relevant accredited diploma / degree and less than 1 year's experience.	No information provided OR submission of no substance / irrelevant information OR Less than 2 year's experience.
Level 1	Relevant accredited diploma / degree and minimum 1 year's experience.	Relevant accredited diploma / degree and minimum 1 year's experience.	Minimum 2 year's experience.
Level 2	Relevant accredited diploma / degree and minimum 2 year's experience.	Relevant accredited diploma / degree and minimum 2 year's experience.	Minimum 3 year's experience.
Level 3	Relevant accredited diploma / degree and minimum 4 year's experience.	Relevant accredited diploma / degree and minimum 4 year's experience.	Minimum 5 year's experience.
Level 4	Relevant accredited diploma / degree and minimum 7 year's experience.	Relevant accredited diploma / degree and minimum 7 year's experience.	Minimum 8 year's experience.
Level 5	Relevant accredited diploma / degree and minimum 9 year's experience.	Relevant accredited diploma / degree and minimum 9 year's experience.	Minimum 10 year's experience.

Criterion: Preliminary Programme

Level 0	No information provided OR submission of no substance / irrelevant information provided
Level 1	Programme does not cover all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and not in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion).
Level 2	Programme covering all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion).
Level 3	Programme covering all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion). **Plus**: Shows critical path with logical linking of tasks/activities
Level 4	Programme covering all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion). **Plus**: • Shows critical path with logical linking of tasks/activities, and • Detailed activity and resources breakdown. • Cashflow included
Level 5	Programme covering all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice, and is in line with Clause 1.1.1.14 of the Conditions of Contract (time for achieving Practical Completion). **Plus**: • Shows critical path with logical linking of tasks/activities, and • Detailed activity and resources breakdown. • Cashflow included • Detailed Plant and equipment resource breakdown

Criterion: Construction Methodology & Quality Control	
Level 0	No information provided; OR submission of no substance / irrelevant information provided
Level 1	The technical approach / methodology, plant and equipment is poor and gives no relevant information in satisfying the projects objectives Quality control statement is poor with no relevant information
Level 2	The technical approach and/or methodology is less than acceptable and unlikely to satisfy project objectives or requirements. Plant and equipment is unlikely to provide adequate protection of the works. Quality control statement is generic.
Level 3	Brief overview of a site-specific methodology which encompasses all programmed activities in appropriate order and includes staff, plant and equipment resources, including subcontractors if applicable, a brief description of preparatory work, construction processes including finishing works for each activity. Quality control statements are site specific with statements covering required sampling and testing requirements for the programmed activities.
Level 4	The methodology is specifically tailored to address specific project requirements. The methods and approach to managing risk etc. are specifically tailored to the critical characteristics of the project. The plant and equipment are specifically tailored to the project requirements and are sufficiently adaptable to accommodate changes that may be required during execution Quality control statements are site specific covering required sampling and testing for programmed activities including site specific quality control checklist for programmed activities
Level 5	Besides meeting the “above Level 4” rating, the important issues are approached in an innovative and efficient way, indicating that the tenderer has excellent knowledge of working in the projects environment and producing the required final product. Plant and equipment proposals and ownership/provision arrangements are most likely to ensure a satisfactory project outcome. Quality control statements are site specific covering required sampling and testing for all programmed activities including site specific quality control checklist for all programmed activities

PART T2: RETURNABLE DOCUMENTS

T2.1 LIST OF RETURNABLE DOCUMENTS

T2.1.1 General

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

The Tenderer is required to complete each and every Schedule and Form listed below to the best of their ability as the evaluation of tenders and the eventual contract will be based on the information provided by the Tenderer. Failure of a Tenderer to complete the Schedules and Forms to the satisfaction of the Employer will inevitably prejudice the tender and may lead to rejection on the grounds that the tender is non-responsive.

T2.1.2 Returnable Schedules, Forms and Certificates

Entity Specific

Eligibility

Technical or Functionality Evaluation

T2.2 RETURNABLE SCHEDULES, FORMS, AND CERTIFICATES

The returnable schedules, forms, and certificates, as listed in T2.1.2, can be found on pages 20 to 38.

NOTE
The **Form of Offer** (C1.1.1), The **Data to be Provided by Contractor** (C1.2.2.2), and the **Bill of Quantities** (C2.2) are also required to be completed by the tenderer.

T2.2.1 COMPULSORY ENTERPRISE QUESTIONNAIRE

Ref	Description	Complete or Circle Applicable
1.1	Name of enterprise	
1.2	Name of enterprise's representative	
1.3	ID Number of enterprise's representative	
1.4	Position enterprise's representative occupies in the enterprise	
1.5	National Treasury Central Supplier Database Registration number	**MAAA**
1.6	eThekwini Supplier Database: Reference number (PR), if any:	**PR**
1.7	VAT registration number, if any:	
1.8	CIDB registration number, if any:	
1.9	Department of Labour: Registration number	
1.10	Department of Labour: Letter of Good Standing Certificate number	

2.0 **Particulars of sole proprietors and partners in partnerships (attach separate pages if more than 4 partners)**

	Full Name	Identity No.	Personal income tax No. *
2.1			
2.2			
2.3			
2.4			

3.0 **Particulars of companies and close corporations**

3.1	Company registration number, if applicable:	
3.2	Close corporation number, if applicable:	
3.3	Tax Reference number, if any:	
3.4	South African Revenue Service: Tax Compliance Status PIN:	

4.0 **Record in the service of the state** (Insert on a separate page if necessary)

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

- ☐ a member of any municipal council
- ☐ a member of any provincial legislature
- ☐ an official of any municipality or municipal entity
- ☐ a member of an accounting authority of any national or provincial public entity
- ☐ a member of the board of directors of any municipal entity
- ☐ a member of the National Assembly or the National Council of Province
- ☐ 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)
- ☐ an employee of Parliament or a provincial legislature

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

5.0 **Record of spouses, children and parents in the service of the state** (Insert on a separate page if necessary)

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 in the service of any of the following:

- ☐ a member of any municipal council
- ☐ a member of any provincial legislature
- ☐ an official of any municipality or municipal entity
- ☐ a member of an accounting authority of any national or provincial public entity
- ☐ a member of the board of directors of any municipal entity
- ☐ a member of the National Assembly or the National Council of Province
- ☐ 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)
- ☐ an employee of Parliament or a provincial legislature

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

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

i) authorizes the Employer to verify the tenderers tax clearance status from the South African Revenue Services that it is in order.

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

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

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

v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.2 CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING / SITE INSPECTION

Reference is to be made to Clauses F.2.1(c) and F.2.7 of the Tender Data.

This is to certify that:

(tenderer name): .....

of (address): .....

.....

.....

was represented by the person(s) named below at the Clarification Meeting held for all tenderers, the details of which are stated in the Tender Data (F.2.7).

I / We acknowledge that the purpose of the meeting was to acquaint myself / ourselves with the site of the works and / or matters incidental to doing the work specified in the tender documents in order for me / us to take account of everything necessary when compiling our rates and prices included in the tender.

Particulars of person(s) attending the meeting:

Name: …… Name: ..... ……

Signature: …… Signature: ..... ……

Capacity: …… Capacity: ……

Attendance of the above person(s) at the meeting is confirmed by the Employer's Agent's Representative, namely:

Name: ……

Signature: ……

Date: ……

T2.2.3 TAX COMPLIANCE STATUS PIN / TAX CLEARANCE CERTIFICATE

Reference is to be made to Clauses F.2.23 and F.3.13(a) of the Tender Data.

SARS has introduced a new Tax Compliance Status System. Tenderers can submit a Tax Compliance Status PIN (TCS PIN) instead of an original Tax Clearance Certificate. This TCS PIN can be used by third parties to certify the taxpayer's real-time compliance status.

Separate Tax Clearance Certificates / TCS PINs are required for each entity in a Joint Venture.

The TCS PIN(s) are to be entered under item 3.4 on form **T2.1.2.1: Compulsory Enterprise Questionnaire**.

Tenderers are to include, at the back of their tender submission document, a printout of their Tax Compliance Status PIN (TCS PIN) OR an original Tax Clearance Certificate.

Failure to include the required document will make the tender submission non-responsive.

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.4 CONTRACTOR'S HEALTH AND SAFETY DECLARATION

If Functionality is applicable as part of tender evaluation, reference is to be made to Clause F3.11.9 of the of the Conditions of Tender.

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

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

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

Declaration by Tenderer

1 I, the undersigned, hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHSA 1993 Construction Regulations 2014.

2 I hereby declare that my company has the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Employer's Health and Safety Specifications.

3 I propose to achieve compliance with the Regulations by one of the following **(Tenderers are to Circle Applicable - Yes or No)**:

	Circle Applicable	
(a) From my own competent resources as detailed in 4(a) hereafter.	Yes	NO
(b) From my own resources still to be appointed or trained until competency is achieved, as detailed in 4(b) hereafter:	Yes	NO
(c) From outside sources by appointment of competent specialist Subcontractors as detailed in 4(c) hereafter:	YES	NO

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

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

NAMES OF COMPETENT PERSONS	POSITIONS TO BE FILLED BY COMPETENT PERSONS

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

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

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

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

5 I, the undersigned, hereby undertake, if this tender is accepted, to provide, before commencement of the works under the contract, a suitable and sufficiently documented Health and Safety Plan in accordance with Regulation 7(1) of the Construction Regulations, which plan shall be subject to approval by the Client.

6 I, the undersigned, confirm that copies of this company's approved Health and Safety Plan, the Client's Safety Specifications as well as the OHSA 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Principal Contractor's personnel, the Client's personnel, the Employer's Agent, visitors, and officials and inspectors of the Department of Labour.

7 I, the undersigned, hereby confirm that adequate provision has been made in the tendered rates and prices in the Bill of Quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHSA 1993 Construction Regulations 2014, and that I will be liable for any penalties that may be applied by the Client in terms of the said Regulations (Regulation 33) for failure on the Principal Contractor's part to comply with the provisions of the Act and the Regulations.

8 I, the undersigned, agree that failure to complete and execute this declaration to the satisfaction of the Client will mean that this company is unable to comply with the requirements of the OHSA 1993 Construction Regulations (2014) and accept that this tender will be prejudiced and may be rejected at the discretion of the Client.

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

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.5 MBD 4: DECLARATION OF INTEREST

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

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

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

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

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

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

3.1	Name of enterprise	Complete T2.1.2.1 Item 1.1
	Name of enterprise's representative	Complete T2.1.2.1 Item 1.2
3.2	ID Number of enterprise's representative	Complete T2.1.2.1 Item 1.3
3.3	Position enterprise's representative occupies in the enterprise	Complete T2.1.2.1 Item 1.4
3.4	Company Registration number	Complete T2.1.2.1 Item 3.1 or 3.2
3.5	Tax Reference number	Complete T2.1.2.1 Item 3.3
3.6	VAT registration number	Complete T2.1.2.1 Item 1.7

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

	Circle Applicable	
3.8 Are you presently in the service of the state?	YES	NO
If yes, furnish particulars: ……		
……		
3.9 Have you been in the service of the state for the past twelve months?	YES	NO
If yes, furnish particulars: ……		
……		

3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid?	YES	NO
If yes, furnish particulars: ……		
……		
3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid?	YES	NO
If yes, furnish particulars: ……		
……		
3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?	YES	NO
If yes, furnish particulars: ……		
……		
3.13 Are any spouse, child or parent of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?	YES	NO
If yes, furnish particulars: ……		
……		
3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract?	YES	NO
If yes, furnish particulars: ……		
……		

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

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

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

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.6 MBD 5: DECLARATION FOR PROCUREMENT ABOVE R10 MILLION
(ALL APPLICABLE TAXES INCLUDED)

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

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

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

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

NAME (Block Capitals): ..... **Date** .....

SIGNATURE: .....

T2.2.7 MBD 6.1: PREFERENCE POINTS CLAIM
In terms of THE PREFERENTIAL PROCUREMENT REGULATIONS (2022)

Reference is to be made to Clause F.3.11 of the Tender Data.

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

1.0 GENERAL CONDITIONS

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

- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2 The applicable preference point system for this tender is the 90/10 preference point system.

1.3 Preference Points for this tender shall be awarded for:

- **Price** and **Specific Goals**: 90 (price) and 10 (specific goals), in terms of 1.2 above.
- The total Preference Points, for Price and Specific Goals, is 100.

1.4 Failure on the part of the tenderer to submit the required proof or documentation, in terms of the requirements in the Conditions of Tender for claiming specific goal preference points, will be interpreted that preference points for specific goals are not claimed.

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

2.0 DEFINITIONS

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

2.2 "**price**" means an amount of money tendered for goods or services and includes all applicable taxes less all unconditional discounts.

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

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

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

3.0 FORMULA FOR CALCULATION OF PREFERENCE PRICE POINTS

3.1 PROCUREMENT OF GOODS AND SERVICES

POINTS AWARDED FOR PRICE: A maximum of 90 points is allocated for price on the following basis:

90 / 10 Points System

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

Where:
Ps = Points scored for price of tender under consideration
Pt = Price of tender under consideration
Pmin = Price of lowest acceptable tender

4.0 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 goal(s) stated in **Table 1** below, as supported by proof/ documentation stated in the **Conditions of 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 maximum points for each goal are indicated per the table below.

Tenderers are to indicate their points claim for each of the Specific Goals in the shaded blocks.

The Specific Goals to be allocated points in terms of this tender	Maximum Number of points ALLOCATED (80/20 system)	Maximum Number of points ALLOCATED (90/10 system)	Number of points CLAIMED (80/20 system)	Number of points CLAIMED (90/10 system)
Ownership Goal: Race (black)	n/a	4	n/a	
Ownership Goal: Gender (female)	n/a	1	n/a	
RDP Goal: The promotion of South African owned enterprises.	n/a	2.5	n/a	
RDP Goal: The Creation of new jobs to address black youth unemployment	n/a	2.5	n/a	
Total CLAIMED Points (20 or 10 Maximum)				

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, certify that the points claimed, based on the specific goals as specified in the tender, qualifies the tendering entity for the preference(s) shown.

I acknowledge that:

1) The information furnished is true and correct.

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

3) 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.

4) 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.

NAME (Block Capitals): ---------- **Date**

SIGNATURE: _____ ----------

T2.2.8 MBD 8: DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

1.0 This Municipal Bidding Document must form part of all bids invited.

2.0 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.

3.0 The bid of any bidder may be rejected if that bidder, or any of its directors have:

a) abused the municipal entity's supply chain management system or committed any improper conduct in relation to such system.
b) been convicted for fraud or corruption during the past five years.
c) wilfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years.
d) been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).

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

		Circle Applicable	
4.1	Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer / Authority of the institution that imposed the restriction after the audi alteram partem rule was applied.) The Database of Restricted Suppliers now resides on the National Treasury's website (www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.	YES	NO

4.1.1 If YES, provide particulars.

……

……

4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.	YES	NO

4.2.1 If YES, provide particulars.

……

……

4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	YES	NO

4.3.1 If YES, provide particulars.

……

……

4.4	Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	YES	NO
	4.4.1 If YES, provide particulars.		
	…….		
	…….		
4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	YES	NO
	4.5.1 If YES, provide particulars.		
	…….		
	…….		

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

I accept that, in addition to cancellation of a contract, action may be taken against me should this declaration prove to be false.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.9 MBD 9: CERTIFICATE OF INDEPENDENT BID DETERMINATION

NOTES

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

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

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

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

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

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

a. take all reasonable steps to prevent such abuse;
b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.

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

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

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

(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:

(Name of Bidder)

that:

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

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

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

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

5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
   (a) has been requested to submit a bid in response to this bid invitation.
   (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience.
   (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder.

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement, or arrangement with any competitor. However, communication between partners in a joint venture or consortium[3] will not be construed as collusive bidding.

7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
   (a) prices.
   (b) geographical area where product or service will be rendered (market allocation).
   (c) methods, factors or formulas used to calculate prices.
   (d) the intention or decision to submit or not to submit, a bid.
   (e) the submission of a bid which does not meet the specifications and conditions of the bid.
   (f) bidding with the intention not to win the bid.

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

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

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

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.10 JOINT VENTURES AGREEMENTS

Joint Venture agreement and Power of Attorney Agreements to be attached here (if applicable).

T2.2.11 RECORD OF ADDENDA TO TENDER DOCUMENTS

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

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

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

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: ..... _____

T2.2.12 ELIGIBILITY: DECLARATION OF MUNICIPAL FEES

Reference is to be made to Clause F.2.1(f)(ii) of the Tender Data.

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

.....

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

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

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

Account	**Account Number: to be completed by tenderer**
Consolidated Account	
Electricity	
Water	
Rates	
JSB Levies	
Other	

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

- Where the tenderer's place of business or business interests are outside the jurisdiction of eThekwini municipality, a copy of the accounts/ agreements from the relevant municipality are to be provided.
- Where the tenderer's Municipal Accounts are part of their lease agreement, then a copy of the agreement, or an official letter to that effect, is to be provided.

Tenderers are to include, at the back of their tender submission document, a printout of the above account's and or agreements signed with the municipality.

Failure to include the required document will make the tender submission non-responsive.

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.13 ELIGIBILITY: REGISTRATION WITH COMPENSATION COMMISSIONER

Reference is to be made to Clause F.2.1(f)(i) of the Tender Data.

The Occupational Injuries and Diseases Act (130 of 1993 as amended) (the Act) refers. A summary of the pertinent Clauses are listed below. The act is to be referenced for the full text of the clauses.

Clause 80: Employer to register with commissioner and furnish him with particulars
The Act requires that an Employer carrying out business in the Republic to register with the Compensation Commissioner. Any person who fails to comply with the provisions of the this clause is guilty of an offence.

Clause 82: Employer to furnish returns of earnings
The Act requires an Employer to furnish the commissioner with a return showing:

- The amount of earnings paid by him to his employees.
- Any further information as may be prescribed or as the commissioner may require.

Any Employer who fails to comply with the provisions of the this clause is guilty of an offence.

Clause 86: Assessment to be paid by an employer to commissioner
The Act states that an Employer will receive notices of assessment from the commissioner. The Employer must pay the commissioner the assessment amount on the notices.

Clause 89: Mandators and contractors
The Act requires a contractor (a person with a contract with a mandator) to register as an Employer in accordance with the provisions of the Act and pay the necessary assessments. Failing registration or payment of assessments, the mandator is required to pay the assessments in respect of the employees of the contractor. The mandator is allowed to recover the assessment amounts paid from the contractor.

The Department of labour issues contractors with a **Letter of Good Standing** if the contractor has complied with the requirement(s) of the Act and is in "good standing" with the Compensation Fund. Employers can check the validity of such Letters of Good Standing on the internet (https://cfonline.labour.gov.za/VerifyLOGS).

Tenderers are to include, at the back of their tender submission document, a printout of their most recent Letter of Good Standing from the Department of Labour.

Failure to include the required document will make the tender submission non-responsive.

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.14 ELIGIBILITY: CSD REGISTRATION REPORT

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

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

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

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

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

CENTRAL SUPPLIER DATABASE FOR GOVERNMENT

Report Date:

Report Ran By:

CSD REGISTRATION REPORT

SUPPLIER IDENTIFICATION

Supplier number		Have Bank Account	
Is supplier active?		Total annual turnover	
Supplier type		Financial year start date	
Supplier sub-type		Registration date	
Legal name		Created by	
Trading name		Created date	
Identification type		Edit by	
Government breakdown		Edit date	
Business status		Restricted Supplier	
Country of origin		Restriction Last Verification Date	
South African company/CC registration number			

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

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

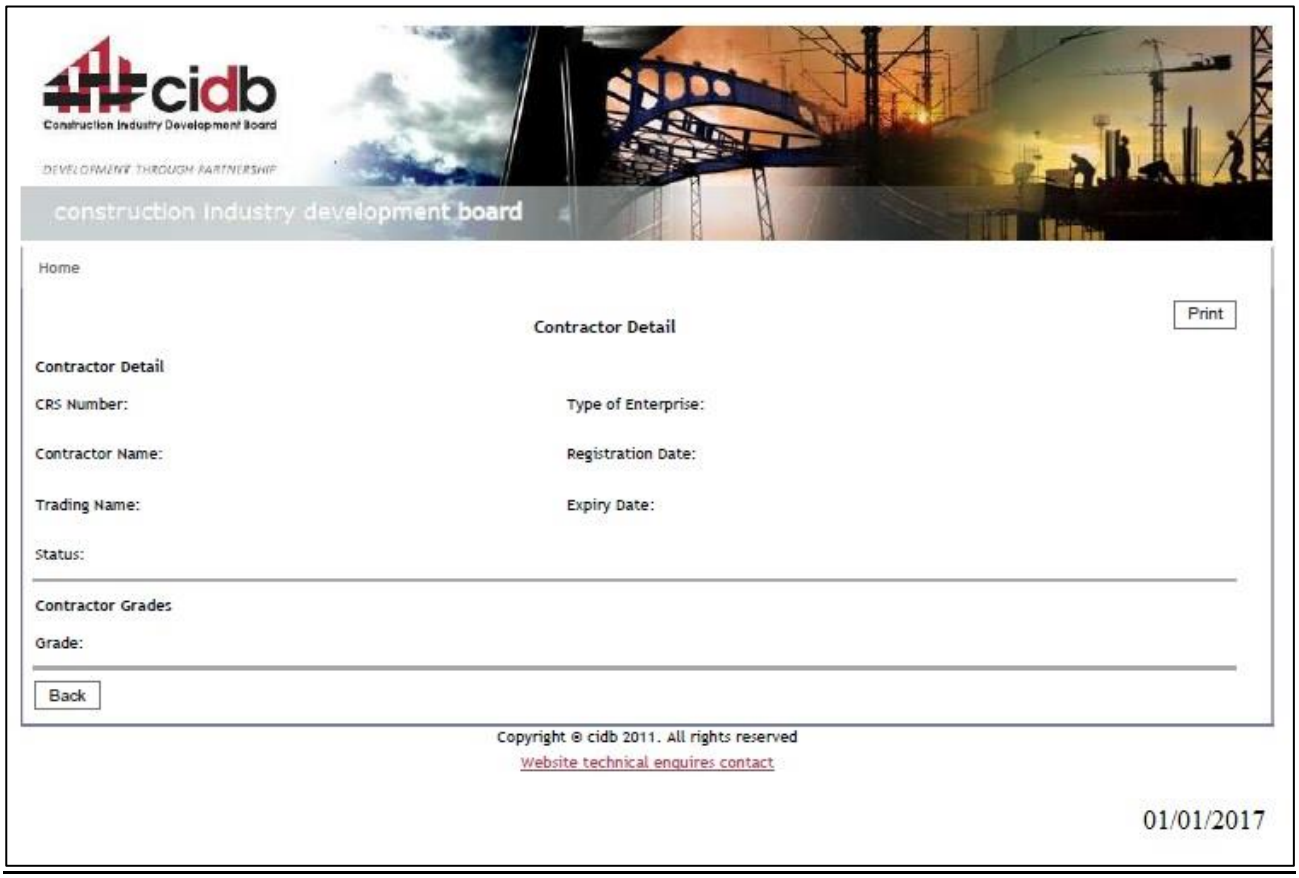
T2.2.15 ELIGIBILITY: VERIFICATION OF CIDB REGISTRATION AND STATUS

Reference is to be made to Clause F.2.1.1 and F.2.23 of the Tender Data**.**

The Conditions of Tender, **Clause F.2.1.1: Eligibility**, requires a tenderer to be registered, as "Active", with the CIDB (at time of tender closing), in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations. The required class of construction work is specified in Clause F.2.1.1.

CIDB Registrations can be obtained from the CIDB website at https://registers.cidb.org.za/PublicContractors/ContractorSearch. The date of obtaining the printout is to be indicated on the printout.

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



Tenderers are to include, at the back of their tender submission document, a printout of their registration with the CIDB.

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.16 EXPERIENCE OF TENDERER

Refer to Clause F3.11.9 for Functionality Points evaluation prompts (if applicable).

The following is a statement of works of similar nature (in relation to the scope of works) recently (within the past 7 years) executed by myself / ourselves.

Tenderers are to submit copies of signed completion certificates for all projects submitted.

EMPLOYER: CONTACT PERSON AND TELEPHONE NUMBER	CONSULTING ENGINEER: CONTACT PERSON AND TELEPHONE NUMBER	NATURE OF WORK	VALUE OF WORK (inclusive of VAT)	DATE COMPLETED

Attach additional pages if more space is required

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

NAME (Block Capitals): ______________________ **Date**

SIGNATURE: ______________________ ______________

T2.2.17 PROPOSED ORGANISATION and STAFFING

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

The tenderer should propose the structure and composition of their team i.e. the main disciplines involved, the key staff member / expert responsible for each discipline, and the proposed technical and support staff and site staff.

The roles and responsibilities of each key staff member / expert should be set out as job descriptions. In the case of an association / joint venture / consortium, it should, indicate how the duties and responsibilities are to be shared.

The tenderer must attach his / her organization and staffing proposals to this page. (this is to include both the on-site and off-site staffing resources used for this project)

In addition to any lists, this information should also be shown in an organogram format (flow chart) clearly indicating the staff hierarchy and reporting lines, again for on- and off-site resources.

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

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.18 KEY PERSONNEL

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

The Tenderer shall list below the personnel which he intends to utilize on the Works, including key personnel (Contract's Manager, Site Agent, and Foremen) which may have to be brought in from outside if not available locally.

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

Note: CVs of key personnel may be requested during the contract period.

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.19 EXPERIENCE OF KEY PERSONNEL

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

The experience of assigned staff member in relation to the Scope of Work will be evaluated from three different points of view:

1) General experience (total duration of professional activity), level of education and training and positions held of each discipline specific team leader.
2) The education, training, skills and experience of the Assigned Staff in the specific sector, field, subject, etc which is directly linked to the scope of work.
3) The key staff members' / experts' knowledge of issues which the tenderer considers pertinent to the project e.g. local conditions, affected communities, legislation, techniques etc.

A CV of the contract manager, site agent(s) and general foreman of not more than 2 pages should be attached to this schedule:

Each CV should be structured under the following headings:

a) Personal particulars
- name
- date and place of birth
- place (s) of tertiary education and dates associated therewith
- professional awards

b) Qualifications (degrees, diplomas, grades of membership of professional societies and professional registrations)

c) Skills

d) Name of current employer and position in enterprise

e) Overview of post-graduate / diploma experience (year, organization and position)

f) Outline of recent assignments / experience that has a bearing on the scope of work

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.20 PRELIMINARY PROGRAMME

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

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

PROGRAMME														
ACTIVITY	**WEEKS / MONTHS**													

Note: The programme must be based on the completion time as specified in the Contract Data.

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

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.21 CONSTRUCTION APPROACH, METHODOLOGY, AND QUALITY CONTROL

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

Construction Approach and Methodology

The construction approach and methodology must respond to the Scope of Work and outline the proposed approach to undertake the work showing a detailed programme including health and safety aspects, the use of plant and resources for this Project.

Quality Control

The quality control statement must discuss what tests and control measures are to be employed on site to attain the specified results and is to cover the program associated activities.

The tenderer must attach his / her Construction Methodology and Quality Control information to this page.

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.22 SCHEDULE OF PROPOSED SUBCONTRACTORS

The following firms have been identified as possible subcontractors for work in this contract.

NAMES AND ADDRESSES OF PROPOSED SUBCONTRACTORS	NATURE AND EXTENT OF WORK TO BE SUBCONTRACTED	PREVIOUS EXPERIENCE WITH SUBCONTRACTOR

Attach additional pages if more space is required

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

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.23 PLANT and EQUIPMENT

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

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

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

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

Attach additional pages if more space is required

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

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

Attach additional pages if more space is required

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

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

T2.2.24 CONTRACTOR'S HEALTH AND SAFETY PLAN

Refer to Clause F3.11.9 for Functionality Points evaluation prompts.

At tender stage only a brief overview (**to be attached to this page**) of the tenderers perception on the safety requirements for this contract will be adequate.

Only the successful Tenderer shall submit separately the Contractor's Health and Safety Plan as required in terms of Regulation 7 of the Occupational Health and Safety Act 1993 Construction Regulations 2014.

The detailed safety plan will take into consideration the site specific risks as mentioned under C.3: Project Specification. A generic plan will not be acceptable.

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

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____ _____

PART C1: AGREEMENT AND CONTRACT DATA

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.1: OFFER

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

Contract No: **23115-6W**

Contract Title: **WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction**

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

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

*** The offered total of the prices inclusive of Value Added Tax is:**

R..... (*In words* .....

.....)

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

For the Tenderer:

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

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

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

Capacity *(of Signatory)* **:** .....

Address : .....

: .....

Telephone : .....

Witness:

Signature : ..... **Date** : .....

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

Notes:
*** Indicates what information is mandatory.**
Failure to complete the mandatory information and sign this form will invalidate the tender.

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.2: FORM OF ACCEPTANCE

This Form will be completed by the Employer

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

The terms of the contract are contained in:

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

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

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

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

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Tenderer (now Contractor) within five days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this Agreement, this Agreement shall constitute a binding contract between the parties.

Signature *(person authorized to sign the acceptance)* **:** .....

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

Capacity *(of Signatory)* **:** .....

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

Address : .....

: .....

Witness:

Signature : ..... **Date** : .....

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

C1.1: FORM OF OFFER AND ACCEPTANCE
C1.1.3: SCHEDULE OF DEVIATIONS

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

1. **Subject** : ……..

Details : ……..

: ……..

2. **Subject** : ……..

Details : ……..

: ……..

3. **Subject** : ……..

Details : ……..

: ……..

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

FOR THE TENDERER		**FOR THE EMPLOYER**
……..……..	Signature	……..……..
……..……..	Name *(in capitals)*	……..……..
……..……..	Capacity	……..……..
……..……	Name and Address of	……..……
……..	Organisation	……..
……..		……..
……..		……..
……	Witness Signature	……
……..	Witness Name	……..
……..	Date	……..

C1.2: CONTRACT DATA

C1.2.1 CONDITIONS OF CONTRACT

C1.2.1.1 GENERAL CONDITIONS OF CONTRACT

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

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

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

C1.2.2 CONTRACT DATA

C1.2.2.1 DATA TO BE PROVIDED BY THE EMPLOYER

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

1.1.1.14 The **time for achieving Practical Completion**, from the Commencement Date is **72 Weeks**. The period as stated in 5.3.2, and the 7 days referred to in 5.3.3, are included in the above time for achieving Practical Completion. The special non-working days as stated in 5.8.1 are excluded from the above time for achieving Practical Completion.

1.1.1.15 The Employer is the eThekwini Municipality as represented by: Logan Moodley
Deputy Head: **Plant and Engineering**

1.2.1.2 The address of the Employer is:
Physical: 22 Electron Road, Springfield, Durban, 4001/ Cleansing & Solid Waste Unit, 17 Electron Road, Springfield, Durban, 4001
Postal: 22 Electron Road, Springfield, Durban, 4001
Telephone: 031 322 4575
Fax: 031 322 2521
E-Mail: Logan.Moodley2@gmail.gov.za

1.1.1.16 The **name of the Employer's Agent** is Nash Dookhi; Wilson and Pass Incorporated
1.2.1.2 The address of the Employer' Agent is:
Physical: 19 Rorvik Avenue, Essenwood, Durban, 4001
Postal: P O Box 641, Westville 3630
Telephone: 082 823 3000 (t)
Fax: 031 266 2840 (f)
E-Mail: nash@wpice.co.za

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

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

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

4.11.1 To carry out and complete the works, the Contractor shall employ a competent Site Agent and Foreman as part of the key staff. It is a requirement for the Contractor's Site Agent and Foreman to each have a minimum of 3 years relevant experience including experience on projects of a similar nature. The CV's of the Site Agent and the Foreman should be submitted to the Employer's Agent's Representative for acceptance by the Department (reference is made to Cl.5.3.1 of the Contract Data).

Note:

i) "similar nature" implies projects that were of a value of at least 70% of this tender's value, and had a comparable Scope of Work in terms of technical requirements and operations.

ii) "experience" implies experience on projects of a similar nature.

iii) "accredited degree / diploma" implies a minimum 3-year qualification within the built environment, from a registered University or Institute of Technology.

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

- Health and Safety Plan (refer to Clause 4.3)
- Initial Programme (refer to Clause 5.6)
- Security (refer to Clause 6.2)
- Insurance (refer to Clause 8.6)
- CV(s) of Key Site Staff (refer to Clause 4.11.1)
- CPG Implementation Plan

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

5.3.3 Add the following paragraph:

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

5.4.2 The access and possession of Site shall not be exclusive to the Contractor but as set out in the Site Information.

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

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

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

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

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

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

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

5.13.1 The **penalty for delay** in failing to complete the Works is **R 5 000.00** (per Day).

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

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

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

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

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

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

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

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

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

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

- The Index for Labour, Plant, and Materials shall be based on **December 2021 = 100**.
- The Index for Fuel shall be based on **December 2020 = 100**.

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

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

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

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

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

8.6.1.1.3 The **amount to cover professional fees** for repairing damage and loss to be included in the insurance sum: **Not Required**.

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

8.6.1.3 The limit of indemnity for **liability insurance**: **R10 000 000.00**.

8.6.1.4 **Ground Support Insurance**:

- Minimum amount for any one occurrence, unlimited as to the number of occurrences, against any claim for damages or loss caused by vibration and / or removal of lateral support: **R2 000 000.00**.
- Maximum first excess: **R10 000.00**.

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

Third Party Insurance (Public Liability)

- Minimum amount for any one occurrence, unlimited as to the number of occurrences, for the period of the contract, inclusive of the maintenance period: **R1 000 000.00**.
- Consequential loss to be covered by policy: **Yes**
- Liability section of policy to be extended to cover blasting: **R5 000 000.00**.
- Maximum excess per claim or series of claims arising out of any one occurrence: **R20 000.00**.

Principal's own surrounding Property Insurance

- Minimum amount for any one occurrence unlimited as to the number of occurrences against any claim for damage which may occur to the Council's own surrounding property: **R1 000 000.00**.
- Maximum first excess: **R10 000.00**.

Insurance of Works

- Minimum amount for additional removal of debris (no damage): **Nil**.
- Minimum amount for temporary storage of materials off site, excluding Contractor's own premises: **Nil**.
- Minimum amount for transit of materials to site: **Nil**.

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

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

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

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

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

C1.2.2.2 DATA TO BE PROVIDED BY CONTRACTOR

1.1.1.9 The legal name of Contractor is:

……

……

……

……

1.2.1.2 The Physical address of the Contractor is:

……

……

……

……

The Postal address of the Contractor is:

……

……

……

……

The contact numbers of the Contractor are:

Telephone: ……

Fax: ……

The E-Mail address of the Contractor is:

……

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

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

C1.2.3 ADDITIONAL CONDITIONS OF CONTRACT

C1.2.3.1 COMMUNITY LIAISON OFFICER AND SOCIAL FACILITATOR

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

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

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

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

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

C1.2.3.2 EMPLOYMENT OF LOCAL LABOUR

It is a condition of contract that the contractor will be required to employ local labour as specified in eThekwini Council Policy "The use of CLOs and Local Labour". The contractor will be required to ensure that a minimum of 50% of the labour force is made up of local labour. For the purposes of this contract, "Local labour" will be deemed to be any **persons who reside within Ward 98.** The contractor will be required to provide proof of authenticity of local labour. Signed confirmation by the appointed CLO will suffice for this.

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

C1.2.3.3 CONTRACTOR PARTICIPATION GOAL (CPG)

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

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

C1.2.3.4 FTE (Full Time Equivalent) EMPLOYMENT INFORMATION

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

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

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

- Category of Employment

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

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

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

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

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

C1.2.3.5 PERFORMANCE MONITORING OF SERVICE PROVIDERS

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

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

C1.2.3.6 EXCEPTED RISKS (Clause 8.3)

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

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

C2.1: PRICING ASSUMPTIONS / INSTRUCTIONS

C2.1.1 GENERAL

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

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

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

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

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

C2.1.3 QUANTITIES REFLECTED IN THE SCHEDULE

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

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

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

C2.1.5 MONTHLY PAYMENTS

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

C2.1.4 PROVISIONAL SUMS / PRIME COST SUMS

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

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

C2.1.6 PRICING OF THE BILL OF QUANTITIES

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

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

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

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

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

C2.1.7 "RATE ONLY" ITEMS

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

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

For "Rate Only" items no quantities are given in the "Quantity" column but the quoted rate shall apply in the event of work under this item being required. The Tenderer shall however note that in terms of the Tender Data the Tenderer may be asked to reconsider any such rates which the Employer may regard as unbalanced.

C2.1.8 PRELIMINARY AND GENERAL

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

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

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

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

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

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

C2.2: BILL OF QUANTITIES

PLEASE NOTE THAT THE **BILL OF QUANTITIES**, THE **PROJECT DESCRIPTION AND SCOPE OF CONTRACT**, THE **PROJECT SPECIFICATION**, THE **STANDARD SPECIFICATIONS**, THE **AMENDMENTS TO THE STANDARD SPECIFICATIONS** AND THE **CONTRACT AND STANDARD DRAWINGS** ARE SEPARATED INTO TWO (2) DISTINCT PARTS.

PART A – *LANDFILL CELL, LEACHATE DAM AND CONTAMINATED STORMWATER DAMS (CSWDs) WORKS*

PART B – *INFRASTRUCTURE WORKS*

PLEASE ENSURE THAT PART A SECTIONS ARE READ AND TENDERED WITH PART A CORRESPONDING SECTIONS.

PLEASE ENSURE THAT PART B SECTIONS ARE READ AND TENDERED WITH PART B CORRESPONDING SECTIONS.

ANY DISCREPANCIES ARE TO BE RAISED AND CLARIFIED ACCORDINGLY DURING THE TENDER STAGE.

The Bills of Quantities follows and comprises of 45 pages. The pages for **Part A** are numbered Error! Bookmark not defined. **to** Error! Bookmark not defined. and the pages for **Part B** are numbered 81 to 109

BILL OF QUANTITIES – PART A

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 1 : GENERAL

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	A	GENERAL				
	8.3	SCHEDULED FIXED CHARGE AND VALUE RELATED ITEMS				
1.1	8.3.1	Contractual requirements	Sum	1		
	8.3.2	Establishment of facilities on the site.				
	PSAB 3.2	Facilities for Engineer				
1.2		a) Furnished offices (1 Nº)	Sum	1		
1.3		c) Nameboards (1 Nº)	Sum	1		
	8.3.2.2	Facilities for Contractor:				
1.4		a) Offices and storage sheds	Sum	1		
1.5		e) Ablution and latrine facilities	Sum	1		
1.6		k) Items (b) - (d) and (f) - (j) as listed in the Standardised Specification	Sum	1		
1.7	8.3.3	Other fixed charge obligations.	Sum	1		
1.8	8.3.4	Removal of site establishment.	Sum	1		
	8.4	SCHEDULED TIME RELATED ITEMS				
1.9	8.4.1	Contractual requirements	Sum	1		
	8.4.2	Operation and maintenance of facilities on site for the duration of construction, except where otherwise stated:				
	PSAB 3.2	Facilities for Engineer				
1.10		a) Furnished offices (1 Nº)	Sum	1		
1.11	PSAB 8.2.2	b) Telephone	PC Sum	1	16 000.00	16 000.00
1.12	PSA 8.6	c) Contractor's overheads, charges and profit in items 1.11 above (state percent and extend as an amount)	%	16 000.00		
	8.4.2.2	Facilities for Contractor:				
1.13		a) Offices and storage sheds	Sum	1		
1.14		e) Ablutions and latrine facilities	Sum	1		
1.15		k) Items (b) - (d) and (f) - (j) as listed in the Standardised Specification	Sum	1		
1.16	8.4.3	Supervision for duration of construction	Sum	1		
1.17	8.4.4	Company and head office overhead costs for the duration of the Contract.	Sum	1		
1.18	8.4.5	Other time related obligations.	Sum	1		
	PSA 8.6	PRIME COST ITEMS				
1.19	PSA 7.5	a) Acceptance control testing (including conformance testing)	PC Sum	1	250 000.00	250 000.00
1.20	PSA 8.6	b) Contractor's overheads, charges and profit in items 1.19 above (state percent and extend as an amount)	%	250 000.00		
	PSA 8.7 / C3.4.3 (5)	DAYWORK				
		Personnel:				
1.21		a) Supervision	hr	120		
1.22		b) Labourer - skilled	hr	160		
1.23		c) Labourer - unskilled	hr	200		
1.24		d) Gang leader - induna	hr	80		
1.25		e) Artisan - foreman	hr	80		
1.26		f) Surveyor with transport, instruments and incidental labour	hr	150		
TOTAL CARRIED FORWARD						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 1 : GENERAL

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
		Brought forward				
		Plant:				
1.27		a) Lowbed transportation of plant of mass exceeding 5 tons	t/km	1200		
1.28		b) Front end loader - rubber tyred 100kW, 10 ton mass	hr	176		
1.29		c) Grader 140G	hr	60		
1.30		d) Tractor loader backhoe (TLB) 55 kW	hr	80		
1.31		e) Vibratory roller, self propelled 80kW 9 ton mass	hr	40		
1.32		f) Excavator (20 ton mass)	hr	60		
1.33		g) Tip trucks 10m3 capacity	hr	176		
1.34		h) Dozer - 123 Kw	hr	80		
	8.8	TEMPORARY WORKS				
1.35	PSA 8.8.2	Accommodation of traffic within the Site	Sum	1		
	8.8.4	Existing Services:				
1.36		c) Excavation by hand in soft material to expose any service if required by the Engineer	m^3	1 080		
1.37	PSA 8.10	As built drawings	Sum	1		
1.38	PSA 8.5 a)	Employment of a Community Liaison Officer and a Social Facilitator	PC Sum	1		400 000.00
1.39	PSA 8.6	Contractor's overheads, charges and profit in items 1.38 above (state percent and extend as an amount)	%	400 000.00		
TOTAL SECTION 1: CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 2 : SITE CLEARANCE

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	C	**SITE CLEARANCE**				
	PSC 8.2.1	Clear and grub				
2.1		i) New Cell 1	m²	47 395		
2.2		ii) Leachate Dam	m²	6 100		
2.2		iii) Contaminated Stormwater Dam	m²	25 860		
TOTAL SECTION 2 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 3 : EARTHWORKS (PIPE TRENCHES)

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	DB	**EARTHWORKS (PIPE TRENCHES)**				
	PSDB 8.3.2 PSDB 5.6.3	Excavation:				
		a) Excavate in all materials for trenches, backfill, compact and dispose of surplus material:				
3.1		1) Open drains, irrespective of depth	m³	2 460		
		2) Subsoil drainage trenches (under new Cell 1, Leachate Dam and Contaminated Stormwater Dam)				
3.2		i) 0.0m - 1.5m	m³	6 485		
		3) Sumps and trenches for leachate pipes				
3.3		i) 0.0m - 1.5m	m³	350		
3.4		ii) 1.5m - 2.0m	m³	175		
3.5		iii) 2.0m - 2.5m	m³	88		
3.6		iiii) 2.5m - 3.0m	m³	58		
		4) Anchor trenches for GCL, HDPE geomembrane, geogrid and geotextiles				
3.7		i) 0.0m -1.5m	m³	2 820		
3.8		b) Extra over items 3.1 to 3.7 for hard excavation	m³	1 244		
3.9	DB 8.3.2	Excavation of unsuitable materials from trench bottom and dispose of it (provisional)	m³	1 500		
3.10	PSDB 8.3.8 (a)	Removal and disposal of waste (provisional)	m³	1 500		
TOTAL SECTION 3 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 4 : GABIONS AND PITCHING

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	DK	**GABIONS AND PITCHING**				
	8.2.1	Surface preparation for bedding of gabions				
4.1		a) Cavities fill with approved excavated material or rock (provisional)	m²	72		
	8.2.2	Gabions				
4.2		a) Reno mattress 0,17m thick, galvanised wire	m³	15		
	PSDK 8.2.4	Geotextile				
		a) Non woven needle punched geotextile				
4.3		i) To separation layer in new Cell 1, Leachate Dam and CSWDs (min. 200g/m² and min. 10.3kN/m tensile strength in the weaker direction)	m²	66 850		
4.4		ii) To subsoil drains and gabions (min. 200g/m² and min. 10.3kN/m tensile strength in the weaker direction)	m²	4 025		
4.5	PSDK8.2.8	Geogrid reinforcement	m²	56 045		
TOTAL SECTION 4 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 5 : EARTHWORKS (ROADS, SUBGRADE)

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	DM	**EARTHWORKS (ROADS, SUBGRADE)**				
	PSDM 8.3.2	Removal of topsoil to stockpile				
5.1		a) Remove topsoil to nominal depth of 200mm from new Cell 1, Leachate Dam and CSWDs area and stockpile as directed by the Engineer (provisional)	m³	15 875		
	PSDM 8.3.3	Treatment of roadbed (provisional)				
		a) Roadbed preparation and compaction of material to				
		2) Minimum of 93% of modified AASHTO maximum density (base preparation layer)				
5.2		i) New Cell 1, Leachate Dam and CSWDs (150mm thick)	m³	6 800		
	PSDM 8.3.4	Cut to fill				
		c) Compact to 93% of modified AASHTO maximum density				
5.3		1) New Cell 1, Leachate Dam and CSWD	m³	27 300		
		Extra over item 5.3				
5.4		b) Hard excavation (provisional)	m³	5 460		
5.5		c) Boulder excavation (provisional)	m³	5 460		
	PSDM 8.3.5	Selected Layers from Commercial Sources				
5.6		a) 53mm crushed rock single-sized aggregate to new Cell 1 drainage layer	m³	7 600		
5.7		b) G7 quality material compacted to 93% mod AASHTO density to Berms	m³	12 100		
5.8		c) G7 quality material compacted to 93% mod AASHTO density to access roads	m³	6 400		
5.9		d) G5 quality material compacted to 95% mod AASHTO density to access roads	m³	1 280		
5.10		e) Stabilised sand (in layers) to new Cell 1, Leachate Dam, CSWDs, anchor trenches and Berms	m³	8 160		
	PSDM 8.3.7	Cut to spoil or stockpile				
5.11		a) Soft material from new Cell 1, Leachate Dam and CSWD (provisional)	m³	13 175		
5.12		c) Hard excavation (provisional)	m³	2 635		
5.13		d) Boulder excavation (provisional)	m³	1 318		
	PSDM 8.3.17	Berms (Toe Berm, Diversion Berm and Internal Cell Separation Berm)				
5.14		a) Berms to new Cell 1, Leachate Dam and CSWD (material from site - cut material)	m³	46 300		
TOTAL SECTION 5 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 6 : CONCRETE (STRUCTURAL)

ITEM No		DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	G	**CONCRETE (STRUCTURAL)**				
	8.4	SCHEDULED CONCRETE ITEMS				
	PSG 8.4.3	Strength concrete:				
6.1		a) Concrete to stormwater drain on toe berms complete, Grade 20/19 Mpa, including formwork, mesh ref. 311 and damp proof course	m^3	125		
TOTAL SECTION 6 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 7 : MEDIUM-PRESSURE PIPELINES

ITEM No	PAYMENT SABS 1200	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT R
	L	**MEDIUM-PRESSURE PIPELINES**				
	PSL 8.2.1	Supply, lay, joint and test (include for all high pressure pumps, stop ends, bends, fittings, specials, etc) complete with couplings, the following pipes, pipe fittings etc				
7.1		a) 250mm diameter Class 16 HDPE pipe (provisional)	m	200		
7.2	PSL 8.2.11	Concrete Anchor/Thrust Blocks and Pedestals - Grade 25/19 MPa	m³	5		
TOTAL SECTION 7 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 8 : BEDDING (PIPES)

ITEM No		DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	LB	**BEDDING (PIPES)**				
	PSLB 8.2.2	Supply only of bedding by importation:				
	PSLB 8.2.2.3	From commercial sources:				
8.1		a) Selected granular material for HDPE pipes	m³	100		
8.2		b) Natural permeable material in subsoil drains and detection anchor trenches	m³	2 700		
8.3		c) Crushed rock aggregate in all subsoil drains (19mm single sized)	m³	775		
TOTAL SECTION 8: CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 9 : SEWERS

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	LD	**SEWERS**				
	PSLD 8.2.1	Supply, lay, joint, bed and test pipeline				
9.1		a) 160mm diameter Class 12 leachate collection pipe to new Cell 1 - perforated	m	2 360		
9.2		b) 160mm diameter Class 12 leachate carrier pipe to new Cell 1 - non-perforated	m	320		
9.3		c) 250mm diameter Class 16 leachate carrier pipe to new Cell 1 - non-perforated	m	140		
	PSLD 8.2.3	Manholes				
9.4		a) Concrete Leachate Detection and Collection Manholes to new Cell 1, Leachate Dam and CSWD up to 4m depth	No.	20		
	LD.8.2.9	Marker Posts				
9.5		a) Supply and install 1,2m long precast concrete marker posts, painted	No.	20		
9.6	PSLD.8.2.17	Valves for up to 250mm OD HDPE piping (non-return valves)	No.	4		
TOTAL SECTION 9 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 10 : STORMWATER DRAINAGE

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	LE	**STORMWATER DRAINAGE**				
	PSLE 8.2.1	Supply and lay concrete pipe culvert on class C bedding				
10.1		a) 600 mm diameter - Class 100D (provisional)	m	40		
	PSLE 8.2.8	Supply and install manholes, catchpits and the like				
10.2		a) Concrete manholes to a depth of 6m for subsoil drains	No.	6		
10.3		d) Headwall to 600mm diameter concrete pipe culvert (provisional)	No.	5		
	PSLE 8.2.14	Supply and lay pipes and subsoil drains				
10.4		a) 110mm diameter HDPE double wall - non-perforated subsoil pipe	m	400		
10.5		b) 110mm diameter HDPE double wall - perforated subsoil pipe	m	6 425		
10.6	PSLE 8.2.15	Concrete caps for subsoil	No.	30		
10.7	PSLE 8.2.16	Design, Supply and Install irrigation system from CSWD to permitted area	PC Sum	1		400 000.00
10.8	PSA 8.6	Contractor's overheads, charges and profit in items 10.7 above (state percent and extend as an amount)	%	400 000.00		
TOTAL SECTION 10 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SECTION 11 : PARTICULAR SPECIFICATION

ITEM No	PAYMENT	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
	PS	**PARTICULAR SPECIFICATION**				
11.1	C3.4.1 (10.1)	Contractor's obligation in respect of the Occupational Health and Safety Act	Sum	1		
	C3.4.4	**Geomembrane Liner**				
	PAA 1.9.1	Supply and install geomembrane liner				
11.2		a) 1.5mm thick double sided textured HDPE geomembrane liner to new Cell 1, Leachate Dam and CSWDs	m²	66 850		
11.3	PAA 1.9.3	b) Establishment of electrical leak location survey equipment for dipole testing	Sum	1		
11.4	PAA 1.9.4	c) Electrical Leak Location Survey of containment barrier by dipole testing in accordance with ASTM D8265	m²	44 700		
	C3.4.5	**Geosynthetic Clay Liner (GCL)**				
	PAB 1.11.1	Supply and lay High Shear GCL				
11.5		a) New Cell 1, Leachate Dam and CSWDs, slope areas and basal areas	m²	66 850		
11.6	PAA 1.9.2 PAB 1.11.2	Freight, Duty and Landing Charges (provisional)	PC Sum	1	80 000.00	80 000.00
11.7	PAA 1.9.3.2.1 PAB 1.11.3	Rate of Exchange (provisional)	PC Sum	1	668 500.00	668 500.00
	C3.4.6	**Liner Temperature Monitoring System**				
11.8	PAC 1.2.1	Installation of a liner temperature monitoring system to monitor and determine the performance and integrity of the liner system	PC Sum	1	200 000.00	200 000.00
	C3.4.7	**Security Fence**				
11.9	PAD 1.2.1	Concrete Palisade Fencing, complete	m	420		
11.10	PAD 1.2.2	Vehicular Gate, complete	No	1		
11.11	PAD 1.2.3	Pedestrian Gate, complete	No	2		
	C3.4.8	**Environmental Monitoring**				
11.12	PAE 1.2.1	Install groundwater monitoring boreholes as directed by Engineer on site	No	6		
11.13	PAE 1.2.2	Supply and install gas monitoring probes as directed by Engineer on site	No	16		
	C3.4.9	**Construction Quality Assurance**				
11.14	PAF 1.2.1	Independent Construction Quality Assurance, as per Regulatory Authority approval	PC Sum	1	1 190 000.00	1 190 000.00
11.15	PSA 8.6	Contractor's overheads, charges and profit in items 11.14 above (state percent and extend as an amount)	%	1 190 000.00		
TOTAL SECTION 11 : CARRIED FORWARD TO SUMMARY						

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

SUMMARY OF SCHEDULE OF QUANTITIES - PART A

SECTION	DESCRIPTION	AMOUNT
1	GENERAL	R
2	SITE CLEARANCE	R
3	EARTHWORKS (PIPE TRENCHES)	R
4	GABIONS AND PITCHING	R
5	EARTHWORKS (ROADS, SUBGRADE)	R
6	CONCRETE (STRUCTURAL)	R
7	MEDIUM-PRESSURE PIPELINES	R
8	BEDDING (PIPES)	R
9	SEWERS	R
10	STORMWATER DRAINAGE	R
11	PARTICULAR SPECIFICATION	R
SUB TOTAL 1 (SUM OF SECTIONS 1 TO 11 ABOVE) - PART A		R

BILL OF QUANTITIES – PART B

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

1: SITE CLEARANCE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 C	SECTION 1: SITE CLEARANCE					
A1.1		CLEAR SITE					
A1.1.1	8.2.1 PSC 8.2.1	Clear and grub Site					
		x) Contaminated Stormwater Dam 1	ha	0.8			
		xi) Western Cut-off Drain	ha	2.0			
		xii) Road 3	ha	0.2			
		xiii) Workshop Road	ha	0.6			
A1.1.2	8.2.3	Remove and grub all trees and tree stumps regardless of girth					
		x) Contaminated Stormwater Dam 1	ha	0.4			
		xi) Western Cut-off Drain	ha	1.2			
		xii) Road 3	ha	0.2			
		xiii) Workshop Road	ha	0.2			
A1.2	SANS 1200 D 8.3.2	EXCAVATION					
A1.2.1	8.3.1.2	Remove topsoil to nominal depth 150mm, stockpile, and maintain					
		x) Contaminated Stormwater Dam 1	m²	6 300			
		xi) Western Cut-off Drain	m²	18 900			
		xii) Road 3	m²	1 200			
		xiii) Workshop Road	m²	4 400			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

2: EARTHWORKS (ROADS, SUBGRADE)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 DM	SECTION 2: EARTHWORKS (ROADS, SUBGRADE)					
A2.1		TREATMENT OF ROAD-BED					
A2.1.1	8.3.3(a)	Road-bed preparation and compaction of material					
A2.1.1.1		Compact to 93 % mod. AASHTO maximum density					
		vi) Platform 2	m³	500			
		xi) Western Cut-off Drain	m³	2 300			
		xii) Road 3	m³	300			
		xiii) Workshop Road	m³	200			
A2.1.2	8.3.3(b)	In-place treatment of roadbed in intermediate or hard material					
A2.1.2.1		Ripping					
		i) MR461	m³	3 100			
		xii) Road 3	m³	400			
		xiii) Workshop Road	m³	800			
A2.1.2.2		Blasting					
		xii) Road 3	m³	100			
		xiii) Workshop Road	m³	100			
A2.1.2.3	PSDM 5.2.2.2	Shape and compact top of blasted rock roadbed with 5 passes of a 1-ton smooth drum vibratory roller					
		xii) Road 3	m²	50			
		xiii) Workshop Road	m²	50			
A2.1.3	PSDM 5.2.9	Benching on slopes steeper than 1v:5h					
		xi) Western Cut-off Drain	m³	2 900			
		xii) Road 3	m³	300			
		xiii) Workshop Road	m³	400			
Total Carried Forward							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

2: EARTHWORKS (ROADS, SUBGRADE)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
A2.2		EARTHWORKS					
A2.2.1	8.3.4	Cut to fill					
A2.2.1.1		Compact to 93 % mod. AASHTO maximum density in 150mm layers G10 (CBR>3)					
		vi) Platform 2	m³	58 500			
		x) Contaminated Stormwater Dam 1	m³	200			
		xiii) Workshop Road	m³	3 100			
A2.2.1.2	PSDM 5.2.4.2	Rockfill, process, and compact					
		xi) Western Cut-off Drain	m³	11 350			
		xii) Road 3	m³	150			
		xiii) Workshop Road	m³	550			
A2.2.2	8.3.5	Selected layer					
A2.2.2.1	PSDM 3.2.1	a) From Site or Stockpile					
A2.2.2.1.1		Compacted to 93% MoD AASHTO 150mm thick layer G9 (CBR>7)					
		vi) Platform 2	m³	700			
		xii) Road 3	m³	350			
		xiii) Workshop Road	m³	150			
A2.2.2.2	PSDM 3.2.1	b) Imported from commercial source					
A2.2.2.2.1		Compacted to 95% MoD AASHTO 150mm thick layer G7 (CBR>15)					
		vi) Platform 2	m³	700			
		xii) Road 3	m³	350			
		xiii) Workshop Road	m³	150			
A2.2.3	8.3.6	Extra-over items B2.2.2.1 for excavating and breaking down material in:					
A2.2.3.1	PSDM 3.1 PSD 3.1.2	Hard excavation					
		xii) Road 3	m³	50			
		xiii) Workshop Road	m³	50			
Total Carried Forward							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

2: EARTHWORKS (ROADS, SUBGRADE)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
A2.2.4	8.3.7	Cut to spoil or stockpile from					
A2.2.4.1	PS 5.2.2.4	Soft excavation					
		vi) Platform 2	m³	4 600			
		x) Contaminated Stormwater Dam 1	m³	24 300			
		xii) Road 3	m³	2 500			
		xiii) Workshop Road	m³	9 600			
A2.2.4.2	PSDM 3.1 PSD 3.1.2	Hard excavation					
		x) Contaminated Stormwater Dam 1	m³	27 950			
		xii) Road 3	m³	52 100			
		xiii) Workshop Road	m³	1 500			
A2.2.4.3		Boulder excavation Class A					
		xii) Road 3	m³	50			
		xiii) Workshop Road	m³	50			
A2.2.4.4		Boulder excavation Class B					
		xii) Road 3	m³	100			
		xiii) Workshop Road	m³	100			
A2.2.5	8.3.8	Removal of oversize material	m³	100			
A2.3	8.3.13	SURFACE FINISHES					
A2.3.1		Topsoiling from site or stockpile					
		xii) Road 3	m²	3 400			
		xiii) Workshop Road	m²	3 500			
A2.3.2		Grassing					
		a) Hydroseeding					
		xii) Road 3	m²	8 250			
		xiii) Workshop Road	m²	12 000			
		b) Full coverage sods					
		xii) Road 3	m²	450			
		xiii) Workshop Road	m²	600			
A2.4	8.3.16 PSDM 3.2.1	GRAVEL SURFACING					
Total Carried Forward							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

2: EARTHWORKS (ROADS, SUBGRADE)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
A2.4.1		Gravel surface layer imported from commercial sources					
A2.4.1.2		Compacted to 98% MoD AASHTO 250mm thick layer G6 Wearing Course (CBR>25)					
		xii) Road 3	m³	400			
A2.5	SANS 1200 D PSD 8.3.2	Restricted Excavation (where directed by the Engineer)	m³			Rate Only	
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

3: SUBBASE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 ME	SECTION 3: SUBBASE					
A3.1	8.3.5	Process material by means of:					
A3.1.1	PSME 8.2.1	Mechanical modification					
		vi) Platform 2	m³	735			
		xii) Road 3	m³	810			
A3.2	PSME 1.2	Crushing					
		a) Establish on site and remove on completion	Sum	1		Rate Only	
		b) Multistage crushing and screening	m³			Rate Only	
A3.3	8.3.8	Stabilizing agent					
A3.3.1		Portland cement					
		vi) Platform 2	t	60			
		xii) Road 3	t	20			
A3.4	1200 ME 8.3.3	Construct subbase with material from commercial sources					
A3.4.1		Compacted to 98% MoD AASHTO 150mm thick layer G5 (CBR>45)					
		vi) Platform 2	m³	700			
		xii) Road 3	m³	300			
A3.4.2		Compacted to 97% MoD AASHTO 150mm thick layer G5 to shoulders (CBR>45)					
		xii) Road 3	m³	50			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

4: KERBING AND CHANNELLING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 MK	SECTION 4: KERBING AND CHANNELLING					
A4.1		CONCRETE KERBING AND CHANNELLING					
A4.1.1		Fig 6 pre-cast mountable kerb with 300mm cast-in-situ channel / fillet complete					
		ii) Road 3	m	200			
A4.2		EXCAVATION					
A4.2.1	SANS 1200 DB 8.3.2(a)	Excavate in all materials for open drains, compact, and dispose of surplus/unsuitable material:					
		xii) Road 3	m^3	20			
		xiii) Workshop Road	m^3	100			
A4.2.2	8.2.6.2	a) Trim excavations and compact base in soft and intermediate material					
		xii) Road 3	m^2	80			
		xiii) Workshop Road	m^2	500			
A4.3	8.2.8	c) Concrete lining to Vee drains completes as per drawings, including formwork, joints, curing and finishing (25MPa, 150 thick)					
		xii) Road 3	m	50			
		xiii) Workshop Road	m	160			
A4.4		Extra-over A4.1 for kerbs on a radius					
		a) For radius less than 15 and greater than 5m					
		ii) Road 3	m	20			
		b) For radius less than 5m and greater than 1m					
		ii) Road 3	m	20			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

5: ANCILLARY ROADWORKS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 MM	SECTION 5: ANCILLARY ROADWORKS					
A5.1		Moveable concrete barriers (New Jersey Type or similar) 3m long					
		a) Supply and install	No.	50			
		b) Move to new position	No.	50			
A5.2		PERMANENT TRAFFIC SIGNS					
A5.2.1		STANDARD SIGNS ON TIMBER POSTS (supplied and installed completed, including support, excavation and backfill))					
		(a) Steel sheet regulatory warning and information signs					
		(1) Octagonal - 610mm					
		xii) Road 3	No.	2			
		xiii) Workshop Road	No.	2			
		(2) Triangular - 900mm side					
		xii) Road 3	No.	2			
		xiii) Workshop Road	No.	2			
		(3) Round - 600mm dia					
		xii) Road 3	No.	2			
		xiii) Workshop Road	No.	2			
		(4) Rectangular - 200 mm wide x 800 mm high (Type W401/ W402)					
		xii) Road 3	No.	5			
		xiii) Workshop Road	No.	5			
		(5) Rectangular - 450 mm wide x 450mm high (Type W405 / W406)					
		xii) Road 3	No.	5			
		xiii) Workshop Road	No.	5			
Total Carried Forward							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

5: ANCILLARY ROADWORKS

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
A5.3		ROAD MARKINGS					
A5.3.1	8.4.1	Non-reflectorized paint applied at nominal rate of 0,42 l/m²					
A5.3.1.1		a) White lines (broken or unbroken)					
		i) 100mm width					
		12) Road 3	km	0.3			
		iv) 300mm width					
		12) Road 3	km	0.10			
A5.3.1.2		b) Yellow lines (broken or unbroken)					
		i) 150mm width					
		12) Road 3	km	0.5			
A5.3.1.3		c) White characters and symbols					
		12) Road 3	m²	5			
A5.3.2	8.4.2	Variation in rate of application from that stated for item B8.3.1					
A5.3.2.1		a) White paint					
		12) Road 3	ℓ			Rate Only	
A5.3.2.2		b) Yellow paint					
		12) Road 3	ℓ			Rate Only	
A5.3.3	8.4.4	Setting out and pre-marking of lines (excluding traffic island markings, characters, and symbols)					
		12) Road 3	km	0.90			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

6: CONCRETE PAVEMENT

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 G	SECTION 6: CONCRETE PAVEMENT					
A6.1	8.4.3	CONCRETE					
	PSG 8.4.3	a) Class 30/20 concrete to road pavement					
		vi) Platform 2	m³	1 100			
		xii) Road 3	m³	390			
		b) Approval of mix design	Sum	1			
		c) Anchors on slopes greater than 3% complete as per standard detail (excluding concrete)					
		1) Anchor block					
		xii) Road 3	m	70			
		2) Panel anchor					
		xii) Road 3	m	70			
		3i) End anchor					
		xii) Road 3	m	6			
		d) Coring and testing of cores					
		i) 100mm cores drilled from pavement	No.	10			
		ii) 150mm cores drilled from pavement and tested for crushing strength	No.	5			
A6.2	8.2	FORMWORK					
		a) Side forms including recess					
		vi) Platform 2	m²	1 100			
		xii) Road 3	m²	380			
		b) 25mm x 25mm chamfer on ends					
		vi) Platform 2	m	200			
		xii) Road 3	m	15			
A6.3	8.3	REINFORCEMENT					
		a) High tensile steel reinforcement					
		1) Y10 tie bars (600mm long)					
		vi) Platform 2	No.	4 420			
		xii) Road 3	No.	480			
A6.4	8.5	JOINTS					
Total Carried Forward							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

6: CONCRETE PAVEMENT

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
	PSG 3.10	a) Sawn joints as per standard detail drawing					
		ii) Road 0	m²	360			
		xii) Road 3	m²	40			
	PSG3.10	b) Construction joints as per standard detail drawing					
		vi) Platform 2	m²	310			
		xii) Road 3	m²	35			
	PSG3.10 PSG 3.11	c) Joint sealing as per standard detail drawing					
		vi) Platform 2	m	2 650			
		xii) Road 3	m	290			
A6.5	8.4.4	TEXTURING					
	PSG 5.5.10	a) Burlap drags					
		vi) Platform 2	m²	5 680			
		xii) Road 3	m²	640			
A6.6	PSG 3.9	CURING					
A6.6.1		Curing compound (White pigmented, sprayed at 0.45 l/m²					
		vi) Platform 2	m²	5 680			
		xii) Road 3	m²	640			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
A: ROADS AND EARTHWORKS

SUMMARY OF SECTIONS

SECTION	DESCRIPTION	AMOUNT (RAND)
A1	SITE CLEARANCE	.....
A2	EARTHWORKS (ROADS, SUBGRADE)	.....
A3	SUBBASE	.....
A4	KERBING AND CHANNELLING	.....
A5	ANCILLARY ROADWORKS	.....
A6	CONCRETE PAVEMENT	.....
Total Carried Forward To Summary Of Schedules		

PART B - ROADS AND INFRASTRUCTURE
B: STORMWATER

1: PIPE TRENCHES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 DB	SECTION 1: PIPE TRENCHES					
B1.1		EXCAVATION					
B1.1.1	8.3.2(a) PSDB 3.1 PSDB 5.4 PSDB 8.3.2	Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for pipes:					
B1.1.1.1		Over 100 up to 300 mm diam. for total trench depth (for subsoils):					
		Exceeding 0,0 m but not exceeding 1,0 m	m	420			
		Exceeding 1,0 m but not exceeding 2,0 m	m	110			
B1.1.1.2		Over 300 up to 600 mm diam. for total trench depth:					
		Exceeding 1,0 m but not exceeding 2,0 m	m	40			
		Exceeding 2,0 m but not exceeding 3,0 m	m	110			
		Exceeding 3,0 m but not exceeding 4,0 m	m	30			
B1.1.2	8.3.2(b)	Extra-over items B1.1.1 for (prov):	m³				
B1.1.2.1	PSDB 3.1	Hard rock excavation	m³	40			
B1.1.3	8.3.2(c)	Excavate and dispose of unsuitable material from trench bottom (Provisional)	m³	40			
B1.2		EXCAVATION. ANCILLARIES Make up deficiency in backfill material (Provisional)					
B1.2.1	8.3.3.1(a	from other necessary excavations on site	m³	40			
B1.3	8.3.4(a) PSDB 5.1.5	Shore trench					
B1.3.1		For trench deeper than 1.5m up to 3.0m	m	150			
B1.3.2		For trench deeper than 3.0m	m	30			
B1.4		EXISTING SERVICES					
B1.4.1		Excavate by hand in soft material to expose service					
B1.4.1.1	8.3.5(a)	Services that intersect a trench	No.	6			
B1.4.1.2	8.3.5(b)	Services that adjoin a trench	No.	6			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
B: STORMWATER

2: BEDDING (PIPES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 LB	SECTION 2: BEDDING					
B2.1		PROVISION OF BEDDING					
B2.1.1		Imported from					
	8.2.2.1	a) Other necessary excavations or stockpile for					
		2) Selected fill blanket	m³	80			
	8.2.2.3	c) Commercial sources (Provisional)					
		1) Selected granular material	m³	60			
		2) Selected fill material	m³	10			
		3) Single size crushed stone, 19mm	m³	110			
B2.2	8.2.3	Concrete bedding (Provisional)	m³	20			
B2.3		SEPARATION LAYER					
B2.3.1		Geotextile non-woven needle punched to					
	PSDK 3.1.4	a) Subsoil drains 200gsm	m²	1 110			
	PSDK 3.1.4	b) Below road layers 340 gsm	m²	670			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
B: STORMWATER

3: STORMWATER DRAINAGE

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		SECTION 3: STORMWATER DRAINAGE					
B3.1	SANS 1200 LE	PIPES					
B3.1.1	8.2.1	Supply, handle, lay, bed on Class A bedding concrete pipe Type Spigot & Socket and Class 75D.					
		a) 450 mm diam.	m	40			
B3.1.2	8.2.1	Supply, handle, lay, bed on Class B bedding, concrete pipe Type Spigot & Socket and Class 75D.					
		a) 450 mm diam.	m	170			
B3.1.3	8.2.1	Supply, handle, lay, bed subsoil pipes:					
		a) 100mm diam.	m	530			
B3.2	8.2.8	MANHOLES Construct complete with heavy-duty cast-iron covers and frames (Type 2B)					
		a) Type A up to 1,5 m deep	No.	2			
		b) Type B, up to 2.5 m deep	No.	6			
		c) Extra over (a) and (b) above for extra depth					
		i) Type A	m	8			
		ii) Type B	m	4			
B3.3	8.2.10	ACCESSORIES					
B3.3.1		Covers and grids					
B3.3.1.1		Extra over or under B3.2(a) and (b) for Heavy-Duty Cast-Iron Grid and frame					
		b) 600 x 600	No.	10			
B3.3.2		Step irons	No.	26			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
B: STORMWATER

4: GABIONS AND PITCHING

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 DK	SECTION 4: GABIONS AND PITCHING					
B4.1	SANS 1200 DB	EXCAVATION See Section D, DA, DE as applicable					
B4.1.1	8.3.2	Excavate for gabions and mattresses in soft materials and place in embankment for:					
		a) Gabion boxes	m³	30			
		b) Reno mattresses	m³	25			
B4.1.2		Extra-over items B4.1.1 for excavation in:					
B4.1.2.1		hard material	m³	15			
B4.2		GABIONS					
B4.2.1	8.2.1	Surface preparation for bedding of gabions	m²	150			
B4.3	8.2.2	Construct gabions using PVC coated galvanised wire mesh					
		a) Toe mattresses of depth 0,25 m with diaphragms providing 2 m x 1 m cells	m³	20			
		b) Foundation mattresses of depth 0,3 m with diaphragms providing 2 m x 1 m cells	m³	10			
		c) Gabions of section 1,0 m x 1,0 m for walls	m³	20			
B4.4	8.2.3	Extra-over item B4.3 for selected stone on exposed faces	m²	100			
B4.5	8.2.4 PSDK 3.1.4	Geotextile (non-woven needle punched, 340 g/m²) placed where ground water seepage occurs					
		a) below foundation mattresses	m²	30			
		b) on slope behind wall	m²	50			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
B: STORMWATER

SUMMARY OF SECTIONS

SECTION	DESCRIPTION	AMOUNT (RAND)
B1	PIPE TRENCHES	.....
B2	BEDDING	.....
B3	STORMWATER DRAINAGE	.....
B4	GABIONS AND PITCHING	.....
Total Carried Forward To Summary Of Schedules		

PART B - ROADS AND INFRASTRUCTURE
C: WATERMAINS

1: PIPE TRENCHES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 DB	SECTION 1: PIPE TRENCHES					
C1.1		EXCAVATION					
C1.1.1	8.3.2(a) PSDB 3.1 PSDB 5.4 PSDB 8.3.2	Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for pipes:					
C1.1.1.1		up to 150 mm diam. for total trench depth:					
		Exceeding 0,0 m but not exceeding 1,0 m	m	40			
		Exceeding 1,0 m but not exceeding 2,0 m	m	170			
C1.1.2	8.3.2(b)	Extra-over items C1.1.1.1 for (prov):					
C1.1.2.1	PSDB 3.1	Hard rock excavation	m³	5			
C1.1.3	8.3.2(c)	Excavate and dispose of unsuitable material from trench bottom (Provisional)	m³	5			
C1.2		EXCAVATION. ANCILLARIES Make up deficiency in backfill material (Provisional)					
C1.2.1	8.3.3.1(a	from other necessary excavations on site	m³	10			
C1.3	8.3.4(a)	Shore trench					
C1.3.1	PSDB 5.1.5	For trench deeper than 1.5m up to 3.0m	m	180			
C1.4		EXISTING SERVICES					
C1.4.1		Location					
C1.4.1.1		Excavate by hand in soft material to expose services	m³	5			
C1.4.2		Dealing with services					
C1.4.2.1	8.3.5(a)	Services that intersect a trench					
		a) Cables	No.	2			
		b) Pipes up to 600 mm diam.	No.	2			
C1.4.2.2	8.3.5(b)	Services that adjoin a trench					
		a) Cables	m	20			
		b) Pipes up to 600 mm diam.	m	10			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
C: WATERMAINS

2: BEDDING (PIPES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 LB	SECTION 2: BEDDING					
C2.1		PROVISION OF BEDDING					
C2.1.1		Imported from					
	8.2.2.1	a) Other necessary excavations or stockpile					
		2) Selected fill blanket	m³	10			
	8.2.2.3	c) Commercial sources (Provisional)					
		1) Selected granular material (sand)	m³	40			
		2) Selected fill material	m³	30			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
C: WATERMAINS

3: MEDIUM-PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		SECTION 3: WATER MAINS					
C3.1	SANS 1200 L	PIPELINE					
C3.1.1	8.2.1 PSDB 3.1 PSBD 5.4 PSBD 8.3.2	uPVC pipes Class 12: Supply, handle, lay, and bed with Flexible Pipe Bedding, Joint with spigot and socket couplings, test, and disinfect (potable water pipeline)					
		a) 75mm diam.	m	20			
C3.1.2	8.2.1	HDPE pipes Class PN 12 (PE80): Supply, handle, lay in Flexible Pipe Bedding, joint with compression type couplings, test, and disinfect (potable water pipelines)					
		a) 50mm diam.	m	200			
C3.2	1200 L 8.2.5	SUPPLY AND FIT, INCL. BED, TEST AND DISINFECT (if for potable water) PIPES, VALVES, AND SPECIALS: (Short pipe runs)					
C3.2.1	SANS 1200 L	SPECIALS AND FITTINGS					
C3.2.1.1	8.2.2	Supply, lay, and bed, joint, incl cut pipes to length where required, test and disinfect: Extra-over items for pipe laying					
C3.2.1.1.1		Bends uPVC Class 12 Plain-ended incl couplings					
		a) 75mm diam. 11.25 deg.	No.	1			
		b) 75mm diam. 22.5 deg.	No.	1			
		c) 75mm diam. 45 deg.	No.	1			
		d) 75mm diam. 90 deg.	No.	2			
C3.2.1.1.2		Bends HDPE Class 12 Plain-ended incl couplings					
		a) 50mm diam. 45 deg.	No.	2			
		a) 50mm diam. 90 deg.	No.	2			
C3.2.1.1.3		Bends hot dipped galvanised steel flanged					
		a) 75mm diam. 90 deg.	No.	1			
C3.2.1.1.4		Couplings (plain / flanged)					
		a) 75mm uPVC plain to 50mm HDPE plain	No.	1			
C3.2.1.1.5		End caps					
		b) HDPE 50mm dia.	No.	1			
Total Carried Forward							

PART B - ROADS AND INFRASTRUCTURE
C: WATERMAINS

3: MEDIUM-PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
C3.2.1.2	8.2.3	VALVES Supply, in valve box or install on concrete support, joint, incl cut pipes where necessary, test, hand closing, (non-) rising spindle.					
C3.2.1.2.1		Flanged Isolating Valve including flange adapters					
		a) 50mm diam. on HDPE pipe	No.	1			
		b) 75mm diam. on uPVC pipe	No.	1			
C3.2.1.2.4		Flanged air release valves including flange adapters					
		a) 75mm diam.	No.	2			
C3.3		ANCILLARIES					
C3.3.1	8.2.11	Anchor/Thrust blocks and pedestals					
C3.3.1.1		Type A to standard detail					
		a) Concrete Class 20/20 including formwork	m^3	2			
C3.4	8.2.13	VALVE CHAMBERS AND MANHOLES:					
		Marker posts	No.	5			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
C: WATERMAINS

SUMMARY OF SECTIONS

SECTION		DESCRIPTION	AMOUNT (RAND)
C1	PIPE TRENCHES		.....
C2	BEDDING		.....
C3	WATER MAINS		.....
Total Carried Forward To Summary Of Schedules			

PART B - ROADS AND INFRASTRUCTURE
D: LEACHATE RISING MAIN

1: PIPE TRENCHES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 DB	SECTION 1: PIPE TRENCHES					
D1.1		EXCAVATION					
D1.1.1	8.3.2(a) PSDB 3.1 PSDB 5.4 PSDB 8.3.2	Excavate in all materials for trenches backfill, compact, and dispose of surplus/unsuitable material, for pipes:					
D1.1.1.1		up to 150 mm diam. for total trench depth:					
		Exceeding 0,0 m but not exceeding 1,0 m	m	200			
		Exceeding 1,0 m but not exceeding 2,0 m	m	1 100			
D1.1.2	8.3.2(b)	Extra-over items D1.1.1.1 for (prov):					
D1.1.2.1	PSDB 3.1	Hard rock excavation	m³	45			
D1.1.3	8.3.2(c)	Excavate and dispose of unsuitable material from trench bottom (Provisional)	m³	45			
D1.2		EXCAVATION. ANCILLARIES Make up deficiency in backfill material (Provisional)					
D1.2.1	8.3.3.1(a	from other necessary excavations on site	m³	60			
D1.2.2	8.3.3.1(b	by importation from designated borrow pits	m³	30			
D1.2.3	8.3.3.1(c	by importation from commercial or off-site sources selected by the Contractor	m³	30			
D1.3	8.3.4(a)	Shore trench					
D1.3.1	PSDB 5.1.5	For trench deeper than 1.5m up to 3.0m	m	440			
D1.4		EXISTING SERVICES					
D1.4.1		Location					
D1.4.1.1		Excavate by hand in soft material to expose services	m³	10			
D1.4.2		Dealing with services					
D1.4.2.1	8.3.5(a)	Services that intersect a trench					
		a) Cables	No.	2			
		b) Pipes up to 600 mm diam.	No.	2			
D1.4.2.2	8.3.5(b)	Services that adjoin a trench					
		a) Cables	m	20			
		b) Pipes up to 600 mm diam.	m	50			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
D: LEACHATE RISING MAIN

2: BEDDING (PIPES)

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
	SANS 1200 LB	SECTION 2: BEDDING					
D2.1		PROVISION OF BEDDING					
D2.1.1		Imported from					
	8.2.2.1	a) Other necessary excavations or stockpile					
		2) Selected fill blanket	m³	40			
	8.2.2.3	c) Commercial sources (Provisional)					
		1) Selected granular material (sand)	m³	280			
		2) Selected fill material	m³	150			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
D: LEACHATE RISING MAIN

3: MEDIUM-PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		SECTION 3: WATER MAINS					
D3.1	SANS 1200 L	PIPELINE					
D3.1.1	8.2.1	HDPE pipes Class PN 25 (PE100): Supply, handle, lay in Flexible Pipe Bedding, joint with compression type couplings, test, and disinfect (potable water pipelines)					
		a) 110mm diam.	m	1 300			
D3.1.2	8.2.1 PSDB 3.1 PSBD 5.4 PSBD 8.3.2	Hot dipped Galvanised Pipes with bolted flanges: Supply, handle, lay,join, test, and disinfect (potable water pipeline)					
		b) 110mm diam.	m	20			
D3.2		Extra-over item D3.1 for laying pipes through sleeve pipes					
		b) 110mm diam.	m	300			
D3.3	1200 L 8.2.5	SUPPLY AND FIT, INCL. BED, TEST AND DISINFECT (if for potable water) PIPES, VALVES, AND SPECIALS: (Short pipe runs)					
D3.3.1	SANS 1200 L	SPECIALS AND FITTINGS					
D3.3.1.1	8.2.2	Supply, lay, and bed, joint, incl cut pipes to length where required, test and disinfect: Extra-over items for pipe laying					
D3.3.1.1.1		Bends HDPE PN 25 Plain-ended incl. couplings					
		e) 110mm diam. 11.25 deg.	No.	34			
		f) 110mm diam. 22.5 deg.	No.	10			
		g) 110mm diam. 45 deg.	No.	2			
		h) 110mm diam. 90 deg.	No.	5			
D3.3.1.1.2		Bends stainless steel flanged					
		b) 110mm diam. 11.25 deg.	No.	10			
		c) 110mm diam. 22.5 deg.	No.	10			
		d) 110mm diam. 45 deg.	No.	10			
		e) 110mm diam. 90 deg.	No.	10			
D3.3.1.1.3		Couplings (plain / flanged)					
		c) 110mm HDPE plain to 110mm Stainless Steel flanged	No.	10			
Total Carried Forward							

PART B - ROADS AND INFRASTRUCTURE
D: LEACHATE RISING MAIN

3: MEDIUM-PRESSURE PIPELINES

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
Brought Forward							
D3.3.1.1.4		Couplings (flanged)					
		a) 100mm uPVC to 75mm Stainless Steel	No.	1			
D3.3.1.2	8.2.3	VALVES					
D3.3.1.2.1		Supply and install stainless steel flanged isolating valves (hand closing, non-rising spindle) including pre-cast concrete spacer ring chamber, concrete work irrespective of class, as per typical details, including cutting of pipes where necessary & testing.					
		d) 110mm diam.	No.	2			
D3.3.1.2.2		Supply and install stainless steel flanged non-return valves including valve chamber with heavy-duty cast iron lid, concrete work irrespective of class, as per typical details, including cutting of pipes where necessary, flange adapters & testing.					
		b) 110mm diam.	No.	2			
D3.3.1.2.3		Supply and install stainless steel flanged air-release valves including valve chamber with heavy-duty cast iron lid, concrete work irrespective of class, as per typical details, including cutting of pipes where necessary, flange adapters & testing.					
		b) 110mm diam.	No.	5			
D3.3.1.2.4		Supply and install stainless steel flanged scour valves including valve chamber with heavy-duty cast iron lid, concrete work irrespective of class, as per typical details, including cutting of pipes where necessary, flange adapters, outlet pipe & testing.					
		b) 110mm diam.	No.	2			
D3.46		ANCILLARIES					
D3.4.1	8.2.11	Anchor/Thrust blocks and pedestals					
D3.4.1.1		Type A to standard detail					
		a) Concrete Class 20/20 including formwork	m^3	20			
D3.5	8.2.12	Concrete casing	m^3	100			
D3.6	8.2.13	VALVE CHAMBERS AND MANHOLES:					
D3.6.1		Marker posts	No.	75			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
D: LEACHATE RISING MAIN

4 PUMP STATION

ITEM NO	PAYMENT	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	
						R	c
		SECTION 4: PUMP STATION					
D4.1		PROVISIONAL SUMS					
D4.1.1		Pump Station including pumps and housing	PSum	1		2 500 000	00
D4.1.2		Contractor's overheads, charges and profit on items D4.1.1 above	%	2 500 000			
D4.1.3		Goose Neck Outlet (Platform 2)	PSum	1		150 000	00
D4.1.4		Contractor's overheads, charges and profit on items D4.1.3 above	%	150 000			
D4.1.5		Electrical works at pumpstation including telemetry	PSum	1		1 500 000	00
D4.1.6		Contractor's overheads, charges and profit on items D4.1.4 above	%	1 500 000			
D4.1.7		Electrical Supply to Pump Station including transformer (11KV)	PSum	1		3 000 000	00
D4.1.8		Contractor's overheads, charges and profit on items D4.1.5 above	%	3 000 000			
Total Carried Forward To Summary							

PART B - ROADS AND INFRASTRUCTURE
D: LEACHATE RISING MAIN

SUMMARY OF SECTIONS

SECTION		DESCRIPTION	AMOUNT (RAND)
D1	PIPE TRENCHES		.....
D2	BEDDING		.....
D3	WATER MAINS		.....
D4	PUMP STATION		.....
Total Carried Forward To Summary Of Schedules			

PART B - ROADS AND INFRASTRUCTURE

SUMMARY OF SCHEDULES

SCHEDULE		DESCRIPTION	AMOUNT (RAND)
A	A: ROADS AND EARTHWORKS		.....
B	B: STORMWATER		.....
C	C: WATERMAINS		.....
D	D: LEACHATE RISING MAIN		.....
Total Carried Forward To FINAL SUMMARY (SUB TOTAL 2)			

Contract No.: 23115-6W

Contract Title: WWMF Contract B - Landfill Cell 1, Lined Dams and Platforms Construction

FINAL SUMMARY OF SCHEDULE OF QUANTITIES - PART A AND PART B

PART	DESCRIPTION	AMOUNT
A	SUB TOTAL 1 (PART A)	R _____
B	SUB TOTAL 2 (PART B)	R _____
	SUB TOTAL 3 (SUM OF PART A AND PART B ABOVE)	**R** _____
	VALUE ADDED TAX The Tenderer shall add **15%** of Sub Total 3 for VAT	R _____
	GRAND TOTAL CARRIED TO FORM OF OFFER AND ACCEPTANCE	**R** _____

PART C3: SCOPE OF WORK

PART A

LANDFILL CELL, LEACHATE DAM AND CONTAMINATED STORMWATER DAMS (CSWDs) WORKS

C3.1: PROJECT DESCRIPTION AND SCOPE OF CONTRACT

C3.1.1 Description of Works

The Contract is for the construction of a new landfill cell, Cell 1, a Leachate Dam, Contaminated Stormwater Dams, and ancillary works for the Western Waste Management Facility (WWMF). The main parts of the envisaged work include:

a) careful relocation of identified indigenous plants from the area of the works, clearing of other vegetation and the removal of trees

b) stripping of topsoil to stockpile for re-use.

c) bulk earthworks in materials ranging from soft clayey soils to soft rock in order to prepare for the new cell, the leachate dam, the contaminated stormwater dams and other works including, but not limited to, gravel roads, drains and pipelines.

d) base preparation layers, GCL and geomembrane liners and geogrid for Cell 1, the Leachate Dam and the Contaminated Stormwater Dams.

e) construction of liner protection layers, generally stabilised sand then the crushed rock aggregate leachate drainage layers for Cell 1, geotextiles and appurtenant works together with the pipework for the leachate detection and under drainage layers for Cell 1, the Leachate Dam and the Contaminated Stormwater Dams.

f) construction of sundry subsoil drains, blanket drains and pipework as may be needed.

g) construction of concrete vee and trapezoidal drains as well as ancillary brickwork structures.

h) construction of leachate, stormwater and monitoring manholes (including pipework and valves) and other structures.

i) stormwater drainage (piping headwalls and manholes).

j) gabions and protection work including diversion drains and berms.

k) ancillary works including fencing, environmental monitoring boreholes and probes and temperature monitoring systems.

C3.1.2 Description of Site and Access

The proposed WWMF is located in KwaZulu Natal Province, approximately 35 km from the Durban City Centre, roughly between KwaNdengezi and Summerveld, and west of the Mariannhill toll plaza.

The site is bounded by the main Durban Johannesburg railway line to the north, secondary provincial roads to the west (MR461) and east (MR518) and undeveloped steeply incised valleys to the south. The existing Enviroserve Shongweni Hazardous Waste Landfill forms part of the northern boundary.

The site comprises a bowl-shaped valley on the stream, with steep slopes along the western, northern and eastern boundaries. The landfill footprint is approximately 176 hA and the total WWMF area, including buffer areas, is 550 hA.

The main Shongweni River bisects the site from the north flowing to the south east. The portion of the site west of the stream is moderately steep and comprises a number of east flowing non perennial tributaries, while the portion of site east of the stream is steep and comprises short west flowing non perennial tributaries.

A locality plan is included in Section C4.1.

C3.1.3 Nature of Ground and Subsoil Conditions

An initial Geotechnical and Hydrogeological study was conducted by Geomeasure Services in 2001.

The landfill footprint is directly underlain by decomposed granite, which is weathered to a depth varying from 2m to 17m, with an average depth of rippable material exceeding 6m.

This material is considered suitable for cover as well as road layers up to sub-base, but is not suitable for impervious lining or drainage layers.

The western plateau above the landfill site is underlain by Natal formation sandstones. This area will not be used for landfill but will underlie the entrance infrastructure and access road.

Twelve TP's were initially excavated on site, in order to be profiled and sampled for a better understanding the general engineering properties of the subsurface soil / rock conditions in view of the proposed landfill site.

The results of the test pits indicated refusal depths ranging between 0.8 and 2.1 m below existing ground level, with an average depth of 1.64 m.

A further detailed geotechnical investigation of the area of the initial development was undertaken by Geosure (Pty) Ltd in February 2023 (*A copy of this report is available upon request*).

Details of the geology are described in detail in the reporting but summarised below for completeness.

Inferred Local Geology – Proposed Landfill Area

At the positions investigated, the geological units observed are listed below in stratigraphic order (from youngest to oldest):

i. Uncontrolled Fill (includes particle contaminants).

ii. Colluvium (fine hillwash).

iii. Talus (gravity deposits).

iv. Residual siltstone (fully decomposed former siltstone rock).

v. Residual sandstone (fully decomposed former sandstone rock).

vi. Residual granite (fully decomposed former granite rock).

vii. Weathered Siltstone Rock. Natal Group.

viii. Weathered Sandstone Rock. Natal Group.

ix. Weathered Granoite Rock. Natal Structural and Metamorphic Province.

It was confirmed that no suitable material was available on site to be used as a compacted clay liner, therefore a geosynthetic clay liner (GCL) will be utilised in the containment barrier.

In addition, no indication of dolerite intrusion or notable faulting was observed as underlying the landfill area to date.

In the valley lines the soils may be soft and wet with groundwater being encountered. Temporary and permanent subsoil drainage is required in these areas.

C3.2: PROJECT SPECIFICATION

PREAMBLE

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

C3.2.1 GENERAL

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

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

PS.1.1 Preliminary Programme

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

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

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

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

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

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

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

a) The time required to comply with the requirements to subcontract 30% of the work to local CPG subcontractors.

b) Adherence to the safety aspects of working on a landfill site.

c) Vehicular access within the landfill needs to be maintained and this may require traffic controls, deviations and the planning of the works, particularly the roadworks and concrete drain repairs.

d) Traffic restrictions. There are no specific traffic restrictions other than noting that access for vehicles for construction and other tasks will be utilising the roads and other areas within the site

e) Subsoil drainage will need to be installed in the valley lines prior to earthworks and liner layerworks being undertaken

f) It may be expected that the earthworks will be in clay soil that may be of less than G10 quality following TRH 14 and require experience to achieve the compaction levels specified.

g) Some of the work involves operations on slopes of up to 1v in 3h (although generally 1v : 5h) and with slope distances of up to some 100m.

h) To protect the GCL and the geomembrane and the protective layer must be placed daily over the section of GCL and geomembrane laid that day.

i) Work on the layers above the liner elements is to be undertaken using light equipment and must follow procedures which must satisfy the Engineer that they will not damage the liner.

j) The Tenderer must make themselves familiar with the procedures and methods required to construct and/or lay the GCL and HDPE liners. Factors that must be considered are:

   (1) rain
   (2) wind
   (3) temperature

k) For stability it is necessary that the construction of the liner layers must extend upwards from the basal area.

l) Stormwater drainage must be carefully controlled during the construction phase. Runoff must be directed away from the area of the works and the liner anchor trenches must be free draining at all times.

m) There will be other traffic close to the works, and the Contractor's work will need to be programmed to interface with these operations.

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

PS.1.3 Requirements for Accommodation of Traffic

PS.1.3.1 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.

Clause 4.10.4 of SANS 1921-2: 2004 shall be replaced with the following:

"Road signs and markings shall comply with the requirements of the "SADC Road Traffic Signs Manual - Volume 2: Roadworks Signing".

PS.1.3.2 Basic Requirements

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

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

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

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

The Contractor shall construct and maintain all temporary drainage works necessary for temporary deviations. The Contractor shall ensure that the existing property accesses are maintained at all times. Where necessary the Contractor shall make allowance in the rates for completing the work required to the accesses out of normal hours.

PS.1.3.3 Traffic Safety Officer

Where warranted by traffic conditions on or near the site, the Contractor shall nominate a suitable member of his staff as traffic safety officer to be responsible for the arrangement and maintenance of all the measures for the accommodation of traffic for the duration of the project. Duties of the traffic safety officer shall be in compliance with the Occupational Health and Safety Act 1993 and the Construction Regulations 2014.

PS.1.3.4 Payment

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

PS.1.3.5 Pedestrian Movement

The Contractor shall make provision for accommodating all required pedestrian movements in the area of the works. Allowance shall be made in the relevant rates for any barricades and signs required.

PS.1.3.6 Temporary Reinstatement

Provided always that if in the course or for the purpose of the execution of the works or any part thereof any road or way shall have been broken up, then notwithstanding anything herein contained:

(a) if the permanent reinstatement of such road or way is to be carried out by the appropriate authority or by some person other than the contractor (or any subcontractor to him), the contractor shall at his own cost and independently of any requirement of or notice from the Engineer be responsible for the making good of any subsidence or shrinkage or other defect, imperfection or fault in the temporary reinstatement of such road or way, and for the execution of any necessary repair or amendment thereof from whatever cause the necessity arises, until the end of the period of maintenance in respect of works beneath such road or way until the authority or other person as aforesaid shall have taken possession of the site for the purpose of carrying out permanent reinstatement (whichever is the earlier), and shall indemnify and save harmless that Council against and from any damage or injury to the Council or to third parties arising out of or in consequence of any neglect or failure of the Contractor to comply with the foregoing obligations or any of them and against and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

(b) where the authority or person as aforesaid shall take possession of the site as aforesaid in sections or lengths, the responsibility of the contractor under paragraph (a) of this sub-clause shall cease in regard to any such section or length at the time possession thereof is so taken, but shall during the continuance of the said period of maintenance continue in regard to any length of which possession has not been taken and the indemnity given by the contractor under the said paragraph shall be construed and have effect accordingly.

PS.2 SERVICES

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

pS.2.1 Existing Services

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

The following services are known to exist:

- 132 kV and 275kV overhead electricity transmission lines and towers operated by Eskom and eThekwini Electricity;
- electrical, water and sewer services into and surrounding the administration offices, workshop and weighbridges;
- electrical cable and water piping.

PS.2.2 Proving Underground Services

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

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

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

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

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

Should any service be damaged by the Contractor in carrying out the works and should it be found that the procedure as laid down in this clause has not been followed then all costs in connection with the repair of the service will be to the Contractor's account.

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

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

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

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

PS.2.3 New Services and Relocation of Existing

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

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

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

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

Services that may be affected by the contract are described as follows:

- PS.3: Watermains;
- PS.4: Sewers;
- PS.5: Stormwater;
- PS.6: Electrical Cables / Lighting;
- PS.7: Telkom / Neotel;
- PS.8: CCTV;

Further to the above, tenderers are referred to the services drawing and are to note that several minor cables / pipes may be encountered during excavation works which may require to be relocated to some extent. It is anticipated that the two week period required under PS.2.2 will allow sufficient time for these relocations.

PS.2.4 Accommodation of Services

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

PS.3 WATERMAINS

PS.3.1 General

No water mains are required to be installed as part of this contract.

PS.3.2 Water Main Valve Access

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

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

PS.3.3 Restriction on Compactive Equipment

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

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

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

PS.4 SEWERS

No domestic sewer reticulation is envisaged as part of this contract.

PS.4.1 Blockage of Foul Water Sewers

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

PS.5 STORMWATER

Stormwater piping and drains are to be built as part of the works. Some areas may have limited access.

PS.5.1 Blockage Stormwater Sewers

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

PS.6 ELECTRICAL PLANT

Limited electrical plant (leachate pumps) is required to be installed as part of this Part A contract.

PS.6.1 General

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

PS.6.2 Street Lighting

The existing lighting will be removed in stages and replaced in the centre median / intersection corners. Relocation will take place during this contract and be executed by eThekwini Electricity or their agents. It is a requirement that the street lighting be operational at all times.

PS.6.3 MV / LV Cables

Certain MV / LV cables are to be replaced within the contract area. The actual cable work associated with this relocation and / or replacement of these cables will be carried out by eThekwini Electricity and it is stressed that the two week period referred to in Clause PS.2 is the minimum period required to enable eThekwini Electricity to be on site timeously.

PS.6.4 Relocation of Existing Services

Should it be necessary to adjust the line, level and / or position of any service not catered for in the contract to enable the construction to proceed the Contractor shall on no account effect such adjustment himself but shall notify the Engineer who will arrange for the work to be carried out at no cost to the Contractor.

PS.7 TELKOM S.A. LIMITED / NEOTEL PLANT

No work to Telkom / Neotel Plant is envisaged.

PS.8 CCTV PLANT

No work to CCTV Plant is envisaged.

PS.9 MANAGEMENT OF THE ENVIRONMENT

The Contractor shall pay special attention to the following:

PS.9.1 Natural Vegetation

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

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

PS.9.2 Fires

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

PS.9.3 Environmental Management Plan

In addition to the above, all requirements according to the Environmental Management Plan as detailed in C3.4: Particular Specifications, will be adhered to.

PS.10 OCCUPATIONAL HEALTH AND SAFETY

PS.10.1 General Statement

When considering the safety on site the Contractor's attention is drawn to the following:

GENERAL HEALTH AND SAFETY

In addition to the statutory requirements of the Occupational Health and Safety Act it should be noted (where applicable) that :

The Contractors attention is drawn to the flammable, explosive and asphyxiative nature of landfill gas resulting from the de-composition of waste. Landfill gas can migrate through ground and the Contractor shall take all necessary precautions to ensure the safety of his/her personnel and all third parties from the dangers of landfill gas. Landfill gas is particularly dangerous in enclosed spaces (manholes etc.) The Contractor's personnel shall not enter the operational areas and contact with refuse and leachate should be kept to a minimum. No scavenging of refuse is allowed. Workmen are to be provided with the appropriate safety clothing and equipment.

In the vicinity of the landfill body, and in particular, within any excavations, flammable and poisonous "landfill gas" may be present. The flammable constituent of the gas is methane. Special care and precautions must be taken where men may work with their heads below the general surface and in excavation.

The lighting of fires is strictly prohibited, due to the possible presence of landfill gas, and smoking on site will also be prohibited. The use of naked flames must only take place under safe conditions. Smoking shall only be allowed in designated safe areas.

The Contractor's attention is also drawn to the possible hazards to health of waste and contaminated water, and adequate health and safety precautions shall be taken.

The Contractor shall make all Sub-Contractors, visitors, third parties and agents aware of the hazards of landfill gas on the site, and shall ensure that they take the necessary precautions.

The Contractor shall take adequate Health and Safety precautions when working in and adjacent to waste. The wastes placed in the in-filled areas are reported to have been predominantly municipal wastes (domestic, commercial, industrial and inert). However, the Contractor should also make provision for the fact that any landfill may contain small quantities of hazardous substances other than those permitted under a site licence. No guarantee can be given that small quantities of other substances, including hazardous industrial waste, have not been concealed within other wastes and disposed without knowledge of the site operator.

Although the site is not currently operational, the Contractor is to be aware of the above.

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 Section 37(2) of the Occupational Health and Safety Act.

PS.10.2 Health and Safety Specifications and Plans to be submitted at tender stage

PS.10.2.1 Employer's Health and Safety Specification

The Employer's Health and Safety Specification is included in C3.4: Particular Specifications.

PS.10.2.2 Tenderer's Health and Safety Plan

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

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

The detailed safety plan will take into consideration the site specific risks as mentioned under PS.10.1 and must cover at least the following:

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

(ii) Pro-active identification of potential hazards and unsafe working conditions;

(iii) Provision of a safe working environment and equipment;

(iv) Statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (*Regulation 7)*;

(v) Monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;

(vi) Details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 8 and other applicable regulations; and

(vii) Details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014.

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

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

A generic plan will not be acceptable.

PS.10.3 Cost of compliance with the OHSA Construction Regulations

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

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

PS.11 SITE SECURITY

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

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

Payment for this item shall be made under Section 1, Part AB of the Bill of Quantities.

PS.12 PERFORMANCE MONITORING OF SERVICE PROVIDERS

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

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

The following KPIs will be applicable to this contract:

(a) The requirements of Clause 1.2.3.2 as regards to the employment of Local Labour.

(b) The requirements of Clause 1.2.3.3 as regards to the Contractor Participation Goals.

C3.3: STANDARD SPECIFICATIONS

C3.3.1 The Specifications on which this contract is based are the SANS / SABS 1200 Series Standard Engineering Specifications (hereafter referred to as the Standard Engineering Specifications). This document is obtainable separately, and Tenderers shall obtain their own copies of the applicable Sections.

SABS 1200 A	:	GENERAL
SABS 1200 AB	:	ENGINEER'S OFFICE
SABS 1200 C	:	SITE CLEARANCE
SABS 1200 D	:	EARTHWORKS
SABS 1200 DB	:	EARTHWORKS (PIPE TRENCHES)
SABS 1200 DM	:	EARTHWORKS (ROADS, SUBGRADE)
SABS 1200 DK	:	GABIONS AND PITCHING
SABS 1200 G	:	CONCRETE
SABS 1200 M	:	ROADS (GENERAL)
SABS 1200 L	:	MEDIUM-PRESSURE PIPELINES
SABS 1200 LB	:	BEDDING (PIPES)
SABS 1200 LD	:	SEWERS
SABS 1200 LE	:	STORMWATER DRAINAGE

C3.3.2 AMENDMENTS TO THE STANDARD SPECIFICATIONS

INTRODUCTION

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

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

The Specifications on which this contract is based are the SANS / SABS 1200 Series Standard Engineering Specifications (hereafter referred to as the Standard Engineering Specifications). This document is obtainable separately, and Tenderers shall obtain their own copies of the applicable Sections.

SABS 1200 A	:	GENERAL
SABS 1200 AB	:	ENGINEER'S OFFICE
SABS 1200 C	:	SITE CLEARANCE
SABS 1200 D	:	EARTHWORKS
SABS 1200 DB	:	EARTHWORKS (PIPE TRENCHES)
SABS 1200 DM	:	EARTHWORKS (ROADS, SUBGRADE)
SABS 1200 DK	:	GABIONS AND PITCHING
SABS 1200 G	:	CONCRETE
SABS 1200 GE	:	PRECAST CONCRETE
SABS 1200 M	:	ROADS (GENERAL)
SABS 1200 MF	:	BASE
SABS 1200 MH	:	ASPHALT BASE & SURFACING
SABS 1200 MK	:	KERBING AND CHANNELLING
SABS 1200 L	:	MEDIUM-PRESSURE PIPELINES
SABS 1200 LB	:	BEDDING (PIPES)
SABS 1200 LC	:	CABLE DUCTS
SABS 1200 LD	:	SEWERS
SABS 1200 LE	:	STORMWATER DRAINAGE

SABS 1200 A - 1986 : GENERAL

PSA 3 MATERIALS

PSA 3.1 Quality

All pipes, equipment and materials necessary for the Works should be provided with the SABS Mark of Approval where applicable. The Contractor shall furnish, at his own expense and without delay, such samples as are called for or may be called for by the Engineer, who may reject all materials or workmanship not corresponding with the approved sample.

Add the following new subclause:

PSA 3.3 Ordering of Materials

The quantities set out in the Schedule of Quantities have been carefully determined from calculations based on data available at the time and should therefore be considered to be only approximate quantities. The liability shall rest entirely and solely with the Contractor to determine before ordering, the required types and quantities of the various materials required for the completion of the Works in accordance with the Specifications and the Drawings issued to the Contractor for construction purposes.

Any reliance placed by the Contractor on the estimated quantities stated in the Schedule of Quantities issued for tendering purposes, or measurements made by the Contractor from the Drawings issued for tendering purposes, shall be entirely at the Contractor's risk and the Employer accepts no liability whatever in respect of materials ordered by the Contractor on the basis of Tender Documents.

PSA 4 PLANT

PSA 4.2 Contractor's Offices, Stores and Services

Add the following:

"No housing facilities are available for the Contractor's employees and the Contractor shall make his own arrangements to house his employees and to transport them to site.

Any temporary buildings erected by the Contractor or site offices, accommodation, stores, workshops and ablutions erected on the site must all be to size and at locations approved by the Employer.

The Contractor is responsible for all security of the Camp Site at his own cost".

PSA 5 CONSTRUCTION

PSA 5.1 Survey

PSA 5.1.1 Setting Out of the Works

The Contractor is responsible for placing and maintaining survey control pegs to be used in setting out the Works.

A full schedule of control beacons will be issued to the successful tenderer prior to the start of the Contract giving X, Y and Z co-ordinates. These control beacons are to be used by the Contractor for all survey requirements.

Add the following new Subsubclause:

PSA 5.1.3 As Built Data

The Tenderer shall note the Lump Sum item 1.36 covering the submission of as built data.

The Contractor shall supply the Engineer with:

a) Co-ordinates and final levels in 10m grid intervals of the new Cell 1, the Leachate Dam and the CSWDs, invert levels, top and bottom edges of the trapezoidal stormwater drain and berms levels, leachate detection/subsoil drain position and depths,

b) Access road surface levels,

c) Co-ordinates and final levels of the berms,

d) A list of surveyed invert and cover levels and co-ordinates of all drains, catchpits, downchutes, headwalls, cable duct markers and manholes constructed or modified during the course of the Contract, where applicable,

e) Subsoil drainage lines, water pipelines and leachate pipelines,

f) Security fence,

g) Environmental monitoring network,

h) Liner temperature monitoring systems

The Completion Certificate shall not be issued unless the above information has been forwarded to the Engineer.

PSA 5.2 Accommodation of Traffic

The Contractor shall strictly comply with the following specifications:

- The Contractors working hours are to be between 07:30 to 17:00 Monday to Friday, excluding public holidays.
- The Contractor shall erect adequate traffic signs that conform to the requirements of the S.A. Road Traffic Signs Manual, maintain and keep them in good order.

The Contractor shall take the necessary care at all times in all his operations and use of his equipment to protect the public and to facilitate the movement of traffic - Clause 5.1 SABS 1200D has reference.

PSA 5.4 Protection of Overhead and Underground Services

The Contractor is to ensure at the start of the Contract that all known services are checked to ascertain whether they interfere with construction of the Works. If obstructions are found, the Engineer is to be notified timeously in writing so that adequate steps can be taken to affect the relocation of the obstructions. No claims for delays will be entertained unless, in the opinion of the Engineer, the Contractor has taken reasonable steps timeously to have the obstruction relocated.

PSA 5.5 Dealing with Water

The Contractor shall be responsible for handling all surface and subsurface water in such a way that construction can proceed with a minimum of risk and at no time shall overland flows be blocked. To this end the Contractor shall divert flow around the working area(s) if necessary. The Contractor shall also take particular care to ensure the safety of the Works against damage by flooding.

The cost of supplying and operating the equipment for dewatering of all excavations and controlling of stormwater and subsurface water on the Works will be held to be included in the

Tender Sums in Section 1 of the Schedule of Quantities and no separate payment will be made for this work.

PSA 5.7 Safety

- ***Add the following:***

"The Contractor will refer to the relevant part under Particular Specifications, for the OHSA 1993 Safety Specification."

- ***and:***

"The Contractor shall provide security watchmen and all measures necessary to secure the works for the contract as he deems fit. The cost thereof will be deemed to be included in the relevant rates tendered. The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team.

- ***and:***

The WWMF is not an operational site, however LANDFILL GAS (containing methane) may be generated within the site and leachate collection system.

NAKED FLAMES AND SMOKING IS NOT PERMITTED anywhere on the Landfill Site and due care should be taken, in compliance with all the laws, when working on the Site.

DUE CARE AND DILIGENCE should also be exercised when work in carried out in the vicinity and/or adjacent to any previous disposal areas.

ALL LIQUIDS emanating from the landfill and surroundings are deemed to be DANGEROUS. Thus, no liquid may be collected or used for any purpose whatsoever.

For health and safety reasons, NO SCAVENGING of any materials deposited on the Landfill Site will be permitted. The Contractor is to ensure that all his workers as well as his Subcontractors comply with this requirement. **Failure to do so may be sufficient grounds to remove persons off site who are in contravention of any of the above.**

Add the following new Subsubclause:

PSA 5.9 Site Diary

A site diary in triplicate format, which shall be supplied by the Contractor must be filled in on a daily basis and submitted to the Engineer on a weekly basis. No claims will be considered without the site diary's schedules property completed (on a daily basis) and submitted.

PSA 6 TOLERANCES

PSA 6.1 Degrees of Accuracy

The Contractor shall construct each of the various parts of the Works to a degree II accuracy except where otherwise specified.

PSA 7 TESTING

Add the following new Subclause:

PSA 7.5 Acceptance Control Testing

A laboratory will not be required on site for the Engineer's use and all acceptance control testing shall be done through a commercial laboratory. The Contractor shall provide his own testing laboratory which shall be capable of carrying out all necessary testing for process control. The

Contractor's laboratory shall be subject to the Engineer's approval. The Engineer shall be given free access to the results of testing carried out by the laboratory.

The cost of acceptance control testing carried out by the Engineer will not be for the Contractor's account and will be paid for under the Prime Cost Sum allowed for the Schedule of Quantities, unless the tests reveal that the material is not in accordance with the Specifications. In which case, the costs of such test shall be borne by the Contractor. Acceptance control testing will only be carried out on the written instruction of the Engineer.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.1 Measurement

Add the following new Subsubclause:

PSA 8.1.3 Security

The Tenderer must make allowance for the provision of security for his personnel, plant and equipment on the site or work points at his own cost. The cost of security is deemed to be included in Section 1: Preliminary and General.

PSA 8.5 Sums stated Provisionally by the Engineer

Amend the penultimate sentence of Subclause 8.5 to read:

"The percentage rate shall cover the Contractor's overheads, charges and profit on the work covered by the sums provisionally stated. Payment will be made on the basis of the sums actually paid for such work".

PSA 8.5 a) Employment of a Community Liaison Officer and Social Facilitator

A Community Liaison Officer (CLO) and a Social Facilitator (SF) must be employed after consultation with the Employer and the Ward Councillor, by the Contractor, for the duration of the Contract as detailed in **C1.2.3 ADDITIONAL CONDITIONS OF CONTRACT**. The CLO and SF will be selected from within the local community. Remuneration of the CLO and SF will be determined by the Engineer after consultation with the Employer and this salary will be paid by the Contractor**.**

The CLO and SF will become the entire responsibility of the Contractor as part of his normal workforce. The CLO will be appointed immediately before work commences, while the SF will be appointed as and when required.

PSA 8.6 Prime Cost Items

Amend the penultimate sentence of Subclause 8.6 to read:

"The percentage rate shall cover the Contractor's overheads, charges and profit on the work covered by the sums provisionally stated. Payment will be made on the basis of the sums actually paid for such work".

PSA 8.7 Daywork

All daywork rates are inclusive of supervision and all overheads. Daywork rates will apply irrespective of the conditions contained in Clause 5.7 of the General Conditions of Contract.

PSA 8.8 Temporary Works

PSA 8.8.2 Accommodation of Traffic

The tendered rate shall include for traffic accommodation as described in PSA 5.2 of this Document.

Add the following new payment items:

PSA 8.9 As Built Drawings

The unit of measurement shall be the **Lump Sum** (Sum).

The tendered rate shall include for supplying the Engineer with "as built" surveys of the Works in marked up drawings, survey data in electronic format and schedules as described in PSA 5.1.3 of this Document. The survey is to include the X, Y and Z co-ordinates in an approved format.

PSA 8.10 Additional Employer's Obligations in Respect of the OHS Act

The unit of measurement shall be the **Lump Sum** (Sum).

The lump sum provided will be for any additional Employer's obligations in respect of the OHS Act. This lump sum is for the sole use by the Employer and only upon written instruction from the Engineer. A Contractor's mark-up is applicable to this item however, the Employer has the right to negotiate the Contractor's mark-up.

SABS 1200 AB - 1986 : ENGINEER'S OFFICE

PSAB 3 MATERIALS

PSAB 3.1 Nameboards

Add the following:

One Employer's nameboards shall be erected within one month of the commencement of construction and shall be placed where ordered by the Engineer. Any damage to this board shall be repaired within 14 days of a written instruction received from the Engineer. For details of the board refer to the Standard Drawings contained in this document.

Erection of One Contractor's nameboards that comply with the drawing(s) provided are required in the area of the Works, at a position approved by the Engineer, who may at any time order their removal if any objections are received.

The board shall be manufactured from materials specified in Clause 3.1 of SANS 1200 AB but shall conform in the painting, decorating and detail with the recommendations to the drawing attached.

All nameboards shall be removed 14 days prior to the date of the Final Approval Certificate.

PSAB 3.2 Office Building(s)

Replace the contents of this clause with the following: -

The Contractor shall supply, maintain and service one office of 9m^2 minimum floor space and a ceiling height of 2.5m with lighting for the sole use of the Engineer.

The furniture stated SABS 1200 AB-1986 clause 3.2, (a.... j) shall be replaced by the following items to be provided in the site office:

(a) One desk 1.5m long x 0.9m wide with four (4) drawers (one lockable).

(b) One trestle table, 2.0m long x 1.0m wide x 0.9m high, with a smooth top.

(c) One Office swivel chair, two visitors' chairs.

(d) An acceptable blind to each window.

(e) A pin board, 1.5m long x 1.2m high for displaying plans and diagrams.

(f) A whiteboard of 2m^2 size with 3 coloured markers and duster

(g) Acceptable lighting

(h) Provision of two 15-amp volt plug points with power supply

(i) An air conditioner in proper working order.

(j) One A3 colour printer.

(k) One small electric refrigerator.

(l) An acceptable blind on each window.

(m) a fire extinguisher which shall be properly maintained by the Contractor

The Contractor sum shall also include for a basin with running water, a lockable toilet for the exclusive use by the Engineer and Employer and 2 No. covered parking bays that shall be erected for the sole use by the Engineer, Employer and his staff.

The Contractor shall also supply, maintain and service a boardroom for 24m^2 minimum floor area able to seat 10 people for joint use by him and the Engineer. This room shall be equipped with adequate lighting, two power points, chairs, tables, a 2m^2 whiteboard, a 2.5m^2 pin board with stationary and an air-conditioner in proper working order.

The Contractor will be required to provide for daily cleaning of the Engineer's office, boardroom and toilets. Payment for the cleaning of the offices will be deemed to be included in the Tenderer's General rates.

PSAB 4 PLANT

PSAB 4.1 Telephone

Replace clause 4.1 with the following:-

The Contractor will be required to supply the Resident Engineer with a reliable internet, Wi-Fi or 3G / LTE for the duration of the Contract. The Contractor shall be responsible for the cost of all calls, installation, rental, supplies, maintenance, etc.

The Contractor will not be required to supply the Engineer with any mobile device / phone, but the Contractor will be required to pay for all calls made from his phone pertaining this Project up to a maximum amount of R1000.00 per month as soon as the contract has commenced.

PSAB 5 CONSTRUCTION

Add the following clauses:

PSAB 5.5 SURVEY EQUIPMENT

The Contractor shall upon request provide the following survey equipment on the Site from commencement to the completion of the Works.

(a) 1 upright reading automatic level with tripod;

(b) 1 metric levelling staff with protective cover bag;

(c) ranging rods;

(d) 1 x 100 metre Stilton tape measure and measuring wheel;

(e) Wooden and steel pegs and hammers as required.

The equipment shall be provided for the exclusive use of the Engineer. The Contractor shall keep the equipment continuously insured against any loss, damage or breakage, and he shall indemnify the Engineer and the Employer against any claims in this regard. The Contractor shall also maintain the equipment in good working order throughout the Contract period.

The following additional equipment/services may be required from time to time by the Engineer and shall be supplied by the Contractor when required. The equipment/service may be shared with the Engineer.

(f) Two chainmen to assist with levelling and surveying.

(g) Spray paint (selected colour)

PSAB 5.6 Site Instruction books

The Contractor shall supply a triplicate book for site correspondence and inspection requests to the Engineer. Reasonable notice shall be allowed prior to inspections. All inspections requests

and approval/disapproval thereof shall be recorded by the Site staff in writing. All requests must be signed and dated by the Engineer before implementation.

The Contractor must ensure that a suitable site quality record system is put in place subject to approval by the Engineer to record that each section, or work item, complies with the relative works specification. Failure to update or provide sufficient records may result of a 10% interim payment reduction being withheld.

PSAB 8 MEASUREMENT AND PAYMENT

PSAB 8.2 Payment

Add the following payment clauses:

PSAB 8.2.1 Fixed and Time Related Charges

PSAB 8.2.2 Telephone

The unit of measurement shall be the Prime Cost Sum (PC Sum).

The Engineer shall reconcile the service provider's account each month for telephone / mobile calls made pertaining the Project and the Contractor shall reimburse the service provider directly within 7 days of receipt of the account.

PSAB 8.2.3 Survey Equipment

Payment for compliance with Clause PSAB 5.6 on the following basis:

Payment will be made for the supply of the equipment specified in clause PSAB 5.5 under the fixed P&G rate on verification by the Engineer that the equipment specified is on site. Should any of this equipment be removed from site during the course of the contract then any payments made for the supply of this equipment will be reversed out of the next interim certificate.

Payment will be made for the maintaining the above equipment in a suitable condition under the time related P&G rate.

SABS 1200C - 1980 : SITE CLEARANCE

PSC 1 SCOPE

The area provisionally included for site clearance on Cell 1, the Leachate Dam and the Contaminated Stormwater Dams is partially vegetated and may include bushes, grassland, stockpiles of natural materials, trees and boulders.

PSC 3 MATERIALS

PSC 3.1 Disposal of Materials

Add the following:

Unless otherwise ordered by the Engineer, the Contractor shall dispose of material resulting from clearing and demolition operations at a site to be determined by the Contractor. Such a site shall have the approval of the Engineer. Payment for the clearing, loading, transport, dumping fees and any other requirement or costs incurred shall be included in the rate submitted. Material shall be tipped in an organised manner and worked off to the satisfaction of the Engineer.

PSC 5 CONSTRUCTION

PSC 5.6 Conservation of topsoil

Add the following:

The topsoil up to a depth of 150 mm, if available and approved by the Engineer, shall be removed in one operation and shall be paid for under Section 3 of the Schedule of quantities, from the above specified cleared areas and stockpiled in a single stockpile not higher than 2m on approved sites for later reuse. Until required for reuse the stockpile of topsoil material shall be managed so that it is not lost through weather elements and shall be stabilized by watering or other approved means to limit dust pollution.

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.1 Basic Principles

All items shall include for removing of cleared material to a designated stockpile or spoil site within the landfill site at a location approved by the Engineer. Should the Contractor wish to use any other area for the disposal of soil, rubble, vegetation etc., its use shall be subject to the approval of the Engineer and Landfill Manager.

If vegetated areas are removed under topsoil stripping, cut to fill or cut to spoil, shaping of waste, etc., no payment will be made for clearing and grubbing.

PSC 8.2 Scheduled Items

PSC 8.2.1 Clear and Grub

The areas to be cleared and grubbed will be shown by the Engineer and clearing and grubbing will only be undertaken upon written instruction by the Engineer.

Designated grassed areas to be stripped of topsoil in one operation, shall be paid for under Section 5 of the Bill of Quantities (removal of topsoil) and no separate payment will be made for clearing and grubbing, if applicable.

The tendered rate shall also include for the clearing and removal of all boulders greater than 0,15m^3 and of size up to 1m^3, all large trees and tree stumps of girth greater than 1m, existing waste and natural materials stockpiles and any leachate detection/collection manholes.

SABS 1200 D - 1988 : EARTHWORKS

PSD 1 SCOPE

This section of the Specification controls the construction of the earthworks for the new landfill cell, the leachate dam and the contaminated stormwater dams, and all other earthworks as applicable.

PSD 3 MATERIALS

PSD 3.1 Classification for Excavation Purposes

PSD 3.1.1 Method of Classifying

Classification of material other than soft shall be agreed upon prior to excavation commencing. The Contractor shall immediately inform the Engineer if and when the nature of the material being excavated changes to such an extent that a new Classification is warranted. Failure on the part of the Contractor to notify the Engineer timeously shall entitle the Engineer to classify the excavated material at his discretion.

PSD 3.1.2 Classes of Excavation

Irrespective of Classes of excavation stated in the SABS Specifications, all excavated material shall be classified as either hard or soft excavation.

The Classification of excavation shall be as follows:

i) Hard excavation shall be classified as excavation in material which cannot be removed and loaded by normal constructional plant without first drilling and blasting.

ii) Soft excavation shall be classified as per Subclause 3.1.2(a) and (b) of Clause 3 of SABS 1200 D.

PSD 3.3 Selection

The approval of a borrow area for a certain purpose does not necessarily mean that all material within that area is suitable for the specified purpose. What it does mean, is that the borrow area contains some suitable material. The onus is on the Contractor to ensure that only material that is indeed suitable, is removed and used for the specified purpose.

Where the Contractor is required to select material from excavations or stockpile for a specific purpose, the above provisions relating to borrow areas shall apply mutatis mutandis to excavations.

The Contractor shall not waste or contaminate materials that have been selected for a specific purpose.

PSD 5 CONSTRUCTION

PSD 5.1 Precautions

PSD 5.1.1 Safety

PSD 5.1.1.2 Safeguarding of excavations

Add the following subparagraph:

i) The Contractor or his agent or his representative shall **not** require or allow any than 1,5m deep, and any excavation which has not been adequately supported or braced

if there is a danger of the overhanging material or the sides of the excavation collapsing. The support, shoring or bracing to be designed and constructed by the

Contractor, shall be strong and sturdy enough to support the sides of the excavation in question".

PSD 5.2 Methods and Procedures

PSD 5.2.1 Site Preparation

PSD 5.2.1.1 Clearing or clearing and stripping of site

The areas specified to be cleared shall be stripped of all vegetable matter and surface soil to a depth of 150mm.

PSD 5.2.2 Excavation

PSD 5.2.2.1 Excavations for general earthworks and for structures

Add the following additional subparagraphs:

f) Over break shall be backfilled at the Contractor's expense and shall not be measured.

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

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

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

PSD 5.2.2.2 Borrow Pits

Add the following:

"Where it is specified that material shall be obtained from a designated borrow pit, the Contractor shall be responsible and include in his rates for making all arrangements for procuring the material. No payment will be made for the removal of overburden or stockpiling or clearing at the source and no extra over payment for excavating in intermediate, hard or boulder material shall apply".

Add the following new Subsubclause:

PSD 5.2.2.4 Selection and Stockpiling

The approval or designation of a particular borrow area for a particular purpose will not imply that all the material is suitable for that purpose or should be used for that purpose. The Contractor shall select suitable material from that source, discard unsuitable material and reserve material for other purposes as necessary. When required and as ordered by the Engineer, material shall be stockpiled for later use when the excavation thereof is unavoidable in order to excavate the material required at the time.

PSD 5.2.3 Placing and Compaction

PSD 5.2.3.1 Embankments

Amend Subsubclause 5.2.3.1 to read:

"*Each layer shall be compacted at OMC to a density of at least 93% of modified AASHTO maximum density*".

PSD 5.2.3.2 Backfilling and compaction of trenches and excavations around structures

a) General

Each layer shall be compacted at OMC to a density of at least 93% of modified AASHTO maximum density".

b) Restricted

The width of the restricted backfill behind any structure shall be as dimensioned on the drawings and/or as instructed by the Engineer on site.

PSD 5.2.5 Transport for Earthworks

PSD 5.2.5.2 Overhaul

There will be no overhaul measured in this contract. All haulage (including that from commercial sources) shall be considered free haul. The cost of haulage shall be deemed to be covered by other rates in the Schedule of Quantities.

SABS 1200 DB - 1989: EARTHWORKS (PIPE TRENCHES)

PSDB 1 SCOPE

This section of the Specifications shall be extended to include for all open drains, subsoil drains and anchor trenches for the GCL, geomembrane liner, geogrid and geotextiles.

PSDB 3 MATERIALS

PSDB 3.1 Classes of Excavation

Irrespective of Classes of excavation stated in the SABS Specifications, all excavated material shall be classified as either hard or soft excavation.

The Classification of excavation shall be as follows:

i) Hard excavation shall be classified as excavation in material which cannot be removed and loaded by normal constructional plant without first drilling and blasting.

iii) Soft excavation shall be classified as per Subclause 3.1.2(a) and (b) of Clause 3 of SABS 1200 D.

PSDB 3.7 Selection

Replace the words "if he so wishes" in the first line of the second paragraph with the words "at his own cost".

PSDB 5 CONSTRUCTION

PSDB 5.1 Precautions

Add the following new subclause:

PSDB.5.1.5 Trench Excavations

The precautions for excavations as specified in Clause 5.1.1 of Section 1200D shall apply to all trench excavations.

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

PSDB 5.2 Minimum base width specified

Excavations for all drains and foundations shall be excavated to the dimensions as shown on the drawings. Payment will be made based on the width shown on the drawings.

PSDB 5.4 Excavation

Add the following:

For pipes constructed in fill areas, the fill must be placed to attain a minimum of 600mm above the crown of the pipe unless indicated otherwise on the drawings, before excavating the trench to the specified width. In such instances, payment for excavation shall be calculated from this level.

Where selected layers are specified above the pipe, excavation shall be measured from the bottom of the selected layer or from 600mm above the crown whichever is the lesser. Excavation

for manholes and other structures shall be included with an allowance of 600mm around the structure to provide working space. For subsoil pipes the excavation depth shall be the full depth as shown the drawings or as directed by the engineer.

PSDB 5.6.3 Disposal of soft excavation material

Excavation material from the trench which is classified as soft and has become surplus because of bulking, displacement by the pipe and importation shall be stockpiled on site as directed by the engineer.

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.1 Basic Principles

PSDB 8.1.4 Overhaul

There will be no overhaul measured in this contract. All haulage (including that from commercial sources) shall be considered free haul.

PSDB 8.3 Scheduled Items

PSDB 8.3.2 Excavation

Clause 8.3.2 a) should now read:

a) "Excavate in all materials for trenches, backfill, compact and stockpile of surplus material."

All soft surplus material from trench excavations will be stockpiled on site as directed by the engineer.

In addition to the requirements of Subclause 8.3.2, the tendered rate for excavation shall also include for trimming the excavations and for compacting the base of the trenches to 95% mod AASHTO maximum density to a depth of 150mm.

Tenderers are to note that in all cases the compaction of the trench backfill shall be to 95% mod AASHTO density with the backfill layers not exceeding 150mm in thickness. The tendered rate for excavation and backfilling in all materials shall include for the increased compaction of the trench bottom excavations and backfill to 95% mod AASHTO density.

Further, in addition to the requirements of Subclause 8.3.2 the tendered rate shall include for the careful excavation of the anchor trenches adjacent to the existing geomembrane liner, to allow for the installation of the new geomembrane liner by the Geomembrane Lining Subcontractor and the backfilling with primary sand material or a geotextile where required.

The Contractor is to observe safety with respect to the presence of landfill gas and leachate.

PSDB 8.3.8(a) Removal and disposal of Waste (Provisional)

This item is for waste that may be required to be excavated and removed from the construction area.

The Tenderer is to note that the waste may consist of domestic waste, rocks, concrete and tree stumps etc. and is to make allowance for this in his rates.

The tendered rate is to include for excavating in any existing waste body and depositing the waste at an approved area. The tendered rate shall include for care of excavating near any

existing cell geomembrane liner and for the repair to the existing liner, should it be damaged.

Odour control shall also be the responsibility of the Contractor. Chemicals must be supplied by the Contractor and the tendered rate must include for the supply and spraying of these chemicals onto the exposed waste at all times until the waste is covered and / or removed to the active landfill face.

Any waste left exposed during this operation (at the end of each working day) must be covered with at least 100mm soil. The Contractor shall also include for this in his tendered rate.

The Contractor is warned against the use of naked flames, smoking and scavenging from the landfill and is to observe safety measures with respect to landfill gas and leachate

SABS 1200 DK - 1996: GABIONS AND PITCHING

PSDK 1 SCOPE

This specification shall be extended to cover the geotextile components required for the subsoil drains, filter layers and separation layers. It shall also be extended to cover the supply and placing of an approved veneer reinforcement over the geomembrane liner on the side slope areas.

PSDK 3 MATERIALS

PSDK 3.1.3 Geotextile

a) Non-woven needle punched geotextile.

The geotextile used for the subsoil drains, erosion protection and separation layers shall be a non-woven polypropylene or polyester geofabric with a nominal minimum mass of 200g/m^2 and shall have the following properties:

Property	Test Method SANS / ASTM	Unit	Value
Tensile Strength – 200mm wide strip (weaker direction)	SANS 1525	kN/m	10.3
Trapezoidal Tear Strength (weaker direction)	SANS D4533	N	330
CBR Puncture Strength	SANS 12236	kN	2.0
Permeability @ 50mm head	SANS 11058	m/s x 10^{-3}	4.2

Notes:

(a) All values are Minimum Average Roll Value (MARV) unless otherwise indicated.

(b) Evaluation to be on 50 mm strip tensile specimens after 500 hours exposure unless otherwise indicated.

Where products are tested under other test methods, the methods and results should accompany the tender.

The geotextile must be stable in the presence of chemicals typically found in a landfill and should be resistant to attack from these chemicals.

All geotextiles should be stable at a temperature of 100 °C.

b) Veneer Reinforcement

The veneer reinforcement layer shall be a geosynthetic geogrid manufactured for reinforcement applications. The geogrid shall be a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil, aggregate or other fill materials. The geogrid structure shall be dimensionally stable and able to retain its geometry under manufacture, transport and installation.

The geogrid shall be manufactured with 100% virgin resin consisting of polyethylene, polypropylene or polyester and with a maximum of 5% in-plant regrind material. Polyethylene and polypropylene shall be stabilised with long-term antioxidants.

The contractor shall submit Certificates of Compliance for the materials provided as specified in the Submittals clause.

The reinforcement shown on the contract drawings shall meet the property requirements listed in Table 1 below. Reinforcement strength requirements represent minimum average roll values in the machine direction.

Table 1: Geogrid Properties

Property		Unit	Value	Test Method
Long Term Design Strength	Stress	kN/m	90 MIN	SANS 1525
Short term Tensile Strength (T_u)	Stress	kN/m	150 MIN	SANS 1525
	Elongation	%	10 MAX	

i. Long Term Design Strength (LTDS)

LTDS shall be based on reduction factors for installation damage (f_d), environmental degradation (f_e), creep (f_c) and material (f_m) as determined by the manufacturer. The manufacturer shall submit the reduction factors used in the determination of the LTDS to the Engineer.

$$LTDS = \frac{T_u}{f_d \times f_e \times f_c \times f_m}$$

ii. Splices

Splices shall consist of a standard method or device recommended by the manufacturer of the geogrid. Splices shall not be allowed unless identified on the approved layout drawings. Splices shall be at least 75 percent efficient.

PSDK 4 PLANT

The Contractor will be required to provide plant specific to the geotextiles and geosynthetics used to prevent damage and/or reduction of the geotextiles and geosynthetics properties specified. Due to the nature of the geosynthetics, "Bobcat" compact track like plant will need to be used to prevent damage of the geosynthetics during the installation thereof and the construction and installation of the layers above.

PSDK 5 CONSTRUCTION

PSDK 5.4 Geotextile and Veneer Reinforcement

a) Geotextile

The geotextile shall be delivered to site in rolls covered with an opaque plastic sheet to prevent damage from sunlight and should be stored as per the supplier's specification.

The geotextile shall be held in place with sandbags to prevent wind uplift. Care should be taken not to drag the geotextile on the leachate drainage layer, as this could damage the material.

Panel Placement forms must be submitted to the Engineer and approved before commencement of the installation.

No horizontal joints shall be allowed on any slope during installation of the geotextile.

Where the geotextile is being placed onto the geomembrane and underlying geosynthetics, it shall be deployed by hand so as not to damage the geomembrane and geosynthetics in any way. Special care shall be taken by the Installer to prevent damage of the geomembrane and underlying geosynthetics. The geotextile shall be held in place with sandbags to prevent wind uplift.

All rolls (placed alongside one another or end-on-end) shall overlap by a minimum of 300mm or be sewn with a polyester thread or shall be heat bonded along overlapping edges, or all three methods, as per the supplier's specification.

A minimum thickness of 300mm of cover shall be kept between heavy equipment and the geotextile at all times.

No construction traffic shall be allowed directly on any of the laid geotextile.

The Contractor shall submit a summary of the manufacturer's qualifications and a copy of the manufacturer's quality control manual together with the Tender Document. The geotextile manufacturer shall provide a qualified and experienced representative to be available on an as needed basis during construction. The representative shall visit the site for consultation at least twice during construction, or as requested by the Contractor.

One properly identified 600 by 600 mm minimum size geotextile sample is to be submitted at the beginning of the Contract. The geotextile sample is intended for visual demonstration prior to product delivery.

b) Veneer Reinforcement

1) Drawings

The Installation geogrid layout plan, along with anchorage and joint details shall be submitted to the Engineer for approval. Sequencing and construction procedures shall also be included. The proposed geogrid layout shall be submitted a minimum of 7 days prior to geogrid placement.

2) Product Data

The following product data shall be provided prior to the delivery of the materials to site:

i) Long Term Design Strength

The calculations shall itemize each reduction factor. Calculations shall be provided a minimum of 7 days prior to delivery of geogrid to the site.

ii) Manufacturer

The Contractor shall submit a summary of the manufacturer's qualifications and a copy of the manufacturer's quality control manual together with the Tender Document. The reinforcement manufacturer shall provide a qualified and experienced representative to be available on an as needed basis during construction. The representative shall visit the site for consultation at least once during construction, or as requested by the Contractor.

iii) Samples

Veneer Reinforcement: One properly identified 600 by 600 mm minimum size geogrid sample. The fasteners proposed for use shall also be submitted.

Note: the geogrid sample is intended for visual demonstration prior to product

delivery. Conformance testing samples, if required, shall be obtained from material actually delivered to site. The sample size for conformance testing shall be one metre in length taken across the full roll width.

iv) Test Reports

Manufacturer's certified raw and roll material test reports. Roll material tests shall include ultimate strength performed in accordance with SANS 1525. Test results not meeting the requirements in Table 1 or in the approved Manufacturer's Quality Control Manual will result in rejection of applicable rolls. Certified test reports shall be provided a minimum of 7 days prior to delivery of geogrid to the site. Should test methods other than those specified be used, the Contractor shall submit the test methods together with the test results.

v) Certificates of Compliance

The Contractor shall submit an affidavit certifying raw and roll material test results submitted are accurate and that the reinforcement meets the requirements of the project specifications. The affidavit shall be signed by an official authorized to certify on behalf of the manufacturer. [If the affidavit is dated after award of the contract and/or is not specific to the project, the supplier shall attach a statement certifying that the affidavit is representative of the material supplied.] The documents shall include a statement confirming that all purchased resin used to produce reinforcement is virgin resin. Affidavit shall be provided a minimum of 7 days prior to delivery of geogrid to the site.

3) Delivery, Storage and Handling

The Contractor shall check products upon delivery to assure that the proper material has been received and is dry and undamaged. The Contractor shall protect the materials from damage and exposure.

i) Labeling

Each roll shall be labeled with the manufacturer's name, product identification, roll dimensions, lot number and date manufactured.

ii) Handling

Geogrid rolls shall be handled and unloaded by hand, or with load carrying straps, a fork lift with a stinger bar or a spreader bar assembly. Geosynthetic rolls shall not be dragged, lifted by one end, lifted by cables or chains or dropped to the ground.

iii) Storage

Geogrid shall be protected from deleterious materials, chemicals, sparks and flames, temperatures in excess of 70 degrees Celsius and any other environmental condition that may degrade the physical properties. If stored outdoors, the rolls shall be elevated from the ground surface. Geogrids, except for extruded grids, shall be protected with an opaque waterproof cover.

4) Installation

i) Subgrade Preparation

Immediately prior to placement of the geogrid, the surface on which the geogrid will be placed shall be free of rock and other material that could damage the geogrid or

the underlying geosynthetics. The geogrid shall be placed directly over the protection geotextile.

ii) Anchor Trench

The geogrid shall be placed in a dedicated anchor trench and no other geosynthetics shall be anchored in the same trench as the geogrid, unless otherwise agreed by the Engineer. The anchor trench shall be placed a minimum of 600 mm back from the edge of the slope to be covered and a minimum of 600mm away from other anchor trenches. The anchor trench shall be a minimum of 600 mm deep and 400 mm wide.

Ponded water shall be removed from the anchor trench while the trench is open. Trench corners shall be rounded to avoid sharp bends in the geogrid. Loose soil, rocks larger than 50 mm in diameter and any other material that could reduce the effectiveness of the geogrid shall be removed from the surfaces of the trench. The geogrid shall extend down the front wall and across the bottom of the anchor trench. Backfilling and compaction of the anchor trench shall be in accordance with Section SABS DB: Earthworks (pipe trenches).

iii) Geogrid Placement

The geogrid shall be installed in accordance with the Manufacturer's recommendations. Geogrid shall be unrolled in the direction of reinforcement. After a layer of geogrid has been placed, suitable means that do not damage the underlying geosynthetics shall be used to hold the geogrid flat and in place until cover materials can be placed. Geogrid damaged during placement and covering shall be removed and replaced at no additional cost to the Client.

1. Overlaps and Fasteners

Adjacent rolls of geogrid shall be positioned edge-to-edge and loosely fastened to maintain alignment during fill placement. Adjacent rolls shall not be overlapped. Fastener type and spacing shall be as recommended by the manufacturer and approved by the Engineer. Metallic fasteners will not be allowed.

2. Splices

Splicing may consist of overlaps, fusion wedge welding, sewing or bodkin connections. Splicing methods that are dependent on installer experience and skill level, such as hot air and torch-applied open flame, are not acceptable. Overlap splices shall be constructed by placing a minimum of 50 mm of soil between the layers of geogrid, or as directed by the Manufacturer. Splicing methods shall not damage the underlying geosynthetic layers, and the installer may be asked to demonstrate this.

Splices, if allowed, shall be located within the bottom one-third of the slope. Splicing shall be limited to only one splice per reinforcing strip and no two consecutive reinforcing strips shall include a splice. Individual reinforcing lengths less than 3 meters shall not be used. Splices in geogrid reinforcement shall be pulled and held taut during cover material placement.

3. Penetrations

For small penetrations through geogrids, only transverse members of the geogrid shall be cut. The load-carrying longitudinal (machine direction) members shall be spread around the penetration. For larger penetrations, additional geogrid shall be placed on each side of the penetration and spliced to the adjacent geogrid to compensate for any longitudinal tensile members that must be cut.

iv) Cover Materials Placement

Geogrid shall be covered with the cover materials within 5 calendar days of

acceptance. The geogrid shall be kept smooth and taut during placement of cover materials. Cover materials shall not be dropped onto the geogrid from a height greater than 1m. The cover materials shall be pushed out over the geogrid in an upward tumbling motion. Cover materials shall be placed from the bottom of the slope upward. The initial loose cover materials lift thickness shall be 300 mm.

Equipment with ground pressures less than 50 kPa shall be used to place the first lift over the geogrid. A minimum of 300mm of cover materials shall be maintained between construction equipment with ground pressures greater than 50 kPa and the geogrid. Equipment placing cover materials shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 2.2 m/s.

v) Oversight

A Construction Quality Assurance Representative shall be present at all times during geogrid installation.

vi) Conformance testing

Conformance testing is performed to verify quality control test results submitted by the manufacturer, to detect degradation during shipping and storage, and to verify the correct product is supplied.

Testing shall be performed by a commercial testing laboratory selected by Engineer. The Engineer reserves the right to direct the location and select the material for samples. Conformance test results must equal or exceed results reported on the Manufacturer's certified roll material test reports.

Table 2: Conformance testing

Property		Unit	Value	Test Method
Short Term Tensile Strength	Stress	kN/m	150 MIN	SANS 1525
	Elongation	%	10 MAX	

PSDK 8 MEASUREMENT AND PAYMENT

PSDK 8.2 Scheduled Items

PSDK 8.2.4 Geotextile

PSDK 8.2.4.1 Non-Woven Needle Punched Geotextile

The unit of measurement shall be the square metre (m^2) of filter fabric supplied and installed as specified.

The tendered rate shall include full compensation for furnishing, procuring, cutting, overlapping, jointing, anchoring, placing and protecting the filter fabric as specified as well as for wastage. The filter fabric shall be needle punched non-woven geotextile as specified or acceptable equivalent.

PSDK 8.2.8 Veneer Reinforcement

The unit of measurement shall be the square metre (m^2) of area covered with veneer reinforcement placed in position. All the geogrid shown on the drawings will be paid for e.g. in anchor trenches, designed overlaps, tie-ins etc.

The tendered rate shall include full compensation for all materials, plant, labour and other incidentals required to supply and install the approved geogrid to the Engineers satisfaction, protecting, cutting, wastage, placing, joining, tensioning, overlapping and securing the material in position testing or quality assurance.

The tendered rate for supply shall include for offloading of the geogrid at the site. The contractor is to ensure that the geogrid is stored at the site under protection and to the Engineer's satisfaction.

PSDM EARTHWORKS (Roads, Subgrade)

PSDM 1 SCOPE

This section of the Specification controls the bulk earthworks to be carried out on the WWMF, the selection and stockpiling of materials, the construction of leachate drainage layers, the construction of leachate detection layers, the construction of toe berms and diversion berms and the base preparation layer.

All surplus material shall be stockpiled on site for future use by the landfill staff.

The selected materials making up the engineered linings, shall be sourced by the Contractor, tested for compliance to the requirements set out below, before being imported.

PSDM 3 MATERIALS

PSDM 3.1 Classification for Excavation Purposes

Irrespective of the classification of excavation contained in the SABS Specifications, all excavated material shall be Classified as that stated in PSD 3.1.2 of this Document.

PSDM 3.2 Classification for Placing Purposes

PSDM 3.2.1 General

a) The nomenclature used for the classification of the various material types to be used in the designed pavement layers is that defined in the NITRR documents TRH 4 and TRH 14.

b) Where G or C class materials are called for in these Project Specifications, the material shall conform in all respects to the requirements of G or C class materials as described in TRH 14 in preference to the material properties given in Subclause 3.2.3.

Add the following new subclauses

PSDM 3.2.5 Clay Material, if and when required

Selected clay material shall be imported form a commercial source and shall be subject to the approval of the Engineer.

The material shall comply with the following:

a) the Plasticity Index shall not be less than 12;

b) the USC classification shall be CL;

c) the material shall consist of a minimum clay content of 25% and shall be described as a sandy clay loam, clay loam or silty clay loam as plotted on the Textural Soil Classification Chart.

d) A permeability when compacted to 100% of standard Proctor at OMC, of less than 1×10^{-6} cm/sec;

e) The material shall have no visible **micaceous** constituents such as those derived from granites;

f) The grading of the clay, before compaction, shall conform with the table below;

Screen Size	Percent Passing
4.75mm	95 – 100
0.425mm	85 – 100
0.075mm	75 - 100

g) The dispersive classification, based upon an average of three test on any of two of the following:

- Pinhole
- Crumb
- Double Hydrometer,

Shall be ND1 or ND2 (non-dispersive soil).

In addition, the classification on the Double Hydrometer tests, shall be less than 30%.

PSDM 3.2.6 Crushed Rock Aggregate to Leachate Drainage Layer

This layer shall be clean single-sized rock crushed to the following specification:

a) Maximum Particle Size 53,0mm

b) Minimum Particle Size <10% passing the 37,5mm sieve size

c) Crushing Strength Values obtained from 10% fines aggregate crushing test 100kN

d) The crushed rock must be washed to remove the fine particles.

e) The Engineer will assess the Flakiness Index of the crushed rock visually and reject any aggregate that does not pass the visual inspection.

PSDM 3.2.8 Stabilised Sand Layers

These layers are to consist of a clean fine sand as per SABS 1083 Table 1 with a fineness modulus of between 0,8 and 2 which shall be homogeneously stabilized with 4% of PBFC by dry mass at 100% Mod AASHTO maximum density. The UCS of the stabilized sand shall not be less than 300kpa.

In addition to the above, the layers shall satisfy the relevant clauses of Part ME with regard to stabilisation.

PSDM 3.2.9 Sand Layer to Leachate Detection Layer

These layers are to consist of a clean fine sand as per SABS 1083 Table 1 with a fineness modulus of between 0,8 and 2. This is proposed as a clean sand with maximum particle size of 4.75mm, excluding silt and clay (<0.075mm).

PSDM 3.2.10 Selected Layers

Where G5, G7 and G9 materials are called for, they shall conform in all respects to the requirements as described in the NITRR document TRH 14.

PSDM 5 CONSTRUCTION

PSDM 5.2 Methods and Procedures

PSDM 5.2.1 Stripping of Site

The topsoil to be stripped shall be stripped together with the grass and grass roots (and small shrubs) and stockpiled as directed by the Engineer.

PSDM 5.2.2 Cut and Borrow

PSDM 5.2.2.2 Dimensions of Cuts

In addition:

i) Overbreak shall be backfilled at the Contractor's expense and shall not be measured.

ii) The minimum depth of blasting shall be 750mm and where depths of less than 750mm are required to form the cell slope surfaces, the Contractor shall allow for the extra depth of blasting. This extra volume will not be measured nor paid for, and the Contractor shall backfill the over excavation at his expense.

PSDM 5.2.4 Fill

PSDM 5.2.4.1 Preparation

a) Before any fill commences, the existing surface shall be surveyed, the existing ground line checked against the design grade and cross section and measured for cut and or fill quantities. The Engineer may then revise the design lines to suite the ground shape. Erosion gullies shall first be filled and, following normal practice, the top of 150mm shall be scarified and recompacted to 93% Mod AASHTO maximum density.

PSDM 5.2.8.2 Overhaul

There will be no overhaul measured in this contract. All haulage (including that from commercial sources) shall be considered freehaul. The cost of haulage shall be deemed to be covered by other rates in the Bill of Quantities.

PSDM 5.2.9 Containment Barrier Layers

a) General

Where the slope, upon which the layerworks are to be constructed, is steeper than 1V: 5H, construction is to proceed from the lower level, in an upwards direction. The Contractor is to take cognizance of this when formulating construction methods and selecting plant.

b) Leachate Detection sand layers

The sand shall be free of any sharp stones greater than 5mm in size. The material shall be carefully placed and protected.

c) Stabilised sand

The sand shall be free of any sharp stones greater than 5mm in size. The premixed material shall be carefully placed in layers not exceeding 100mm thick and compacted with 4 passes of a light plate compactor.

PSDM 8 MEASUREMENT AND PAYMENT

PSDM 8.1 Basic Principles

Further to the requirements of Clause 8.1, the following shall apply:

a) **Bulking and Shrinkage**

For measurement and payment purposes, no allowances will be made for bulking or shrinkage, and it shall be assumed that 1 cubic metre of excavated material from the site shall form 1 cubic metre of compacted fill. In the event of there being surplus material encountered on site due to bulking, the Tenderer shall allow in the relevant rates for the material to be spoiled. Similarly, should the material shrink, the Tenderer shall allow for the importation of material.

b) **Volumes**

Measurement for bulk earthworks shall be from topographical survey and DTM modeling. The Tenderer must note that when working above waste materials, certain volumes of materials may be lost due to the infiltration of the materials into the waste voids. The Tenderer is to make allowances for the loss of relevant materials and no extra or separate payment will be made due to the materials losses.

c) **Restricted Work**

No extra or separate payment will be made for work considered to be of a restricted nature. These costs shall be deemed to be covered by other rates in the Schedule of Quantities.

d) **Stockpiling of material**

The Tenderer must note that it may be necessary to stockpile some of the excavated material before the fill areas become available. Allowance for any costs incurred in the stockpiling as described in Clause 8.3.11 must be made in the cut to fill / spoil / stockpiling rates as items have not been included in the Schedule of Quantities to cover stockpile handling.

PSDM 8.3 SCHEDULED ITEMS

PSDM 8.3.2 Removal of topsoil to stockpile

Topsoil shall be carefully stripped and stockpiled as directed by the Engineer, generally with the grass, roots etc. The depths and locations of stripping shall be determined by the Engineer on site.

PSDM 8.3.3 Treatment of Roadbed

The Bid rate shall also include for all restricted work where appropriate.

PSDM 8.3.4 Cut to Fill

The tendered rate shall include full compensation for all costs arising from the trimming of exposed surfaces to the required tolerance such that they are free of all protrusions, stones larger than 25mm, roots and other materials which may negatively affect the construction of the layers above.

As a result of excavation (which have taken place either prior to the commencement of the Contract, or during the Contract) certain areas of hard material may have become exposed. In order to prepare the surfaces for further earthworks, the following shall apply which shall

be deemed included in the tendered rate:

i) these surfaces shall be scalped of all loose material and trimmed to a rough but stable surface, or to naturally bedded materials;

ii) fill material shall be imported and placed in such a manner as to provide a uniform layer of at least 150mm compacted to 93% of Modified AASHTO maximum density.

In addition, due to the nature of the landfill site, the tendered rate is to make provisions for the operation to be in waste materials, as no additional payments will be made.

PSDM 8.3.5 Selected Layers from Commercial Sources

In addition to the requirements of Clause DM 8.3.5, the following shall apply:

a) the measured volume for all imported fill shall be cubic metre (m^3) measured in place, as constructed and compacted to the specified dimensions shown on the drawings;

b) the tendered rate shall include for all additional compaction requirements as specified;

c) the tendered rate for the stabilised sand layers shall also include for the operation of stabilizing as well as the provision of the approved stabilising agent at a normal rate of 4% by mass and shall thus include all operations and materials to satisfy the requirements of stabilising as described in the relevant Clauses of Part ME. The tendered rate shall also include for work considered to be of a restricted nature, being for the narrow and restricted access, the steepness of the site or for the difficulty of turnaround. The Contractor is reminded that no construction traffic will be allowed over the stabilised sand layer/s.

d) Where applicable, the tendered rate shall include for all restricted work as well as for satisfying the requirements of Section PSDM 5.2.9.

e) The tendered rate for the detection layers and the course aggregate drainage layers are to include for the provision of an isolation trench, the supplying and spraying of adequate moisture and all provisions to undertake the electronic leak location (ELL) survey, as required by the Regulatory Authority. Upon completion of the ELL survey, the layers are to be reinstated as per the project specification. No additional payment for the isolation works will be considered.

PSDM 8.3.7 Cut to Spoil

In addition to Clause PSDM 8.3.4, the tendered rate shall also include for selection of the excavated material. The excavated material taken to stockpile shall be free of any rock or boulders in excess of 200mm in size. Any rock or boulders in excess of 200mm are to be separated out of the material and taken to a separate stockpile as ordered by the Engineer.

PSDM 8.3.17 Berms (Toe Berm, Diversion Berm and Internal Cell Separation Berm)

The tendered rate shall include for the use of the cut material from site or imported material and constructing the berms, in layers not exceeding 150mm thick, to the compaction and shape as detailed on the drawings. The tendered rate shall include for a cut-to-fill operation and no additional payment/s will be made for any stockpile handling.

The Tenderer must note that it may be necessary to construct specific details from imported/fill material and no additional payments will be made. Quantities for these details

constructed shall be measured in place, as constructed and compacted to the specified dimensions shown on the drawings.

SABS 1200 G - 1982 : CONCRETE (STRUCTURAL)

PSG 1 SCOPE

This specification has been extended to cover the construction of the concrete lined drains to prevent runoff into the new cell and to manage stormwater.

PSG 3 MATERIALS

PSG 3.2 Cement

PSG 3.2.1 Applicable Specifications

The new SABS ENV. 197-1 (adopted in 1996): Cement – composition, specification and conformity criteria Part 1 : Common Cement, replaces SABS 471 – 1971, SABS 626 – 1971 and SABS 831 – 1971 in Clause EM.2 of Part EM : Concrete Surface to Roads.

Add the following new Subclause:

PSG 3.9 Curing Compound

The curing compound used shall be a white pigmented resin based curing compound, complying with the requirements of ASTM C 309 except that the water loss as determined by the water retention test shall not exceed 0,040 g/cm².

A recent certificate from an approved testing laboratory shall be submitted certifying that the curing compound complies with the specifications. Further testing shall be carried out at regular intervals throughout the contract period on samples taken at the nozzle of the spraying equipment.

The curing compound shall be capable of being sprayed onto a wet surface without loss of stability or performance. This characteristic shall also be certified by the approved testing laboratory.

The curing compound shall be compatible with the cement used to avoid discolouration.

PSG 3.10 Silicon Seals

The joints shall be sealed with Plycol 327 applied after priming with Epidermix 317 or similar approved systems.

PSG 3.11 Joint Filler

The joint filler shall be Plycord 10 or Sandor Strip or Ethercord or similar, with PVC tape between backup strip and the sealant.

PSG 5 CONSTRUCTION

PSG 5.1 Reinforcement

PSG 5.1.2 Fixing

Delete from the eighth line:

"or, if permitted by the Engineer, by welding"

PSG 5.5 Concrete

PSG 5.5.10 Concrete Surfaces

PSG 5.5.10.2 Formed concrete surface finishes

Exposed concrete surface finishes for all concrete shall be a wood float finish to the Engineer's satisfaction.

PSG 8 MEASUREMENT AND PAYMENT

Basic Principle

1) No extra or separate payment will be made for work considered to be of a restricted nature, being for the narrow access corridor, the steepness of the site or for the difficulty of turnaround.

2) No extra or separate payment will be made for any additional formwork to the concrete. All formwork will be deemed to be included in the rates Bid for the concrete.

PSG 8.4 Scheduled Concrete Items

PSG 8.4.3 Strength Concrete

The Bid rate will differentiate between the different elements of concrete works scheduled for this Contract.

The Bid rates for all scheduled items shall include for the provision of all formwork, damp proof course, weep holes, collars, reinforcing, curing of concrete, wood float finish, joints and other incidentals as detailed on the drawings and directed by the Engineer on site.

The Bid rates shall also include for the removal and disposal of the existing concrete lined drains where tie-ins are required and for all concrete works required to ensure a transitional, level tie-in between the existing drains and new drains.

SABS 1200 L – 1983: MEDIUM PRESSURE PIPELINES

PSL 1 SCOPE

This section covers the supplying and laying of the various leachate rising main pipes and all related items, where applicable.

PSL 3 MATERIALS

PSL 3.2 Water Mains (Subclause 3.2 To 3.7)

PSL 3.2.1 Pipes and Specials

Should the contractor wish to submit a tender for alternative pipe materials to those specified, he may do so. The rates submitted for any alternative must include for any additional specials and fittings that may be required or costs that may be incurred by the contractor as a result of use of the alternative materials.

PSL 3.7 Other Type of Pipes

Add the following new sub-clause:-

PSL 3.7.1 uPVC Pipes

Add the following to the first sentence " ..... SANS 966 or SANS 966 Part 1".

PSL 3.7.2 HDPE Pipes

HDPE pipes shall be type Class 16 unless otherwise specified: HDPE fittings shall be manufactured from HDPE type PE100 PN18,0 pipe unless otherwise specified.

All puddle flanges on HDPE fittings shall be thrust bearing with a minimum thickness of 75 mm unless otherwise specified.

HDPE pipes that are to be used for sewer pipelines and in pipe jacking applications are to have all joints reamed both internally and externally.

PSL 3.8 Jointing Materials

PSL 3.8.2 Flexible Couplings

PSL 3.8.2.1 KLAMFEX long barrel straight couplings are to be used to join plain ended uPVC and HDPE pipes and fittings where required. All couplings and flanges are to be DENSO wrapped using the complete Denso system (PSL 3.9.7).

Flange adaptor couplings shall also be long barrel where plain uPVC & HDPE pipes are to be coupled to a flanged fitting or special.

PSL 3.8.3 Steel Specials, Valves, Flanges and Accessories

Steel specials are to be fabricated from ASTM A106 spiral welded pipe with a minimum wall thickness of 8 mm. Specials fabricated from 304 L stainless steel are to be fabricated from ASTM A312 seamless pipe conforming to schedule 10.

Flanges for all valves, water meters and flange adaptors are to be drilled to SANS 1123, Table 16, unless directed otherwise.

PSL 3.8.4 Loose Flanges

Bolts and nuts shall comply with the relevant requirements of SANS 135.

PSL3.9 Corrosion Protection

PSL3.9.5 Joints, Bolts, Nuts and Washers

All bolts, nuts and washers are to be as specified under PSC 3.9.7.

PSL3.9.7 Corrosion Protection of Fittings / Specials

All steel fittings, saddles and couplings shall be, both internally and externally, hot dipped galvanized to SANS 763 class B and then epoxy coated with 400µm of COPON epoxy paint or alternatively fusion bonded epoxy lined to 250µm.

All bolts, nuts and washers of couplings, saddles and fittings shall be stainless steel if not protected as detailed hereafter. Where treated as detailed hereafter, hot dipped galvanised bolts, nuts and washers can be used. These latter fittings etc. shall be wrapped in denso or similar protective tape after the application of Denso prime (or similar) and profiling the joint with Denso mastic or similar. The complete joint shall be sealed using 6 layers of Denso cling wrap (or similar).

PSL3.10 Valves

PSL3.10.1 Cast Iron Gate Valves

Gate (sluice) valves shall be clockwise closing type sluice valves with non-rising spindle and cap top for turning key, and with flanged ends suitable for coupling to the type of pipes specified under PSL3.2.1, and in compliance with SANS 665, Class 16.

Valves shall be coated both internally and externally with 400 micron minimum of COPON epoxy paint. Where valves are fusion bonded epoxy lined and coated, a minimum of 250 micron will be accepted.

PSL3.10.2 Knife Gate Valves

Knife gate valves shall be manufactured using 304l stainless steel, shall be clockwise closing, wafer type. The seal shall also be stainless steel. The spindle shall be a rising spindle protected with a cover. The valve shall be fitted with a hand wheel.

PSL3.10.5 Air Valves

The air valves shall be a combined small and large orifice air valve, the small orifice permitting escape of air from the pipe under working pressure and the large orifice permitting air to enter or escape from the pipe when the pipe is emptied or filled respectively.
The air valves shall be a double purpose air release valve all as detailed. The installation shall include a stainless steel knife gate valve on sewage mains. A gate valve or inline uPVC ball valve FIP or similar, is required on potable water lines.

PSL3.11.3 Concrete

Cover to all reinforcing to be 40mm unless otherwise stated. 50mm cover is required for concrete in contact with the ground.

PSL5 CONSTRUCTION

PSL5.1 Laying

PSL5.1.4 Depths and Cover

Pipelines shall be laid generally so that the cover to the top of the pipe barrel from finished surface shall be 0.6m except at under carriage ways were a minimum of 1,2m is specified, unless otherwise instructed by the engineer.

PSL5.3.1 Pipeline Markers and Route

This would necessitate the provisional allowance for additional bends and specials. Provision has been made in the Schedule of Quantities, where applicable.

Pipe markers, existing of a concrete-filled pipe shall be installed at the ground surface at every inflection point and manhole along the pipeline route.

The markers shall be installed in the positions as directed by the Engineer.

PSL 5.11 Connection To Existing Works

The contractor will be held responsible for the cost of any damage, subsequent repairs and mopping up operations arising from flooding caused by connecting to or damaging existing services.

The contractor shall also undertake all necessary liaison with existing service providers (and any other relevant authority) to arrange for all connections to existing services and interruptions of supply of services to consumers.

PSL7 TESTING

PSL7.1 General

PSL7.1.1 Working Pressure of Gate Valves

The Contractor shall ensure that the differential pressure across valve gates does not exceed the manufacturer's stated maximum working pressure.

PSL7.3.1 Test Pressure and Time of Test (Sub-clause 7.3.1)

The test pressure for all pipelines and specials installed under this contract will be 1.25 x maximum working pressure (900 kPa unless otherwise specified). It is recommended that short sections of piping be tested once they have been laid and anchor blocks have attained their specified strength. A factory pressure test certificate must be produced by the supplier for all fabricated fittings before they are laid by the contractor.

PSL7.4 Test on Epoxy Coatings

PSL 7.4.1 Amend the first sentence as underlined below:

The Contractor shall carry out the following tests on epoxy coatings on steel and cast iron pipes, fittings and specials. Results of all tests carried out shall be supplied to the Engineer immediately they are known.

PSL 7.4.2 The adhesion of the coating to the substrate shall be tested.

Add the following:-

Control testing of epoxy coatings on all valves, specials, fittings and pipes as described in subclause 7.4 as well as any other tests, e.g. checking of surface preparation, deemed necessary by the Engineer, will be carried out by the Engineer, or by an independent laboratory approved by the Engineer.

The Contractor shall ensure that access to his supplier's factory/workshop is freely available to the Engineer for the purpose of carrying out control tests and that whatever representative samples selected by the Engineer for testing, either from the supplier's yard or from Site, are supplied to the Engineer as and when required.

Should samples tested fail to pass the tests, further samples shall be supplied by the Contractor for testing. All rejected samples coating shall be repaired in accordance with the Engineer's instructions.

The rates tendered for steel and cast iron pipes, specials and fittings shall include for the costs of testing by the Contractor as described in subclause 7.4 and for any necessary remedial work as required by the Engineer.

Should the results of a test fail to comply with the specification, the costs of the test shall be borne by the Contractor.

PSL8 MEASUREMENT AND PAYMENT

PSL8.1 General

The tendered rates for the supply of materials shall cover the cost of all protective coating and linings, where applicable.

No extra payment will be made for temporary or permanent water supply connections for testing. The tender rate shall include for all testing requirements for the laying of pipes, valves and specials.

PSL8.2.1 Supply, Lay, etc. of Pipes

The tender rate per metre shall, in addition to the costs specified in Sub-clause 8.2.1, cover the cost of supplying and fitting of the additional couplings, jointing, bends and all specials required for cut pipes and pipe joints. Unused off-cuts shall become the property of the Contractor.

PSL8.2.11 Anchor/Thrust Blocks

Notwithstanding Sub-clause 8.2.11, the construction of anchor and thrust blocks as ordered by the Engineer, will be measured by the cubic metre of 25 MPa/19 concrete. The tender rate shall cover the cost of all excavation and trimming, reinforcement, concrete and formwork required.

No separate payment will be made to cover the cost of over break in the excavation.

SABS 1200 LB - 1983 : BEDDING (PIPES)

PSLB 3 MATERIALS

PSLB 3.1 Selected Granular Material

Add the following:

"Alternatively clean, coarse river sand may be used".

Add the following new Subclauses:

PSLB 3.5 Concrete Sand

Where shown on the drawings the backfill for drains shall be concrete sand (fine aggregate) as per the relevant requirements of SABS 1083. The material must be obtained from an approved source.

PSLB 3.6 Crushed Rock Aggregate

Where shown on the drawings, the backfill for subsoil drains and percolation trenches shall be as per the relevant requirements of SABS 1083. The material must be obtained from an approved source.

PSLB 5 CONSTRUCTION

PSLB 5.1 GENERAL

PSLB 5.15 Placing and Compacting Bedding Material

a) For combined trenches, placing and compacting bedding around multiple pipes laid side by side shall be paid for only once, namely, for one placement and compaction, measured along the centre line of the trench.

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.2 Scheduled Items

PSLB 8.2.2 Supply only of bedding by importation

PSLB 8.2.2.3 From commercial sources

Where applicable, the tendered rate shall also include for the placing of the 38mm crushed rock aggregate and coarse sand in the trenches and the levelling of the materials to the required level.

SABS 1200 LD - 1983: SEWERS

PSLD 1 SCOPE

The scope of this specification has been extended to cover the leachate collection pipes, leachate detection pipes, and the leachate detection and collection manholes.

PSLD 3 MATERIALS

PSLD 3.1 Pipes, Fittings and Pipe Joints

PSLD 3.1.8 HDPE Pipes

The HDPE pipes shall conform to SABS 533 Part II of 1982. The sizes referred to in both specifications and drawings are the minimum outside diameter.

Size of Perforations

The apertures in the pipes shall not exceed the following filter criteria:

For slots	$\frac{\text{D85 (filter)}}{\text{slot width}}$	< 1.2
For circular holes	$\frac{\text{D85 (filter)}}{}$	< 1.0

Jointing procedures for HDPE pipes shall be as follows:

Pipe Diameter (mm)	Required Jointing Method
50	"Plasson" type compression coupling
110/160/200/250	Electrofusion welding on site

PSLD 8 MEASUREMENT AND PAYMENT

PSLD 8.2.1 Supply, Lay, Joint, Bed and Test Pipeline

In addition, the tendered rate for HDPE pipes shall also include for all electrofusion welds, compression type couplings (eg V-J joints), bends and specials used as well as for all pipe penetrations through the lining system.

PSLD 8.2.3 Manholes

The unit of measurement shall be the number (No) implying the complete construction of the leachate detection and collection manholes, as detailed on the drawings, including excavation, backfill and name tags. The rate shall also include for all works required for the complete construction of the manholes up to a depth of 6m.

A stainless steel name tag with the description

"from Cell No…."

shall be attached to the inside of the manhole above the outlet of the monitoring pipe.

PSLD8.2.13 Valves

The unit of measurement shall be the **number** (No) of valves. The rate shall cover additional excavation (see Sub-clause 8.2.2 and 8.2.3 of SANS 1200DB), the materials, plant, and labour necessary for the complete installation and testing. The rates tendered should be inclusive of the additional couplings and short pipe lengths either side of these valves.

SABS 1200 LE - 1982: STORMWATER DRAINAGE

PSLE 1 SCOPE

This section covers the subsoil drainage measures.

Concrete pipe culverts with the appropriate drainage headwalls, drop inlets etc. are to be installed, where applicable.

Subsoil drains as shown on the drawings may be installed at the Engineer's discretion. The positions of the subsoil drains have not been shown on the drawings but will be indicated on site by the Engineer depending on insitu ground conditions.

PSLE 3 MATERIALS

PSLE 3.1 Culvert Units and Pipes

PSLE 3.1(d) Skewed Ends

Add the following:

"The cutting of pipes on site to form skewed ends or to reduce their length will be allowed providing that the pipes shall first be cast into the accommodating structure and such a structure is left to attain its full strength. The pipe shall then be hand chipped with hammer and chisel to the required shape and the exposed end shall be made good with a 1:2 cement / sand mortar to provide a smooth finish, all to the satisfaction of the Engineer.

Add the following new Subsubclause:

PSLE 3.1(f) Subsoil Pipes

Pipes for subsurface drains shall have a specified internal diameter as specified, which shall not be less than 100mm for their specified application. They shall be of the following type:

a) perforated HDPE pipes

b) non perforated HDPE pipes

The size of the perforations in perforated pipes in all cases shall be 8mm diameter ± 1.5mm and the number of perforations per metre shall not be less than 26 for 100mm pipes. Perforations shall be spaced in two rows for 100mm pipes.

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

Pipes without slots or perforation that are required for transporting subsoil water from the subsoil drain proper to the point of discharge shall be unperforated HDPE pipes.

PSLE 3.1(g) Concrete Caps for Subsoil Drain Pipes

Where required, e.g. at the higher end of each system, the drainage pipe shall be sealed off with a loose concrete cap of Class 15 / 19 concrete.

PSLE 3.4 Manholes, Catchpits and Accessories

PSLE 3.4.1 Bricks

Add the following:

"Bricks for the stormwater and subsurface structures shall be either burnt clay engineering bricks with compressive strength 28MPa to SABS 227 or concrete bricks with minimal compression strength 21MPa to SABS 1215.

PSLE 5 CONSTRUCTION

PSLE 5.1 Trench Bottom

The requirements of SABS 1200 LE shall apply.

PSLE 5.2 Bedding and Laying

PSLE 5.2.2 Pipe Culverts

Add the following:

"Stormwater pipes will be laid on a Class C bedding as detailed on Drawing LB-1 of SABS 1200 LB.

All stormwater pipes shall be concrete spigot and socket pipes with rubber rings to the manufacturer's specifications.

Add the following new Subclause:

PSLE 5.8 Subsurface Drains

PSLE 5.8.1 Laying of Pipes

Trenches for subsoil drains shall be excavated to the dimension and gradients shown on the drawings or as directed by the Engineer.

A layer of permeable material of the class and thickness as shown on the drawings shall be placed on the bottom of the trench and lightly tamped and finished to the required gradient.

Pipes of the type and size, when required, shall then be firmly bedded on the permeable material true to level and grade, coupled where required and the trench backfilled with further permeable material to such height above the pipes as shown on the drawings or as directed by the Engineer. The permeable material shall be lightly compacted and finished to the required level. Further layers of finer permeable material shall be placed, lightly compacted and finished to an even surface as directed by the Engineer. The remainder, if any, of the trench shall be backfilled with approved impermeable material as required by the Engineer, in layers not exceeding 100mm and compacted to at least the same density as the surrounding material. The trench must be specially protected against the ingress of water before completing the impermeable layer.

Permeable material must be placed in layers of not more than 300mm at a time and lightly compacted. The total thickness of each type of permeable material must be carefully controlled, and when placing the thinner layers, suitable spacers must be used for this purpose. When placing successive layers the lower layer must not be walked on or disturbed more than can be avoided. Care shall be taken to prevent the contaminations of the drains during construction and all permeable material contaminated by soil or silt shall be removed and replaced by the Contractor at his own expense.

Perforated and slotted pipes shall be joined by couplers. Perforated pipes shall be laid with the perforations as instructed.

The higher end of subsurface drain pipes shall be sealed off with a loose concrete cap of Class 15/19MPa concrete, as directed by the Engineer and the lower end of the pipe shall be built into a headwall providing a positive outlet or connected to stormwater pipes or manholes.

Any section of a subsurface drain constructed from pipes without perforations or slots shall be backfilled with impermeable backfill materials as directed above. Where suitable, the excavated material may be used for backfilling.

PSLE 8 MEASUREMENT AND PAYMENT

PSLE 8.2 Scheduled Items

PSLE 8.2.1 Supply and Lay Concrete Pipe Culverts

The supply of ends of pipes shall not be measured separately but deemed to be included in the rate for supply and laying of pipes.

PSLE 8.2.8 Supply and Install Manhole, Catchpits, Headwalls etc.

Excavation and backfilling for manholes, catchpits, headwalls and the like shall not be measured separately, but shall be deemed to be included in the price tendered for the construction of such manholes and headwalls etc.

Manholes and headwalls shall be measured according to type and varying depth only. The rate tendered for the manholes / headwalls shall include for the different pipe sizes, drain sizes and benching configurations.

The typical manhole detail is as per SABS 1200 LE – 1982 Drawing LE – 1.

Add the following new payment items:

PSLE 8.2.14 Supply and Lay Pipes and Subsoil Drains

The unit of measurement shall be the **meter** (m) measured in place along the pipe centreline, including the length of fittings.

The tendered rate shall include full compensation for procuring, furnishing, laying and jointing, bends, fittings and testing the pipes as specified.

Where directed by the Engineer, it may be required to break into manholes to provide an outlet for the subsoil drains. The tendered rate shall be deemed to include for this occurrence as well as making good of the manhole after the pipe has been installed.

PSLE 8.2.15 Concrete Caps for Subsoil Pipes

The unit of measurement shall be the **number** (No) of caps installed in the subsoil drains as instructed by the Engineer.

The tendered rate shall include full compensation for procuring, furnishing and installing the caps as instructed.

PSLE 8.2.16 Design, Supply and Install irrigation system from CSWD to permitted area

The unit of measurement shall be the PC Sum.

The PC Sum covers all works and all sub-contractor payments as needed at the discretion of the Employer. The above works shall only be carried out on the written instruction and approval by the Engineer.

The PC Sum is to include for the design, supply and installation of an irrigation system to convey and to spray evaporate water from the CSWD to the approved irrigation area.

The successful Bidder is required to provide three (3) No. quotations for the specified works and the quotations will be assessed and approved accordingly by the Employer.

C3.4: PARTICULAR SPECIFICATIONS

In addition to the Standardized and Project Specifications the following Particular Specifications / Policies shall apply to this contract:

C3.4.1 OHSA 1993 - SAFETY SPECIFICATION

PARTICULAR SPECIFICATION: OHSA 1993 HEALTH AND SAFETY SPECIFICATION

CONTENTS

OCCUPATIONAL HEALTH AND SAFETY SPECIFICATION

1: 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 85 and amendment Act No 181) 1993, and the corresponding Construction Regulations 2003, and all other safety codes and specifications referred to in the said Construction Regulations.

In terms of the OHSA Agreement 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 OHSA 1993 and the Construction Regulations 2003.

This safety specification and the Contractor's own Safety Plan as well as the Construction Regulations 2003, 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 in the vicinity of potentially inflammable gas (methane).
- 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,
- 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,
- 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.

2: DEFINITIONS

For the purpose of this contract the following shall apply:

(a) "**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 2003. "**Employer**" and "**client**" is therefore interchangeable and shall be read in the context of the relevant document.

(b) "**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 mandatary, without derogating from his status as an employer in his own right.

(c) "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).**

3: 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 2003 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 2003;

(c) a declaration to the effect that he made provision in his tender for the cost of the health and safety measures envisaged in the Construction Regulations.

(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.

4: 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 3,0 m or more;

(b) the use of explosives;

(c) construction work that will exceed 30 days or 300 person-days;

(d) excavation work deeper than 1,0 m; or

(e) working at a height greater than 3,0 m above ground or landings.

The notification must be done in the form of the pro forma included under Section 9 (Forms to be Completed by Successful Tenderer) 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.

5: 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 2003).

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.

6: 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 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.

7: 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. The Safety Officer shall have the necessary competence and resources to perform his duties diligently.

Provision shall be made by the Contractor in his rates, to cover the cost of this dedicated construction safety officer appointed after award of the contract.

7.3: Health and safety representatives

In terms of **Sections 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 a workplace shall be at least one for every 100 employees.

The function of the 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.

The 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 the inspector, and to make recommendations regarding health and safety to 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 competent person as described in Regulation 21(1);

(m) Control of all temporary electrical installations on the construction site as described in Regulation 22.

(n) Stacking and storage on construction sites as described in Regulation 26; and

(o) 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 persons 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.

8: 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 2003;

(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)];

(k) 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)].

(l) Maintenance records of material hoists and inspection results must be kept in a record book to be kept on site [Regulation 17(8)];

(m) A record of any repairs to or maintenance of a batch plant must be kept on site [Regulation 18(9)];

(n) A warning notice must be displayed in a conspicuous manner when and wherever an explosive powered tool is used [Regulation 19(2)];

(o) A register for recording of findings by the competent person appointed to inspect construction vehicles and mobile plant [Regulation 21(1)(j)].

9: CONTRACTOR'S 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 2003.

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 2003, 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 Principal 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 2003.

(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 are 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 all 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) Tunnelling *(Regulation 13)*

The Contractor shall comply with Regulation 13 wherever tunnelling of any kind is involved.

(k) Scaffolding *(Regulation 14)*

The Contractor shall ensure that all the 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 *(Regulation 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 chairs *(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 Regulation 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 R1031 of 30 May 1986), the Driven Machinery

Regulations (Government Notice R295 of 26/2/1988) and the Electrical Installation Regulations (Government Notice R2271 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 the 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 sites *(Regulation 23)*

The Contractor shall comply with the provisions of the General Safety Regulations (Government Notice R1031 of 30 May 2986) 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 environmental 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 of 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 2003

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.

Should the Contractor fail to comply with the provisions of the Regulations 3 to 28 as listed in Regulation 30, he will be guilty of an offence and will be liable, upon conviction, to the fines or imprisonment as set out in Regulation 30.

The Contractor is advised in his own interest to make a careful study of the Act and the Construction Regulations as ignorance of the Act and the Regulations will not be accepted in any proceedings related to non-conformance to the Act and the Regulations.

10: MEASUREMENT AND PAYMENT

10.1:	**Scheduled Item**	**Unit**
	Contractor's obligations in respect of the Occupational Health and Safety Act	**Lump Sum**

Payment of the lump sum tendered in the Preliminary & General item shall include full compensation for all costs resulting from the Contractor's specified obligations in respect of fulfilling his obligations in respect of the Occupational Health and Safety Act.

Payment of the sum tendered will be made in two instalments, as follows:

The first instalment, 50% of lump sum, will be paid after the Contractor has submitted a Health and Safety plan in accordance with the specifications.

The second instalment, 50% of the lump sum, will be paid after the issuing of the Completion Certificate and the submission of the Health and Safety file.

(a) Safety personnel

The Construction Supervisor, the Construction Safety Officer, Health and Safety Representatives, Health and Safety Committee and Competent Persons referred to in clauses PAM-7.1 to 7.5 shall be members of the Contractor's personnel, and no additional payment will be made for the appointment of such safety personnel.

(b) Records and Registers,

The keeping of health and safety-related records and registers as described in PAM-8 is regarded as a normal duty of the Contractor for which no additional payment will be considered, and which is deemed to be included in the Contractor's tendered rates and prices.

C3.4.2 ENVIRONMENTAL MANAGEMENT SPECIFICATION

CONTENTS

ENVIRONMENTAL MANAGEMENT SPECIFICATION

1. PURPOSE

The purpose of the EMP is to encourage good management practices through planning and commitment with respect to environmental issues, and to provide rational and practical environmental guidelines to minimise disturbance of the natural environment.

2. RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT

The contractor will be responsible for environmental control on site during construction and the maintenance period. The construction activities will be monitored by an independent environmental specialist and audited against the EMP.

3. TRAINING AND INDUCTION OF EMPLOYEES

The contractor has a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, etc.).

4. COMPLAINTS REGISTER AND ENVIRONMENTAL INCIDENT BOOK

Any complaints received by the project team from the community will be recorded. The complaint will be brought to the attention of the site manager.

All complaints received will be investigated and a response given to the complainant within 28 days.

All environmental incidents occurring on the site will also be recorded.

5. ENVIRONMENTAL SAFETY

The management of impacts associated with various categories of concern is discussed as separate topics, indicated below.

5.1 Soil

(a) Topsoil should be temporarily stockpiled, separately from (clay) subsoil and rocky material, when areas are cleared. If mixed with clay sub-soil the usefulness of the topsoil for rehabilitation of the site will be lost.

(b) Stockpiled topsoil should not be compacted and should be replaced as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed.

(c) Stockpiled soil should be protected by erosion-control berms if exposed for a period of greater than 14 days during the wet season. The need for such measures will be indicated in the site-specific report.

(d) Topsoil stripped from different sites must be stockpiled separately and clearly identified as such. Topsoil obtained from sites with different soil types must not be mixed.

(e) Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste or any other foreign matter, which may inhibit the later growth of vegetation and micro-organisms in the soil.

(f) Soil must not be stockpiled on drainage lines or near watercourses without prior consent from the Project Manager.

(g) Soil should be exposed for the minimum time possible once cleared of invasive vegetation, that is the timing of clearing and grubbing should be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. Stockpiled topsoil must be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds.

(h) Limited vehicular access is allowed across rocky outcrops and ridges.

(i) All cut and fill surfaces need to be stabilized with appropriate material or measures when major civil works are complete.

(j) Erosion and donga crossings must be dealt with as river crossings. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and destabilized.

(k) All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.

(l) Soil contaminated with oil must be appropriately treated and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods.

(m) Runoff must be reduced by channelling water into existing surface drainage system.

5.2 Water

(a) Adequate sedimentation control measures must be instituted at any river crossings when excavations or disturbance of a riverbanks or riverbeds takes place.

(b) Adequate sedimentation control measures must be implemented where excavations or disturbance of drainage lines of a wetland may take place.

(c) All fuel, chemical, oil, etc spills must be confined to areas where the drainage of water can be controlled. Use appropriate structures and methods to confine spillages such as the construction of berms and pans, or through the application of surface treatments that neutralise the toxic effects prior to the entry into a water course.

(d) Oil absorbent fibres must be used to contain oil spilt in water.

(e) During construction through a wetland, the majority of the flow of the wetland should be allowed to pass downstream.

(f) Vehicular traffic across wetland areas must be avoided.

(g) No dumping of foreign material in streams, rivers and/or wetland areas is allowed.

(h) The wetland area and/or river must not be drained, filled or altered in any way including alteration of a bed and/or, banks, without prior consent from the DWAF. The necessary licenses must be obtained in terms of Section 21 and 22 of the National Water Act, 36 of 1998 from DWAF.

(i) No fires or open flames are allowed in the vicinity of the wetland, especially during the dry season.

(j) No swimming, washing (including vehicles and equipment), fishing or related activity is permitted in a wetland or river without written permission from the Project Manager.

(k) Disturbances to nesting, breeding and roaming sites of animals in or adjacent to wetland areas must be minimized.

5.3 Air

Speed limits must be implemented in all areas, including public roads and private property to limit the levels of dust pollution.

Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that must not result in the generation of run-off.

The site-specific investigation will quantify the impact of dust on nearby wetlands, rivers and dams in terms of sedimentation. Mitigation measures identified during the site specific study must be implemented.

The Contractor must notify the Principal of all schools within 50m of the site of proposed activities. The Principal must in turn ensure that children with allergies and respiratory ailments take the necessary precautionary measures during the construction period. The Contractor must ensure that construction activities do not disturb school activities e.g. dust clouds may reduce visibility affecting sports activities.

Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours.

Noise control measures must be implemented. All noise levels must be controlled at the source. All employees must be given the necessary ear protection gear. IAP's must be informed of the excessive noise factors.

The Contractor must inform all adjacent landowners of any after-hour construction activities and any other activity that could cause a nuisance e.g. the application of chemicals to the work surface. Normal working hours must be clearly indicated to adjacent land owners.

No loud music is allowed on site and in construction camps.

No fires are allowed if smoke from such fires will cause a nuisance to IAP's.

5.4 Social and Cultural

(a) Access by non-construction people onto any construction sites must be restricted. The Contractors activities and movement of staff must be restricted to designated construction areas only.

(b) The Contractors crew must be easily identifiable due to clothing, identification cards or other methods.

(c) Rapid migration of job seekers could lead to squatting and social conflict with resident communities and increase in social pathologies if not properly addressed. The Contractor must ensure that signs indicating the availability of jobs are installed.

(d) Criteria for selection and appointment (by the Contractor) of construction labour must be established to allow for preferential employment of local communities. The Local Authority must be actively involved in the process of appointing temporary labourers.

(e) Sub-Contractors and their employees must comply with all the requirements of this document and supporting documents e.g. the Contract document that applies to the Contractor. Absence of specific reference to the sub-contractor in any specification does not imply that the sub-contractor is not bound by this document.

(f) No member of the construction workforce is allowed to wander around private property, except within the immediate surroundings of the site.

(g) The Contractor must provide suitable sanitation facilities for site staff. Sanitation provided during the construction phase should be managed so that it does not cause environmental health problems. The use of the surrounding veld for toilet purposes is not permitted under any circumstance.

(h) The Contractor must arrange for all his employees and those of his sub-contractors to be informed of the findings of the environmental report before the commencement of construction to ensure:

- A basic understanding of the key environmental features of the work site and environments, and

- Familiarity with the requirements of this document and the site specific report.

(i) Supervisory staff of the Contractor or his sub-contractors must not direct any person to undertake any activities which would place such person in contravention of the specifications of this document, endanger his/her life or cause him/her to damage the environment.

(j) The demand for construction materials and supplies will have an effect on the local economy. This impact can be optimised by sourcing and purchasing materials locally and regionally wherever possible, insofar as the material complies with the design specification.

(k) The Contractor must maintain a detailed complaints register. This must be forwarded, together with solutions, to the authorities when requested.

5.5 Aesthetics

(a) Scenic Quality

Damage to the natural environment must be minimized.

Trees and tall woody shrubs must be protected from damage to provide a natural visual shield. Excavated material must not be placed on such plants and movement across them must not be allowed, as far as practical.

The clearing of all sites must be kept to a minimum and surrounding vegetation must, as far as possible, be left intact as a natural shield.

No painting or marking of natural features must be allowed.

(b) All above ground structures could be treated or painted to blend in with the natural environment.

(c) Cut and fill areas, river and stream crossings and other soil stabilisation works must be constructed to blend in with the natural environment.

(d) Natural outcrops, rocky ridges and other natural linear features, must not be bisected. Vegetation on such features must, as far as possible, not be cut unless absolutely necessary for construction.

(e) Excavated material must be flattened (not compacted) or removed from site. No heaps of spoil material must be left on site once the Contractor has moved to a new construction site.

(f) Any complaints from interest groups regarding the appearance of the construction site must be recorded and addressed promptly by the Contractor.

5.6 Archaeology and Cultural Sites

(a) All finds of human remains must be reported to the nearest police station.

(b) Human remains from the graves of victims of conflict, or any burial ground or part thereof which contains such graves and any other graves that are deemed to be of cultural significance may not be destroyed, damaged, altered, exhumed or removed from their original positions without a permit from the South African Heritage and Resource Agency (SAHRA).

(c) Work in areas where artefacts are found must cease immediately.

(d) Under no circumstances must the Contractor, his/her employees, his/her sub-contractors or his/her sub-contractors' employees remove, destroy or interfere with archaeological artefacts. Any person who causes intentional damage to archaeological or historical sites and/or artefacts could be penalised or legally prosecuted in terms of the National Heritage Resources Act, 25 of 1999.

(e) A fence at least 2 m outside the extremities of the site must be erected to protect archaeological sites.

(f) All known and identified archaeological and historical sites must be left untouched.

(g) Work in the area can only be resumed once the site has been completely investigated. The Project Manager will inform the Contractor when work can resume.

5.7 Flora

(a) All suitable and rare flora and seeds must be rescued and removed from the site. They must be suitably stored, for future use in rehabilitation.

(b) The felling and/or cutting of trees and clearing of bush must be minimised.

(c) Bush must only be cleared to provide essential access for construction purposes.

(d) The spread of alien vegetation must be minimized.

(e) Any incident of unauthorised removal of plant material, as well as accidental damage to priority plants, must be documented by the Contractor.

(f) Woody vegetative matter stripped during construction must either be spread randomly throughout the surrounding veld so as to provide biomass for other micro-organisms and habitats for small mammals and birds, or it may be stockpiled for later redistribution over the reinstated topsoiled surface. No vegetative matter must be burnt or removed for firewood other than those removed during the grubbing and clearing phase. Such vegetation can be made available to the local inhabitants to be used as firewood.

(g) No tree outside the footprint of the Works area must be damaged.

5.8 Fauna

(a) No species of animal may be poached, snared, hunted, captured or wilfully damaged or destroyed.

(b) Snakes and other reptiles that may be encountered on the construction site must not be killed unless the animal endangers the life of an employee.

(c) Anthills and/or termite nests that occur must not be disturbed unless it is unavoidable for construction purposes.

(d) Disturbances to nesting sites of birds must be minimized.

(e) The Contractor must ensure that the work site is kept clean and free from rubbish, which could attract pests.

5.9 Infrastructure

(a) The relevant authorities must be notified of any interruptions of services, especially the Local Municipality, National Road Agency, Spoornet, TELKOM and ESKOM. In addition, care must be taken to avoid damaging major and minor pipelines and other services.

(b) The integrity of property fences must be maintained.

(c) No telephone lines must be dropped during the construction operations, except were prior agreement by relevant parties is obtained. All crossings must be protected, raised or relocated as necessary.

(d) All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented.

(e) Storage Facilities

- Proper storage facilities should be provided for the storage of oils, grease, fuels, chemicals and hazardous materials.

- The Contractor must ensure that accidental spillage does not pollute soil and water resources.

- Fuel stock reconciliation must be done on all underground tanks to ensure no loss of oil, which could pollute groundwater resources.

- Cement must be stored and mixed on an impermeable substratum.

(f) Traffic Control

All reasonable precautions must be taken during construction to avoid severely interrupting the traffic flow on existing roads, especially during peak periods.

Before any work can start the Local Traffic Department must be consulted about measures to be taken regarding pedestrian and vehicular traffic control.

(g) Access Roads

The Contractor and the affected landowner must collaborate on the planning and construction of new access routes and the repair or upgrading of existing routes.

Access to the site must be controlled such that only vehicles and persons directly associated with the work gains access to the site.

Temporary access roads must not be opened until required and must be restored to its former state as soon as the road is no longer needed.

(h) Batching Plants

Concrete must be mixed only in an area demarcated for this purpose. All concrete spilled outside this area, must be promptly removed by the Contractor and taken to a permitted waste disposal site. After all concrete mixing is complete, all waste concrete must be removed from the batching area and disposed of at an approved dumpsite. Stormwater must not be allowed to flow through the batching area. Water laden with cement must be collected in a retention area for evaporation and not allowed to escape the batching area. Operators must wear suitable safety clothing.

(i) Chemical toilet facilities should be managed and serviced by a qualified company. No disposal or leakage of sewerage should occur on or near the site.

(j) Blasting

Blasting must not endanger public or private property.

Noise mufflers and/or soft explosives must be used to minimize the impact on animals.

All the provisions of the Explosives Act, 26 of 1956 and the Minerals Act, 50 of 1991 must be complied with.

The Contractor must take measures to limit flyrock.

5.10 Safety

(a) Measures must be taken to prevent any interference that could result in flashover of power lines due to breaching of clearances or the collapse of power lines due to collisions by vehicles and equipment.

(b) Measures must be taken during thunderstorms to protect workers and equipment from lightning strikes.

(c) All tall structures must be properly earthed and protected against lightning strikes.

(d) The process of excavation and back filling must be carried out as a sequential process following one another as quickly as possible. Excavations must only remain open for a minimum period of time and during this time they must be clearly demarcated. If excavations place the public at risk these sites must be fenced.

(e) The residents directly affected by open trenches must be notified of the dangers. This will be done during the site-specific phase.

5.11 Waste

Solid Waste

(a) Littering on site and the surrounding areas is prohibited.

(b) Clearly marked litterbins must be provided on site. The Contractor must monitor the presence of litter on the work sites as well as the construction campsite.

(c) All bins must be cleaned of litter regularly.

(d) All waste removed from site must be disposed at a municipal/permitted waste disposal site.

(e) Excess concrete, building rubble or other material must be disposed of in areas designated specifically for this purpose and not indiscriminately over the construction site.

(f) The entire works area and all construction sites must be swept of all pieces of wire, metal, wood or other material foreign to the natural environment.

(g) Contaminated soil must be treated and disposed of at a permitted waste disposal site, or be removed and the area rehabilitated immediately.

(h) Waste must be recycled wherever possible.

Liquid Waste

(a) The Contractor must maintain mobile toilets on site.

(b) The Contractor must provide adequate and approved facilities for the storage and recycling of used oil and contaminated hydrocarbons. Such facilities must be designed and sited with the intention of preventing pollution of the surrounding area and environment.

(c) All vehicles must be regularly serviced in designated area within the Contractors camp such that they do not drip oil.

(d) All chemical spills must be contained and cleaned up by the supplier or professional pollution control personnel. Run-off from wash bays must be intercepted.

Hazardous Waste

(a) No hazardous materials must be disposed of in the veld or anyplace other than a registered landfill for hazardous material. Hazardous waste must be stored in containers with tight lids that must be sealed and must be disposed at an appropriately permitted hazardous waste disposal site. Such containers must not be used for purposes other than those originally designed for.

(b) The Contractor must maintain a hazardous material register.

5.12 Rehabilitation and Site clearance

(a) When all major construction activities are completed, the site must be inspected to determine site-specific rehabilitation measures. This may be considered as unplanned work e.g. soil rehabilitation due to oil spills.

(b) All temporary buildings and foundations, equipment, lumber, refuse, surplus materials, waste, construction rubble fencing and other materials foreign to the area must be removed.

(c) If waste products cannot be recycled they must be disposed of at a permitted landfill site.

(d) All drainage deficiencies including abandoned pit latrines and waste pits must be corrected.

(e) Cut and fill areas must be restored and re-shaped.

(f) The area must be restored to its natural vegetation condition using indigenous trees, shrubs and grasses as directed by a grassland and/or rehabilitation expert.

(g) Borrow pits must be re-shaped into even slopes and surfaces to blend with the natural terrain and topsoil must be replaced.

(h) The grass mix, shrubs and trees used for rehabilitation must be compatible with the species identified in the site-specific investigation.

(i) Areas compacted by vehicles during construction must be scarified to allow penetration of plant roots and the regrowth of natural vegetation.

6. MEASUREMENT AND PAYMENT

No additional payment will be made to the Contractor to comply with the above actions as it will be deemed to be included in the rates tendered.

C3.4.3 PARTICULAR SPECIFICATION: DAYWORK SCHEDULE

CONTENTS

PARTICULAR SPECIFICATION: DAYWORK SCHEDULE

1 GENERAL

In cases where the Engineer orders any variation in the form, quality or quantity of the work or any extra work to such an extent that the tendered rates for specific items are no longer applicable, or where a combination of tendered rates cannot be applied to compensate for such work, the Engineer may, in terms of the General Conditions of Contract, order that the amended or extra work be carried out as daywork at the cost of labour, plant and materials. For that purpose provision is made for the Contractor to tender his rates for labour and plant in the Daywork Schedule which forms part of this contract.

No work will be measured as daywork unless:

(a) the Engineer agrees that the varied work is not in accordance with the specification or scope of a measured item in the contract;

(b) the Engineer has issued an order in writing for the execution of such varied work; and

(c) statements of plant and labour are submitted daily to the Engineer for his consideration and approval.

All work valued at the tendered rates in the Daywork Schedule will be subject to contract price adjustment as applicable to the Contract.

2 SALARIES AND WAGES OF WORKMEN

The amount to be paid for labour will be based on the rates tendered in the Daywork Schedule for the workers executing the work. The tendered rates shall be all-inclusive and shall be held to cover all charges for the Contractor's profits, timekeeping, clerical work, insurance, establishment, superintendence, the use of hand tools, etc, and no additional surcharge over and above the tendered rates will be applicable.

3 CONSTRUCTIONAL PLANT

The rates for constructional plant as tendered in the Daywork Schedule shall cover all costs, overheads and profit for the contractor and no further surcharge will be payable on the tendered rates. The cost of operators shall be included in the tendered rates.

Where plant or equipment for which no rates exist in the Daywork schedule are employed, the cost thereof shall be determined as agreed with the Engineer in terms of the General Conditions of Contract. In such case contract price adjustment will only be applicable if the agreed cost is based on rental rates at the time of the base month before closing of tenders, or if the ruling rates current at the time of the execution of the work are de-escalated to the base month.

The Contractor will be paid for the transport to and from the site of constructional plant not on site and specially ordered by the Engineer to be brought on site. No payment will be made for transport of equipment listed in the Contractor's Schedule of Constructional Plant in the tender document, or for equipment which has been removed from the site on request of the Contractor, or for equipment already on site, regardless of whether it appears on the Schedule of Constructional plant or not.

4 MATERIALS

Materials required for daywork items which cannot be compensated under existing rates and have to be purchased, will be paid for at cost, excluding VAT, plus a surcharge of 15%. The cost of materials provided for daywork at current rates at the time when the work is executed, will not be subject to contract price adjustment unless the prices of the materials are de-escalated to the base month for escalation.

5 MEASUREMENT AND PAYMENT

As per Section C3.3.2 AMENDMENTS TO THE STANDARD SPECIFICATIONS, Clause PSA 8.7

PSA 8.7 Daywork

All daywork rates are inclusive of supervision and all overheads. Daywork rates will apply irrespective of the conditions contained in Clause 5.7 of the General Conditions of Contract.

Where applicable. the unit of measurement is the hour or part thereof during which workers were engaged in daywork.

The tendered rate shall include full compensation for all salaries, wages, bonuses, pension, insurance, medical aid and other benefits as well as overheads arising from administrative personnel, site agents, supervisors, tools and profit. No surcharge will be paid on the tendered rates

The cost of operators included in the rates for constructional plant, will not be measured again under Labour.

The unit of measurement for *Lowbed transport of plant to and from the site* is the ton constructional equipment multiplied by the kilometre distance over which the plant has been transported with a lowbed transporter as ordered by the Engineer.

The unit of measurement for the hour is the hour or part thereof during which the item of plant had been in active use for the daywork operation, including stopping time of less than five minutes.

Where applicable travel time to and from the normal parking position on site, or the position of the most recent non-daywork activity, as well as stopping time exceeding five minutes shall be multiplied by a factor of 0,6. Time shall be measured by means of a vibrating clock card.

The tendered rates shall include full compensation for the supply, maintenance, service, repairs, depreciation as well as fuel, lubricants, licensing, insurance, overheads and profit. It shall also include the cost of drivers and operators.

C3.4.4 PART PAA : GEOMEMBRANE LINER

PAA 1 GEOMEMBRANE LINER

PAA 1.1 Scope

The geomembrane liner to be utilised for the landfill cell, leachate dam and contaminated stormwater dams shall be an approved HDPE geomembrane. The HDPE geomembrane shall be 1,5mm thick double sided textured. Spray-on texturing will not be permitted. The material will not be used unless approved by the Engineer, who may require test results (including friction tests) before acceptance.

PAA 1.2 Definitions

For the purposes of this specification, the following definitions shall apply:

a) **Manufacturing Quality Control (MQC)**: A planned system of inspections that is used to directly monitor and control the manufacture of a material which is factory originated. MQC is normally performed by the manufacturer of geosynthetic materials and is necessary to ensure minimum (or maximum) specified values in the manufactured product. MQC refers to measures taken by the manufacturer to determine compliance with the requirements for materials and workmanship as stated in certification documents and contract specifications.

b) **Manufacturing Quality Assurance (MQA)**: A planned system of activities that provides assurance that the materials were constructed as specified in the certification documents and contract specifications. MQA includes manufacturing facility inspections, verifications, audits and evaluation of the raw materials and geosynthetic products to assess the quality of the manufactured materials. MQA refers to measures taken by the geomembrane lining contractor and/or engineer as applicable to determine if the manufacturer is in compliance with the product certification and contract specifications for a project.

c) **Construction Quality Control (CQC):** A planned system of inspections that is used to directly monitor and control the quality of a construction project. Construction quality control should be performed by the geomembrane lining contractor and is necessary to achieve quality in the constructed or installed system. Construction Quality Control (CQC) refers to measures taken by the installer or contractor to determine compliance with the requirements for materials and workmanship as stated in the drawings and specifications for the project.

d) **Construction Quality Assurance (CQA)**: A planned system of activities that provides the employer, engineer and permitting authorities assurance that the facility was constructed as specified in the design. Construction Quality Assurance (CQA) includes inspections, verifications, audits and evaluations of materials and workmanship necessary to determine and document the quality of the constructed facility. Construction Quality Assurance (CQA) refers to measures taken by the engineer to assess if the geomembrane contractor is in compliance with the drawings and specifications for the project.

PAA 1.3 Materials

The specific material requirements are:

The geomembrane liner shall be:

a) 1.5mm thick high density polyethylene (HDPE) double sided textured.

PAA 1.3.1 Composition

The material shall:

a) be manufactured from a hexane or octane based resin for the HDPE
b) be pigmented with 3% by weight of Carbon Black Printe X 80 or as recommended by the manufacturer of the specified resin;
c) contain not more than 5% by mass of in-line, recycled/reprocessed polymers, fillers, plasticizers or extenders.

PAA 1.3.2 Manufacture

a) For the purposes of this Project, all applicable conditions of ***GRI GM13*** and ***SANS 1526*** are to be met, in addition to the following conditions:

   i. Thickness to be nominal, not -5%, and the lowest individual thickness for any of the ten (10) values is to be -10%, as per ASTM D559.

   ii. Break elongation to be minimum 400%, as per ASTM D6693 Type IV.

   iii. Puncture resistance to be a minimum of 450N for 1.5mm and 600N for 2mm, as per ASTM D4833.

   iv. Standard OIT to be 200 minutes, as per ASTM D3895.

   v. HP OIT to be 600 minutes, as per ASTM D5885.

   vi. Minimum Asperity Height 0.4mm, as per ASTM D7466.

   vii. Texturing is to be embossed.

b) If a tenderer wishes to submit any other product, full shear box test results using site appropriate materials must be submitted with the tender.

PAA 1.3.3 Testing

It is recognised that due to differences in the chemical constituents of materials making up the geomembrane liner, as well as the variations in the manufacturing process, the physical and chemical properties may vary. The tenderer shall thus submit the following data and appropriate test results, if alternatives are forward, to enable evaluations and comparisons of the materials to be made.

Property	**Test Method**	**Unit**
Nominal thickness variation	D 5994	%
Asperity Height	D 7466	mm
Formulated Density	D 1505 / D792	g/cm³
Puncture Resistance	D 4833	N
Tear Resistance	D 1004	N
Tensile Stress at Yield	D 6693	MPa
Tensile Stress at Break	D 6693	MPa
Elongation at Yield	D 6693	%
Elongation at Break	D 6693	%
Carbon Black Content	D 4218	%

Tenderers should also note that the geomembrane liners selected should be resistant to degradation by sunlight, ultra-violet rays, ozone, airborne pollution, weathering and municipal leachate.

It is expected that the leachate will contain a range of contaminants, including simple organic acids and alcohols, ammonia, humic and fulvic acids as well as inorganic salts high in sodium, calcium, chloride, sulphate and iron.

PAA 1.4 Manufacturing Quality Control and Manufacturing Quality Assurance

Tenderers shall submit with the tender, details of the Manufacturing Quality Control (MQC) and Manufacturing Quality Assurance (MQA) procedures that are utilised by the manufacturer and supplier respectively of the offered products. Tenderers shall also submit evidence that GRI GM13 and SANS 1526 is adhered to.

In addition to the above, tenderers shall submit details of the manufacturer's experience in the production of geomembrane liners with particular reference to the amount produced (m^2), thickness (mm) and material composition (FPP, HDPE, LLDPE etc).

Noncompliance with this part of the specification may be considered sufficient grounds to reject the tender.

PAA 1.5 Construction Quality Control - Introduction

This specification addresses the minimum measures that must be incorporated by the contractor in his Construction Quality Control Programme to ensure the quality of workmanship and the installation integrity of the geomembrane liners.

It is recognised that careful and specific documentation of the installation procedure is required to substantiate this Construction Quality Control Programme. The onus shall be on the contractor to ensure that his Quality Control Co-coordinators carries out this task to the satisfaction of the engineer.

PAA 1.6 Material Delivery

The engineer or his representative should be present, whenever possible, to observe the material delivery and unloading on site. The engineer or his representative is to note any material received in a damaged state and to remove any necessary conformance samples. Upon mobilisation on site, the contractor shall:

a) verify that the equipment used on site is adequate and does not present a risk of damage to the geomembrane or other materials,
b) mark rolls or portions of rolls which appear damaged,
c) verify that storage of materials ensures adequate protection against dirt, theft, vandalism, passage of vehicles and that the storage area is dry, ventilated and not exposed to direct sunlight,
d) ensure that rolls are properly labeled and that labeling corresponds with quality control documentation,
e) ensure that roll numbers, date, roll size and any damage are logged on the material delivery checklist.

PAA 1.7 Geomembrane Installation

PAA 1.7.1 Earthworks

The contractor shall be responsible for preparing and maintaining the base preparation layer in a condition suitable for the installation of the geomembrane liner.

The base preparation layer shall be free of any sharp stones greater than 5mm and shall be finished to a level standard such that no step greater than 10mm, nor a gap greater than 20mm, can be measured beneath a 3m straightedge, particularly at construction joints as directed by the Engineer on site.

PAA 1.72 Surface Acceptance

Immediately prior to the placement of the geomembrane liner, the surface shall be moistened and swept clean by the contractor. The installer shall provide the contractor with a written acceptance of the surface to be lined. Subsequent changes or repairs to the subgrade and the surface shall remain the responsibility of the contractor.

PAA 1.7.3 Anchor Trenches

The anchor trenches, if required, shall be excavated by the contractor to line and widths shown on the design drawings, prior to the geomembrane liner placement.

Anchor trenches excavated in clay soils susceptible to desiccation cracking should be excavated only for the length required for that day's geomembrane liner placement

Corners in the anchor trenches shall be slightly rounded where the geomembrane liner adjoins the trench in order to minimise sharp bends in the geomembrane liner.

PAA 1.7.4 Field Panel Placement

a) Panel Placement Forms

Placement forms must be submitted to the Engineer and approved before commencement of the installation.

b) Weather Conditions

Geomembrane liner deployment will not be carried out during any precipitation, in the presence of excessive moisture, in an area of standing water or during high winds.

c) Method of Deployment

The method and equipment used to deploy the panels must not damage the geomembrane liner or the supporting subgrade surface.

No personnel working on the geomembrane liner will wear shoes that can damage the geomembrane liner or engage in actions which could result in damage to the geomembrane liner.

When using welding/seaming equipment, a protection sheet shall be placed on the geomembrane liner and used as a working surface. All tools and equipment shall be placed on this sheet when not in use.

Adequate temporary loading and/or anchoring (i.e. sand bags, tyres), which will not damage the geomembrane liner, will be suitably placed to prevent wind lifting up the geomembrane liner.

The geomembrane liner will be deployed with enough slack to allow for typical thermal effects. Measures should be taken to prevent and / or accommodate wrinkling of the geomembrane liner resulting from its dimensional instability.

Any area of a panel seriously damaged (torn, twisted or crimped) will be marked and repaired in accordance with clauses elsewhere in of this specification.

The use of steel pegs driven through the geomembrane liner, as a means of securing it in anchor trenches, will not be permitted.

Irregular panels shall be cut so as to allow adequate overlaps for seaming.

PAA 1.7.5 Geomembrane Field Seaming

PAA 1.7.5.1 General Requirements

All personnel performing seaming operations shall be trained in the operation of the specific seaming equipment being used and will qualify by successfully welding a test seam as described in the specifications.

PAA 1.7.5.2 Equipment

a) Fusion Welding

Fusion welding consists of placing a heated wedge, mounted on a self propelled vehicular unit, between two (2) overlapped sheets such that the surface of both sheets are heated above the geomembrane material's melting point. After being heated by the wedge, the overlapped panels pass through a set of preset pressure wheels, which compress the two (2) panels together to form the weld. The fusion welder is to be equipped with a device, which continuously monitors the temperature of the wedge.

b) Extrusion Fillet Welding

Extrusion fillet welding consists of introducing a ribbon of molten resin along the edge of the overlap of the two (2) geomembrane sheets to be welded. A hot air preheat and the addition of molten polymer causes some of the material of each sheet to be liquefied, resulting in a homogeneous bond between the molten weld bead and the surfaces of the overlapped sheets. The extrusion welder is to be equipped with gauges giving the temperature of the apparatus and a numerical setting for the pre-heating unit.

The use of hot air blowers and rollers as a sole method of seaming will not be permitted.

PAA 1.7.5.3 Weather Conditions

Factors such as the geomembrane temperature, humidity, wind, precipitation, etc., can affect the integrity of field seams and must be taken into account when deciding whether or not seaming should proceed. Test seams are required prior to daily production to determine if the weather conditions will affect the contractor's ability to produce quality seams. Additional non-destructive and destructive testing of production seams will be carried out to substantiate the decision made by the contractor to seam on any given day.

PAA 1.7.6 Seam Preparation

a) Fusion Welding

The panels of the geomembrane liner shall be overlapped by approximately 100mm to 150mm prior to welding.

The seam area must be cleaned prior to seaming to ensure the area is clean and free of moisture, dust, dirt or debris of any kind.

The panels must be adjusted so that seams are aligned with the fewest possible number of wrinkles and "fishmouths".

A movable protective layer may be used, at the discretion of the contractor, directly below the overlap of the geomembrane liner to be seamed, to prevent build-up of dirt or moisture between the panels.

b) Extrusion Fillet Welding

Whenever possible, the sheets shall be bevelled prior to heat tacking commences.

The panels of the geomembrane liner shall be overlapped a minimum of 75mm.

Using a hot air device, the panels of the geomembrane liner to be welded should be temporarily tacked, taking care not to damage the geomembrane liner.

The seam area must be cleaned prior to seaming to assure the area is clean and free of moisture, dust, dirt and debris of any kind.

The seam overlap should be ground prior to welding within one (1) hour of the welding operation in a manner that does not damage the geomembrane liner. Grind marks should be covered with extrudate whenever possible. In all cases, grinding should not extend more than 5mm past the edge of the area covered by the extrudate during welding.

The extruder should be purged prior to beginning the seam in order to remove all heat degraded extrudate from the barrel.

The welding rod should be kept clean and dry.

PAA 1.7.7 Trial Welds

a) General

Trial welds must be conducted by welding technicians prior to each seaming period, or every five (5) hours, or as weather conditions dictate, or as requested by personnel if welding problems are suspected, or if requested by the engineer or his representative. All trial welds will be conducted under the same conditions as those expected during actual seaming. Once qualified, after passing trial welding tests, technicians will not change parameters without performing another trial weld.

b) Trial Weld Length

A trial weld shall be conducted by joining two (2) pieces of geomembrane liner, each piece at least 150mm in width. Trial welds for fusion welds will be approximately 2m long and extrusion trial welds will be a minimum of 1m long.

c) Sample Procedure

The seam should be visually inspected for squeeze out, footprint pressure and general appearance.

Three (3) 25mm wide specimens should be cut, one (1) from the middle of the seam and one each 300mm from each end of the test seam using a 25mm die cutter. The specimens shall then be tested for peel using a field tensiometer.

In order for a trial weld to be considered acceptable, all three specimens must meet the following criteria:

(i) Exhibit Film Tearing Bond (FTB)

(ii) If any specimen is nonconforming, the entire procedure shall be repeated. In the case of double track fusion welded seams, both welds must pass in order to be considered acceptable.

If repeat tests utilising reasonable sets of welding parameters also fail, the seaming apparatus shall not be accepted and shall not be used for seaming until the deficiencies are corrected and a passing test seam is achieved.

d) Trial Weld Documentation

The CQC co-ordinator and the engineer or his representative will be present during peel testing and will record date, time, operator, machine number, ambient and operating temperatures, speed setting, peel values and pass/fail designation.

All trial weld records shall be recorded on the Trial Weld Information Form.

The CQC co-ordinator will give final approval to proceed with welding once the engineer or his representative has verified that he too is satisfied that all procedures have been correctly completed.

PAA 1.7.8 General Seaming Procedures

When welding a seam, the proper overlap should be monitored and maintained. Seaming shall extend a minimum of 300mm into the anchor trench.

No horizontal joints shall be allowed on any slope during installation of the geomembrane.

The seam area should be inspected to ensure that it is clean and free of moisture, dust, dirt or debris of any kind. Extreme care is to be taken with regard to temperature. This includes machine operating temperatures, ambient temperatures and geomembrane liner temperatures.

Welding technicians should periodically check machine operating temperatures and speed and record his information on the geomembrane sheet.

Wrinkles at the seam overlap should be aligned to allow welding through the wrinkle.

"Fishmouths" or wrinkles at seam overlaps that cannot be welded, should be cut along the ridge in order to achieve a flat overlap. The cut "fishmouth" or wrinkle should be heat tacked flat and extruded or patched with an oval or round patch using the same geomembrane liner and extending a minimum of 75mm beyond the cut in all directions.

All cross/butt seams between two (2) rows of seamed panels should be welded during the coolest time of the day, or when practical, to allow for typical thermal expansion of the geomembrane liner.

Prior to welding cross/butt seams, the top and bottom overlap of intersecting fusion welded seams should be trimmed to 150mm. Intersecting extrusion fillet welded seams should be ground to flatten the extrusion bead prior to welding butt seams.

All "T" joints produced as a result of cross/butt seams should be extrusion fillet welded. The overlap on each "leg" of the "T" joint should be trimmed back 150mm. A length of 75mm minimum on each of the three (3) legs of the "T" should be ground and all of the area prepared by grinding should be extrusion welded.
Whenever possible welding technicians should cut a 25mm peel specimen at the end of every seam underneath the future overlap. Prior to welding the next seam, the specimen will be tested for peel.

In the event that non-complying seam test strips are encountered, the welding machine will be taken out of service until a passing trial weld is obtained. Additional peel specimens will be taken to localise the flaw.

The engineer or his representative may order the CQC co-ordinator to take destructive samples from any seam, if defects are suspected.

Any texturing which lies within the seam area, is to be carefully ground off without damaging the geomembrane liner, if it cannot be proven that good welds can be obtained without grinding it off.

PAA 1.7.9 Seaming Documentation

Welding technicians should mark on the liner with permanent markers at the start of all seams information regarding date, time, welding technician ID, machine number and set temperature. The CQC co-ordinator should record date, time, seam number, welding technician ID, machine ID, set temperature, speed and weather conditions on the Panel Seaming Form.

Welding technicians should periodically check operating temperature and speed and record the information along the seam.

The CQC co-ordinator should make periodic checks on welding operations to verify overlap, cleanliness etc.

PAA 1.7.10 Seam Testing

PAA 1.7.10.1 Concept

a) Air Pressure Testing

The equipment for air testing should consist of:

(i) An air pump (manual or motor driven) capable of generating and sustaining a pressure between 100 to 300 kPa.

(ii) A rubber hose with fittings and connections.

(iii) A sharp hollow needle, or other approved pressure feed device, with a pressure gauge capable of reading and sustaining a pressure between 100 to 300 kPa.

b) Procedure for Air Testing

Both ends of the seam to be tested should be sealed.

A needle, or other approved pressure feed device, should be inserted into the sealed channel created by the fusion weld.

The test channel should be inflated to a pressure of approximately 200 kPa and the pressure maintained within the range listed in the initial pressure schedule. With the valve closed, the initial pressure should be observed and recorded. The pressure given in the tables below should be adjusted for actual temperatures as measured on site.

INITIAL PRESSURE SCHEDULE *

Material thickness (mm)	Minimum kPa	Maximum kPa
1.0 1.5 2.0	150 175 200	200 225 250

* Initial pressure settings should be recorded after an optional two (2) minute stabilisation period. The purpose of this "relaxing period" is to permit the air temperature and pressure to stabilise. The initial pressure reading may be recorded once stabilisation has taken place.

  The air pressure should be observed and recorded two to three minutes after the initial pressure setting is recorded. If the loss of pressure exceeds the following, or if the pressure does not stabilise, the suspect area should be located and repaired in accordance with clauses elsewhere in this document.

MAXIMUM PERMISSIBLE PRESSURE DIFFERENTIAL AFTER TWO TO THREE MINUTES

Material (mm)	**Pressure Differential (kPa)**
1,0	25
1,5	20
2,0	15

At the conclusion of all pressure tests, the end of the air channel opposite the pressure gauge should be cut. A decrease in gauge pressure must be observed or the air channel will be considered "blocked" and the test will have to be repeated from the point of blockage. If the point of blockage cannot be found, the air channel in the middle of the seam should be cut and each half treated as a separate test.

The pressure feed needle should be removed and the resulting hole sealed by extrusion welding.

c) Procedure for Non-Complying Air Pressure Test

In the event of a non-complying air pressure test, the following procedure should be followed:

The seam end seals should be checked and seams retested.

If a seam will not maintain the specified pressure, the seam should be visually inspected to localise the flaw.

If the seam passes the visual inspection, the overlap left by the wedge welder should be removed and the entire length of seam should be vacuum tested in accordance with this clause.

If a leak is located by the vacuum test, it should be repaired by extrusion fillet welding. The repair should be tested by vacuum testing.

If no leak is discovered by vacuum testing, the seam will be considered to have passed non-destructive testing.

If one or more peel specimens are in non-compliance, additional samples should be taken as described below.
When two (2) passing samples are located, the length of seam bounded by the two (2) passing test locations will be considered non-complying. The overlap left by the wedge welder should be heat tacked in place along the entire length of seam and the non-complying portion of seam should be extrusion fillet welded.

The entire length of the repaired seam should be tested by vacuum testing.

d) General Air Testing Procedures

The opposite end of the air channel should in all cases be pierced to ensure that no blockages of the air channel have occurred.

Whenever possible, seams should be air tested prior to completing butt seams to avoid having to cut into the geomembrane liner.

All cuts through the geomembrane liner, as a result of testing, should be repaired by extrusion welding.

All needle holes in air channels, within the boundaries of the active cell, should be repaired with an extrusion bead.

e) Air Pressure Testing Documentation

All information regarding air pressure testing (date, initial time and pressure, final time and pressure, pass/fail designation, and technician's number) must be recorded on one end of the seam, or portion of seam tested. All of the above information will also be logged on the Non-destructive Testing Form.

PAA 1.7.11 Vacuum Testing

This test is to be used on extrusion welds, or when the geometry of a fusion weld makes air pressure testing impossible or impractical, or when attempting to locate the precise location of a defect believed to exist after air pressure testing.

a) Equipment for Vacuum testing

The equipment should consist of ;

(i) Vacuum box assembly consisting of a rigid housing with a soft neoprene gasket attached to the open bottom, a transparent viewing window, port hole or valve assembly and a vacuum gauge.

(ii) Vacuum pump or Venturi assembly equipped with a pressure controller and pipe connection.

(iii) A rubber pressure/vacuum hose with fittings and connections.

(iv) A bucket and means to apply a soapy solution.

(v) A soapy solution.

b) Procedure for Vacuum Testing

Any excess overlap should be trimmed from the seam.

The vacuum pump/compressor should be turned on to reduce the vacuum box gauge pressure to approximately 34kP.

A generous amount of a strong solution of liquid detergent and water should be applied to the area to be tested.

The vacuum box should be placed over the area to be tested and sufficient downward pressure applied to "seat" the seal strip against the geomembrane liner.

The bleed valve should be closed and the vacuum valve opened.

A minimum of 34kPa vacuum should be applied to the area as indicated by the gauge on the vacuum box.

It should be ensured that a leak tight seal is created.

For a period of approximately 10 seconds the geomembrane liner should be examined through the viewing window for the presence of soap bubbles.

After this period the vacuum valve should be closed and the bleed valve opened. The box should be moved over to the next adjoining area with a minimum 75mm overlap and the process repeated.

c) Procedure for non-complying test

All areas where soap bubbles appear should be marked and such areas repaired.

Repaired areas should be retested.

d) General Vacuum Testing Procedures

Vacuum box testing should be performed only by qualified construction personnel.

The overlap must be trimmed prior to vacuum boxing all seams.

Special attention shall be exercised when vacuum testing "T" seams or patch intersections with seams.

e) Vacuum Testing Documentation

The vacuum testing crew should use permanent markers to write on geomembrane liner indicating tester's ID number, date, and pass/fail designation on all areas tested.

Records of vacuum testing should be recorded by the CQC co-ordinator or testing crew on the Non-destructive Testing Form or Repair Report Form.

PAA 1.7.12 Destructive testing

a) Concept

The purpose of destructive testing is to determine and evaluate seam strength. These tests require direct sampling and thus subsequent patching. Therefore, destructive testing should be held to a minimum in order to reduce the amount of repairs to the geomembrane liner.

b) Procedure for Destructive Testing

Destructive test samples should be marked by the engineer or his representative and cut out randomly at a minimum average frequency of one (1) test location every 150m of seam length, unless otherwise specified or agreed. Whenever possible these samples will be cut in the overlap region to avoid having to repair good wedge welds with inferior extrusion welds. The size will be adjusted accordingly to enable this.

The location of destructive samples will be selected by the engineer or his representative, with samples being cut by the staff of the contractor.

Destructive samples should be taken and tested as soon as possible after the seams have been welded (the same day), in order to receive test results in a timely manner.

Qualified personnel should observe all field destructive testing and record date, time, seam number, location and test results on the Destructive Testing Form.

All destructive test locations with pass/fail designation will be marked on the geomembrane liner with permanent markers.

i) Sample Size

The sample should be 300mm wide with a seam 400mm long, centred length-wise in the sample. The sample may be increased in size to accommodate independent laboratory testing by the engineer or by specific project specifications.

A 25mm specimen shall be cut from each end of the test seam for field testing.

The two (2) 25mm wide specimens should be tested on a field tensiometer for peel strength. If either field specimen does not pass, it should be assumed that the sample would also not pass specified destructive testing.

The procedure outlined above should be followed to locate passing samples for specified testing.

c) Procedure for Non-complying Destructive Test

Additional field samples should be cut for peel testing. In the case of a field production seam, the samples should lie a minimum of 3m in each direction from the location of the initial non-complying sample. A field test for peel strength is then carried out and if these field samples pass, then full samples can be cut for specified testing.

If the full samples pass, then the seam between the two (2) passing sample locations should be repaired according to procedures detailed elsewhere in the document.

If either of the samples are still in non-compliance then additional samples should be taken in accordance with the above procedure until two (2) passing samples are found to establish the zone in which the seam should be reconstructed.

All passing seams must be bounded by two (2) locations from which full samples passing specified destructive tests have been taken.

In cases of repaired seams exceeding 50m, a sample must be taken and pass destructive testing from within the zone in which the seam has been reconstructed. Each destructive test must be considered a seam.

All destructive seam samples should be numbered and recorded on the Destructive Testing Form.

PAA 1.7.13 Specified Testing of Destructive Seam Samples

a) Full Destructive Seam Testing

Full destructive samples should be tested by the contractor in the event that testing is not being performed by the engineer. Full samples should be tested under appropriate conditions on site, unless the engineer requests laboratory testing.

Destructive samples should be tested for "shear strength" and "peel adhesion". Five (5) specimens should be tested for each test method. Four (4) out of the five (5) specimens must exhibit FTB for each round of peel and shear testing.

PAA 1.7.14 Defects and Repairs

The CQC co-ordinator should conduct a detailed walk through and visually check all seams and non-seam areas of the geomembrane liner for defects, holes, blisters and signs of damage during installation.

All other installation personnel shall, at all times, be on the lookout for any damaged areas. Damaged areas shall be marked and repaired.

PAA 1.7.15 Repair Procedures

Any portions of the geomembrane liner or geomembrane seam showing a flaw, or having a destructive or non-destructive test in non-compliance should be repaired. Several procedures exist for repair and the decision as to the appropriate repair procedure should be made by the contractor in conjunction with the engineer.

Procedures available for repair are to include the following:

a) Patching - used to repair large holes, tears and destructive sample locations. All patches shall extend at least 75mm beyond the edges of the defect and all corners of patches shall be rounded.

b) Grinding and welding - used to repair sections of extruded fillet seams.

c) Spot welding or seaming - used to repair small tears, pinholes or other minor localised flaws.

d) Capping - used to repair lengths of extrusion or fusion welded seams.

e) Extrude overlap along the length of fusion welded seams.

f) Removal of a seam and replacement with a strip of new material seamed into place.

PAA 1.7.16 Verification of Repairs

Every repair should be non-destructively tested. Repairs which pass the non-destructive test shall be deemed acceptable. Repairs in excess of 50m will require a destructive test. Non-destructive testing of repairs shall be logged on the Repair Report Form as shown in this document.

PAA 1.8 Construction Quality Assurance

The engineer, or his representative, shall have full access to all test results carried out by the contractor. In addition, he shall be entitled to be present whenever such tests are carried out.

Should it be deemed necessary, additional tests may be called for by the engineer and the contractor shall give full co-operation in obtaining samples for such tests.

PAA 1.9 Measurement and Payment

PAA 1.9.1 Supply and install 2.0mm HDPE Geomembrane Liner Double Sided Textured

The unit of measurement shall be the square metre (m^2) of area on which the geomembrane liner has been supplied and installed. All lining shown on the drawings will be paid for e.g. in anchor trenches, designed overlaps, tie ins etc.

The tendered rate for the installation of the geomembrane liner shall include full compensation for all materials, plant, labour and other incidentals required to install the geomembrane liner complete to the Engineer's satisfaction. No additional payment will be made for any cutting, waste, placing, joining, overlapping, anchoring/securing of material in position, testing or control, pipe penetrations, assurance of quality or the requirements for the electronic leak location survey (including isolation requirements).

The tendered rate for supply shall include for offloading of the geomembrane liner at the site. The contractor is to ensure that the geomembrane liner is stored at the site under protection and to the Engineer's satisfaction.

PAA 1.9.2 Freight, Duty and Landing Charges

a) The unit of measurement shall be the Prime Cost Sum (PC Sum).

No contractor's mark-up shall be applicable to these items.

The contractor should take account of the following with respect to the above:

b) Where the goods or material to be supplied have to be imported, the contractor shall, notwithstanding anything to the contrary contained in the General Conditions of Contract, base his tender on the duty and landing charges ruling as at the closing date of tenders and the contractor shall state such freight rates, duty and landing charges in a covering letter. No claim by the contractor for an adjustment in terms of subclause (b) and (c) hereof will be entertained unless the details required by this subclause are provided as stipulated above.

c) Where freight rates actually paid by the contractor are higher or lower than the rates upon which the tender price was based, then:

i) If Conference Lines ships were used for the purpose of transporting the goods or materials there shall be payable or deductible by the employer (as the case may be) the difference between the rates upon which the tender was based and the Conference Lines freight rates ruling at the date of shipment.

ii) If other shipping lines were used, any difference between the freight rates upon which the tender was based and the freight rates actually paid by the contractor shall be paid or deducted by the employer, as the case may be.

d) Where the rates of duty or landing charges are varied between the date of closing tenders and the date of clearing, any increase or decrease in the rates shall be paid or deducted by the employer, as the case may be.

e) The contractor shall:

i) Submit documentary proof of the freight rates, duty and landing charges paid by him, and

ii) When adjustment is claimed in terms of this subclause, submit documentary proof to the satisfaction of the employer in support of such claim.

In the case of no such proof, no claim by the contractor for any increase will be entertained.

PAA 1.9.3 Rate of Exchange

PAA 1.9.3.1 Scope

Some significant portion of the equipment may be sourced from outside of South Africa so this item makes an allowance to protect the Contractor against currency depreciation between the time of his tender and the award of the work.

Fluctuations in freight and wharfage charges and customs duties are to be borne by the Contractor and allowed for in his rates.

The Contractor shall be responsible for the implications of exchange rate changes from the start of the work to completion of the first years operation and maintenance and training.

PAA 1.9.3.2 Measurement and Payment

PAA 1.9.3.2.1 Allowance for fluctuations in the Rate of exchange.

The unit of measurement shall be the Prime Cost Sum (P.C. Sum).

No Contractor's mark-up shall be applicable to this item.

Tenderers shall take account of the following with respect to the above:

i) Where the goods are imported, the Contractor shall within seven (7) days of the notification of acceptance of his Tender arrange through his bankers for the foreign commitment to be covered forward down to the Rand in order to fix the rate of exchange, exercising due care in consultation with the said bankers to ensure that the forward exchange is taken out on such terms as will provide the best possible exchange rate. The Contract shall notify the Council as soon as possible regarding the rate, which has been fixed on such forward exchange.

   An increase or decrease between the basic rate of exchange as at a date seven (7) days prior to the date of closing of Tenders and that existing at the date of establishment of the forward exchange cover within the period stipulated above shall be paid or deducted by the Council. Upon failure to the Contractor to establish forward cover, he shall be liable for any such increase or decrease in the basic rate of exchange occurring after the last mention date.

   The bank charges incurred in obtaining the forward exchange cover shall be for the Contractor's account.

ii) The Contractor shall on request:

a) Submit full documentary proof of the exchange;

When an adjustment is claimed in terms of this subclause whether by the Contractor or the Council, submit documentary proof to the employer in respect of such.

PAA 1.9.3 Establishment of electrical leak location survey equipment for dipole testing

The unit of measurement shall be the **Lump Sum** (Sum).

The rate tendered shall include for all operations associated with establishing and maintaining all leak detection / location systems on site for the duration of the testing, which shall be determined by the Contractor. The tendered rate shall also include for any/all de-establishment costs. Payment will be a single sum for all establishment of any and all testing equipment.

Please note that the payment will be once off, and the Contractor shall include for any recurring works as deemed in the Contractor's programme. Close liaison and programming are required with the Service Provider to prevent recurring establishments as this will be a once off payment.

PAA 1.9.4 Electrical Leak Location Survey of containment barrier by dipole testing in accordance with ASTM D8265

The unit of measurement shall be the square metre (m^2) of area on which the containment barrier has been supplied and installed.

The rate tendered shall include for all operations associated with leak detection of the installed containment barrier by dipole in accordance with ASTM D8265. The testing is to be done once the geomembrane is covered by the protection layer and this shall be moistened as needed and the cost included in the rate tendered.

The lined area to be tested will need to be electrically isolated from the surrounding ground, generally by a perimeter trench with the geomembrane exposed. The rate tendered for the testing shall include for an adequate number of sensitivity tests using either a real or an artificial leak to be set up and performed before beginning the survey and to the approval of the Engineer.

C3.4.5 PART PAB : GEOSYNTHETIC CLAY LINER (GCL)

PAB 1.1 Scope

This specification covers the supply and installation of a High Shear grade geosynthetic clay liner (GCL) in the landfill cell, the leachate dam and the contaminated stormwater dams. The installation of the GCL is to be undertaken by an approved specialist Contractor qualified in such installation and proof of such experience must be submitted with the Tender.

PAB 1.2 Definitions

For the purposes of this specification, the following definitions shall apply:

a) **Manufacturing Quality Control (MQC):** A planned system of inspections that is used to directly monitor and control the manufacture of a material that is factory originated. MQC is normally performed by the manufacturer of geosynthetics materials and is necessary to ensure minimum (or maximum) specified values in the manufactured product. MQC refers to measures taken by the manufacturer to determine compliance with the requirements for materials and workmanship as stated in certification documents and contract specifications. For the purposes of this Project, all applicable conditions of ***GRI GCL3*** must be met.

b) **Manufacturing Quality Assurance (MQA):** A planned system of activities that provides assurance that the materials were constructed as specified in the certification documents and contract specifications. MQA includes manufacturing facility inspections, verifications, audits and evaluation of the raw materials and geosynthetics products to assess the quality of the manufactured materials. MQA refers to measures taken by the GCL installation contractor and/or Engineer as applicable to determine if the manufacturer is in compliance with the product certification and contract specifications for a project.

c) **Construction Quality Control (CQC):** A planned system of inspections that is used to directly monitor and control the quality of a construction project. Construction quality control should be performed by the GCL installation contractor and is necessary to achieve quality in the constructed or installed system. Construction Quality Control (CQC) refers to measures taken by the installer or contractor to determine compliance with the requirements for materials and workmanship as stated in the drawings and specifications for the project.

d) **Construction Quality Assurance (CQA):** A planned system of activities that provides the Employer, Engineer and permitting authorities assurance that the facility was constructed as specified in the design. Construction Quality Assurance (CQA) includes inspections, verifications, audits and evaluations of materials and workmanship necessary to determine and document the quality of the constructed facility. Construction Quality Assurance (CQA) refers to measures taken by the Engineer to assess if the GCL installation contractor is in compliance with the drawings and specifications for the project.

e) **Geosynthetic Clay Liner (GCL):** A factory manufactured hydraulic barrier consisting of Sodium Bentonite clay sandwiched between, supported and encapsulated by two geotextiles, held together by needle punching.

f) **Woven or nonwoven fabrics:** used to contain the Bentonite used in a GCL.

g) **Sodium Bentonite:** The high swelling clay component of GCL's consisting primarily of the mineral Montmorillonite.

h) **Needle punching:** A GCL manufacturing process whereby boards of barbed needles incorporate the staple fibres from a nonwoven geotextile, through a Sodium Bentonite clay layer, into the matrix of a second or more geotextile layers.

PAB 1.3 Materials

The GCL must comply with the following specifications:

a) The GCL shall be manufactured by mechanically bonding the cover and carrier geotextiles using a needle punching process to enhance frictional and internal shear strength characteristics.

b) In order to maintain these characteristics, no glues, adhesives or other non-mechanical bonding processes shall be used instead of the needle punching process.

c) The needle punched GCL shall be locked to prevent fibre pull out under continuous, long-term strain. The lock process must set the nonwoven fibres where they protrude from the carrier geotextile (woven or nonwoven depending upon product) to secure the reinforcement in place more permanently.

d) No other manufacturing techniques shall be approved unless it can be suitably demonstrated that the GCL exhibits uniform shear strength characteristics across the entire width of the panel. Isolated sewn, stitched or stapled rows do not constitute uniform reinforcement for the purposes of this specification.

e) To ensure correct joining between adjacent GCL panels, the GCL shall be Bentonite impregnated along both top long edges to enable self-sealing along these edges. This impregnation is to extend inward 500mm (minimum 300mm) from the edges of the roll, in the long direction.

f) A minimum overlap guideline shall be imprinted with non-toxic ink on both long edges of the GCL roll to ensure the accuracy of overlap seams. These lines shall be used during Construction Quality Assurance (CQA) procedures, to ensure the minimum overlap is achieved. The minimum overlap guideline shall indicate where the edge of the panel must be placed in order to achieve a full 300 mm of Bentonite overlap for each panel.

g) The minimum acceptable dimensions for the GCL panels shall be 4.5 metres wide and 30 metre long. Short rolls (rolls less than 30 metres long) may be supplied, but at a rate not to exceed 5% of the total product area produced for this project.

h) To demonstrate the uniformity of the manufacturing process, no delamination of the geotextile components from the Bentonite core shall occur when samples of the GCL are immersed in tap water at ambient temperature of one hour.

GCL: PARTICULAR SPECIFICATION

			HIGH SHEAR	M Q TESTING (m^2)	TEST METHOD
GEOTEXTILE COVER LAYER	PP non-woven white	g/m^2	200	4 000	ASTM D5261
GEOTEXTILE CARRIER LAYER	PP slit film woven	g/m^2	110		
	PP non-woven white	g/m^2	200		
	Composite	g/m^2	310		
BENTONITE LAYER (Bentonite mass at 0% moisture content)	Quality	Montmorillonite content > 75%, Sodium Cation Na^+ > 60%			
	Sodium Bentonite Powder	g/m^2	3 700	4 000	ASTM D5993
	Swell index	ml/2g	≥ 24	Per 33 tonnes	ASTM D5890
GCL MASS PER UNIT AREA		g/m^2	4 210	4 000	ASTM D5993
BONDING PROCESS		Fully Needle-punched and thermally locked			
TENSILE STRENGTH	Machine	kN/m	4 000	20 000	ASTM D6768
STATIC PUNCTURE (CBR)	Strength	N	1 600	20 000	EN ISO 12236
HYDRAULIC CONDUCTIVITY		m/s	≤ 1.92×10^{-11}	25 000	ASTM D5887
PEEL STRENGTH		N/m	≥ 600	4000	ASTM D6496

Notes:

1) Minimum Average Roll Values (MARV) are reported unless otherwise stated.

2) A high shear grade GCL is required for this Contract.

Acceptable GCL's for this Contract include any needle punched GCL's that meet all the requirements of this specification.

Before considering an alternative GCL material to that specified in the Contract Documents, the Contractor shall submit with his Tender certified test results and statements of quality from the proposed GCL supplier to the Engineer, indicating without exception that the proposed GCL meets the requirements of the specification.

PAB 1.4 Quality Control

a) The GCL shall be tested for compliance with this specification by the test methods indicated on the material specification. During production needle punched GCL's shall be continuously inspected for broken needles using an in-line metal detector and broken needles shall be removed. GCL's produced on a line that is not equipped with on-line needle detection facilities will not be considered for acceptance. Candidate GCL materials may be tested and pre-approved at the manufacturing location.

b) The GCL manufacturer shall issue Quality Control Certificates to the Project Engineer, CQA Inspector or other designated party for each delivery of material. The certifications shall be signed by the quality control manager of the GCL manufacturer or other responsible party and shall include the following information:

i) Shipment Packing List. A list indicating the rolls shipped on a particular truckload.
ii) Bill of Lading. The shipping documents for the truck used for the shipment.
iii) Letter of Certification. The letter indicating the material is in conformance with the physical properties specified.
iv) Physical Properties Sheet. The material specification for the GCL supplied in accordance with this specification.

c) Manufacturer Quality Control Submittal. The GCL manufacturer shall issue Quality Control submittals to the Project Engineer, CQA Inspector or other designated party for each lot of material if necessary. The submittals shall include the following information:

i) Bentonite Manufacturer Certification. Bentonite manufacturer quality documentation for the particular lot of clay used in the production of the rolls delivered.
ii) Geotextile Manufacturer Certification. Geotextile manufacturer quality control documentation for the particular lots of geotextiles used in the production of the rolls delivered.
iii) GCL Manufacturer Tracking List. Cross-referencing list delineating the corresponding geotextile and Bentonite lots for the materials used in the production of the rolls delivered.
iv) Manufacturing Quality Control Data. The manufacturing quality control test data indicating the actual test values.

d) Packaging. All GCL rolls shall be packaged in opaque moisture resistant plastic sleeves. The roll cores shall be sufficiently strong to resist collapse during transit and handling.

e) Roll Identification and Labelling. Before shipment, the manufacturer shall label each roll, both on the GCL roll and on the surface of the plastic protective sleeve. Labels shall be resistant to fading and moisture degradation to ensure legibility at the time of the installation. At a minimum, the roll labels shall identify the following:

i) Product name and grade
ii) Length and width of roll
iii) Total weight of roll
iv) Production lot number and individual roll number

f) Any accessory Bentonite used for sealing seams, penetrations or repairs, shall be high-quality powdered Sodium Bentonite from a recognised producer.

PAB 1.5 Installation

The following operational procedures are a specific as possible while recognising that the specific requirements of the project may necessitate minor modifications. Significant deviations from these procedures shall be pre-approved by the Project Engineer or other designated party.

b) Shipping and Handling Equipment. The party responsible for unloading the GCL shall contact the supplier before shipment to determine the correct unloading methods and equipment if different from the pre-approved and specified methods.

c) GCL's must be supported during handling to ensure worker safety and prevent damage to the product. Under no circumstances should the rolls be dragged, lifted from one end, lifted with only the forks of a lift truck or dropped on to the ground from the delivery vehicle.

d) The QCA Inspector shall verify that proper handling equipment exists which does not pose any danger to installation personnel or risk of damage or deformation to the liner material itself. Suitable handling equipment is described below:

i) Spreader Bar Assembly. A spreader bar assembly shall include both a core pipe or bar and a spreader bar beam. The core pipe shall be used to uniformly support the roll when inserted through the GCL core, while the spreader bar beam will prevent chains or straps from chafing the roll edges.

ii) Carpet Spike. A carpet spike is a rigid pipe or rod with one end directly connected to a forklift or other handling equipment, and the other end rounded off to allow easy insertion into roll material cores. If a carpet spike is used, it should be at least 3.0 metres long and inserted to its full length into the roll core to prevent excessive bending of the roll when lifted.

iii) Roller Cradles. Roller cradles consist of two large diameter rollers spaced approximately 75mm apart, which both support the GCL roll and allow it to unroll freely. The use of roller cradles shall be permitted if the rollers support the entire width of the GCL roll.

iv) Straps. Straps may be used to support the ends of spreader bars *but are not recommended as the primary support mechanism.* As straps may damage the GCL where wrapped around the roll and generally do not provide sufficient *uniform* support to prevent roll bending or deformation, great care must be exercised when this option is used.

d) GCL Inspection upon Delivery. Each roll shall be visually inspected when unloaded to determine if any packaging or material has been damaged during transit.

i) Rolls exhibiting damage shall be marked and set aside for close examination during deployment.

ii) Minor rips or tears in the plastic packaging shall be repaired with moisture resistant tape before being placed in storage to prevent moisture damage.

iii) The presence of free flowing water within any roll packaging shall require that roll to be set aside for further examination to ascertain the extent of any damage.

iv) GCL rolls delivered to the project site shall be only those indicated on GCL manufacturing quality control certificates.

e) Storage / Stockpiling / Staging. Storage of the GCL rolls shall be the responsibility of the installer or other designated party. All GCL rolls shall be stockpiled and maintained dry in a well-drained flat location area away from high-traffic areas, but sufficiently close to the active work area to minimise handling.

i) Rolls shall not be stacked on uneven or discontinuous surfaces, in order to prevent bending, deformation, and damage to the GCL or cause difficulty inserting the carpet spike or core pipe.

ii) GCL's should be stored no higher than four rolls high, or limited to the height at which installation personnel may safely manoeuvre the handling apparatus. Stacks or tiers of rolls should be situated in a manner that prevents sliding or rolling by chocking the bottom layer of the rolls.

iii) An additional tarpaulin or plastic sheet shall be used over the stacked rolls to provide extra protection for GCL material stored outdoors.

iv) Bagged Bentonite material shall be stored under cover. Bags shall be stored on pallets or other suitably dry surfaces that will prevent prehydration.

f) Manufacturing Quality Assurance Documentation. Third party GCL MQA sampling and testing for compliance with this specification shall be co-ordinated by the third party CQA inspector as necessary to support the manufacturer's MQC data.

g) No horizontal joints shall be allowed on any slope during installation of the GCL.

PAB 1.6 Subgrade Preparation

The surfaces upon which the GCL is to be laid shall be suitable for the placement of GCL material, subject to the specification below.

a) Subgrades. The surface upon which the GCL material will be installed shall be inspected by the CQA inspector and certified by the earthworks Contractor to be in accordance with the requirements of this specification.

i) The subgrade soil shall be well graded containing less than 20% gravel 50mm in diameter and no sharp stones larger than half the thickness of the subgrade / foundation layer.

ii) In applications where the GCL is the sole barrier and will be subjected to a hydraulic head that exceeds the confining stress, subgrade surfaces consisting of gravel or granular soils may not be appropriate due to their large void content. For these applications, the top 150mm of the subgrade soil should possess a particle size distribution where at least 80% of the soil is finer than 0.2mm (#60 sieve).

iii) Site specific compaction requirements should be followed in accordance with the project drawings and specifications. At a minimum, the level of compaction should be such that no rutting is caused by installation equipment or other construction vehicles that traffic the area of deployment.

iv) The surfaces to be lined shall be smooth and free of any debris, vegetation, roots, sticks, sharp rocks, or other deleterious materials larger than 5mm in diameter, as well as free of any voids, large cracks or standing water.

v) Directly before deployment of the GCL, the subgrade shall be final-graded to fill remaining voids or desiccation cracks, and proof-rolled to eliminate sharp irregularities or abrupt elevation changes. The surfaces to be lined shall be maintained in this smooth condition.

PAB 1.7 Placement

GCL material shall be placed in general accordance with the procedures specified below, or modified to account for site specific conditions.

a) Panel Placement forms must be submitted to the Engineer and approved before commencement of the installation.

b) GCL Orientation. In the absence of specific guidelines, GCL panels should be placed with the nonwoven side up on slopes to maximise shear strength characteristics.

i) In base or flat areas, the GCL does not require any particular orientation, however, in composite liner applications, intimate contact may be facilitated by placing the woven face of the GCL against the overlying FML.

c) GCL Panel Position. Where possible, all slope panels should be installed running down the slope, while panels installed in flat areas require no particular orientation.

d) Panel Deployment. GCL materials shall be installed in general accordance with the procedures set forth in this section, subject to site specific conditions that would necessitate modifications.

e) Deployment should proceed from the highest elevation to the lowest to facilitate drainage in case of precipitation.

f) The GCL may be deployed on slopes by pulling by hand the material from a suspended roll, or securing a roll end into an anchor trench and unrolling each panel by hand while slowly moving backwards. The roll must not be allowed to roll down the slope freely without any form of restraint. All care must be taken not to damage the underlying geosynthetics, where applicable.

g) Deployment on flat areas shall be conducted in the same manner as that for the slopes. However, care should be taken to minimise "dragging" the GCL. Slip-sheet may be used to facilitate positioning of the liner while ensuring the GCL is not damaged by underlying harsh surfaces. All care must also be taken not to damage the underlying geosynthetics, where applicable.

h) Overlaps shall be a minimum of 300mm and be free of wrinkles, folds or "fish-mouths".

i) The Contractor shall only install as much GCL as can be covered at the end of each working day. Only those GCL panels that can be anchored and covered in the same day shall be unpacked and installed. If exposed GCL cannot be permanently covered before the end of a working day, it shall be temporarily covered with plastic or other waterproof material to prevent hydration. No GCL shall be left exposed overnight. Exposed edges of the GCL shall be covered by temporary water resistant sheeting until work commences again.

j) Anchoring. All GCL material installed on slopes greater than 7h: 1v shall be anchored to prevent potential GCL panel movement.

k) Standard Anchor. The GCL shall be placed into and across the base of the excavated trench, stopping at the back wall of the excavation.

l) "Run-Out" Anchor. On gentle slopes or locations where it is difficult to create an anchor trench, the GCL may alternatively be anchored by a material run-out past the crest of the slope. The length of the run-out shall be pre-approved by the Project Engineer before the use of this method.

l) Overlap seams shall be a minimum of 300mm on panel edges and 300mm on panel ends.

m) Bentonite paste manufactured in accordance with the GCL supplier's specification should be placed between panels at a minimum rate of 900 grams per linear metre of seam. Where a product is claimed to be self-sealing along the edges, the manufacturer shall provide proof of this claim.

n) Detailing. Detail work, defined as the sealing of the liner to pipe penetrations, foundation walls, drainage structures, spillways, and other appurtenances shall be performed as recommended by the GCL manufacturer.

PAB 1.8 Damage Repair

Before cover material placement, damage to the GCL shall be identified and repaired by the installer. Damage is defined as any rips or tears in the geotextiles, delamination of geotextiles or a displaced panel.

a) Rip and Tear Repair (flat surfaces). Rips or tears may be repaired by completely exposing the affected area, removing all foreign objects or soil, and by then placing a patch cut from unused GCL over the damage (damaged material may be left in place), with a minimum overlap of 300mm on all edges.

b) Accessory Bentonite paste should be placed between the patch edges and the repaired material at a rate of 900 grams per lineal metre of edge spread in a continuous 150mm wide fillet, 5mm thick.

c) Rip and Tear Repair (slopes). Damaged GCL material on slopes shall be repaired by the same procedures above. However, the edges of the patch should also be adhered to the repaired liner with a suitable adhesive to keep the patch in position during backfill or cover operations.

d) Displaced Panels. Displaced panels shall be adjusted to the correct position and orientation. The adjusted panel shall then be inspected for any geotextile damage or Bentonite loss. Damage shall be repaired by the above procedure.

e) Premature Hydration. If the GCL is prematurely hydrated, the installer shall notify the QA/QC technician and Project Engineer for a site specific determination as to whether the material is acceptable or if alternative measures must be taken to ensure the quality of the design, *dependent upon the degree of damage.*

PAB 1.9 Cover Material

The cover materials shall be compatible as well as suitable for use over the GCL and placed in a manner appropriate to the particular subgrade. Regardless of the cover material, the uncovered edge of GCL panels shall be protected at the end of the working day with a waterproof sheet, which is adequately secured with ballast.

a) Earthen Cover Soil. The topsoil cover material is a minimum thickness of 200mm. The soil cover shall be free of sharp-edged stones greater than 50mm in size. Laboratory analysis of especially calcareous cover material shall be required to ensure compatibility with the GCL.

i) Equipment. Topsoil cover shall be placed with low ground pressure equipment. Care should be taken to avoid damaging the GCL by making sharp turns or pivots with equipment as well as sudden starts or stops.

ii) Placement. Topsoil may be placed on the GCL by pushing with a track dozer or by carefully placing it with a loader or a backhoe. The use of construction machinery operating directly over the GCL is strictly prohibited.

iii) Thickness. A minimum thickness of 200mm of cover shall be kept between heavy equipment and the GCL at all times, except when final-grading. No heavy vehicles should be driven directly over the GCL until the proper thickness of cover has been placed.

iv) Compaction. To prevent damage to the GCL, the initial lift(s) of soil cover shall not be compacted to more than 85% Modified AASHTO density or as specified by the Engineer.

v) Slope Placement. When covering the GCL on sloped areas steeper than 4h: 1v, cover should be pushed up slope to minimise traction forces on the GCL.

PAB 1.10 Weather Conditions for Installation

Light rainfall (<5mm / hr intensity) should not affect the installation of the GCL provided deployed panels are covered and confined by 200mm of cover soil (or equivalent) within 2 hours of first exposure to the light rain. Heavy direct raindrop impact should be avoided. The panels can be covered during heavy rainfall events with a tarpaulin or plastic sheet if there is not enough time to complete soil cover placement.

PAB 1.11 Measurement and Payment

PAB 1.11.1 Supply and Install High Shear Grade GCL

The unit of measurement shall be the square metre (m^2) of area on which the GCL has been supplied and installed. All lining shown on the drawings will be paid for e.g. in anchor trenches, designed overlaps, tie ins etc.

The Bid rate for the installation of the GCL shall include full compensation for all materials, plant, labour and other incidentals required to install the GCL complete to the Engineer's satisfaction. No additional payment will be made for any cutting, waste, placing, joining, overlapping, anchoring, securing of material in position, testing or control or assurance of quality. The Bid rate is also to include for all requirements, including the moisture requirements to undertake the required electronic leak location survey, where applicable.

The Bidder must clearly state in a covering letter, the total time required from date of order to time of supply of the GCL to site. This time period will be taken into account when awarding the Bid.

C3.4.6 PART PAC : LINER TEMPERATURE MONITORING SYSTEM

PAC1.1 Scope

This item covers all works necessary for the installation of a liner temperature monitoring system. The liner temperature monitoring system will determine and monitor the liner system performance and integrity with regards to temperature effects.

PAC 1.2 Measurement and Payment

PAC 1.2.1 Installation of a liner temperature monitoring system, complete

The unit of measurement shall be the PC Sum.

The PC Sum covers all works and all sub-contractor payments as needed at the discretion of the Employer. The above works shall only be carried out on the written instruction and approval by the Engineer. A Contractor's mark-up is applicable to this item however the Employer has the right to negotiate the Contractor's mark up.

The PC Sum is to include for the supply and installation of an approved temperature monitoring system. The liner temperature monitoring system is to include the supply and installation of thermocouples, cabling, a data logger/s, telemetry, all trench excavations and backfill, protection of cabling and infrastructure, and all works as directed by the Engineer. Details of the proposed monitoring system are to be submitted to the Engineer for approval.

The successful Bidder will be required to provide three (3) No. quotations for the specified works and the quotations will be assessed and approved accordingly by the Employer.

C3.4.7 PART PAD : SECURITY FENCE

PAD 1.1 Scope

A heavy duty concrete palisade fence is to be erected around the leachate dam, which includes a standard steel vehicular gate and a standard steel pedestrian gate A comprehensive detail from various suppliers is required and must be submitted and approved by the Engineer.

PAD 1.2 Measurement and Payment

PAD 1.2.1 Concrete Palisade Fencing, complete

The unit of measurement shall be the **metre** (m) of fence erected.

The concrete palisade fence is to be a heavy duty, 10 pale fence with the following minimum specifications:

Poles:	Overall length	3000mm
	Front face	40 x 130mm
	Width	210mm
	Reinforcing	3 x R8 bars
	Mass	116kg
Pales:	Overall length	2400mm
	Front face	40 x 100mm
	Width	100mm
	Reinforcing	3 x 4.5 HD
	Galvanised Hook Bolts	2 x 8mm x 80mm
	Mass	38kg

		TOP	*BOTTOM*
Cross Bar:	Overall length	2000mm	2000mm
	Front face	150mm	150mm
	Width	55mm	55mm
	Reinforcing	3 x Y10 bars	2 x Y10 bars
	Mass	47kg	40kg

10 pales per section	
Concrete strength	minimum 30 MPa at 28 days
Reinforcing	minimum of 15mm cover
Mass per meter length	minimum 292kg
Opening between pales	maximum 79mm

The Bid rate shall include full compensation for all plant, accessories, equipment, materials, labour, transport, treatment, survey, contractor's mark ups etc. to supply and erect the fence specified complete as per the supplier's specification and approved by the Engineer.

The rate is to also include for clearing of the fence line, excavation and compaction of postholes, concrete foundations, testing of concrete, backfilling, trimming and clearing after completion of works.

PAD 1.2.2 Vehicular Gate, complete

The unit of measurement shall be the **number** (No.) of steel gates supplied and erected.

The Bid rate shall include full compensation for all plant, accessories, equipment, materials, labour, transport, treatment, survey, contractor's mark ups etc. to supply and erect the gate specified complete as per the supplier's specification and approved by the Engineer.

The rate is to also include for clearing of the fence line at the position of the gates, excavation and compaction of postholes, concrete foundations, concrete ground beams, testing of concrete, backfilling, trimming and clearing after completion of works.

PAD 1.2.3 Pedestrian Gate, complete

The unit of measurement shall be the **number** (No) of steel gates supplied and erected.

The Bid rate shall include full compensation for all plant, accessories, equipment, materials, labour, transport, treatment, survey, contractor's mark ups etc. to supply and erect the gate specified complete as per the supplier's specification and approved by the Engineer.

The rate is to also include for clearing of the fence line at the position of the gates, excavation and compaction of postholes, concrete foundations, concrete ground beams, testing of concrete, backfilling, trimming and clearing after completion of works.

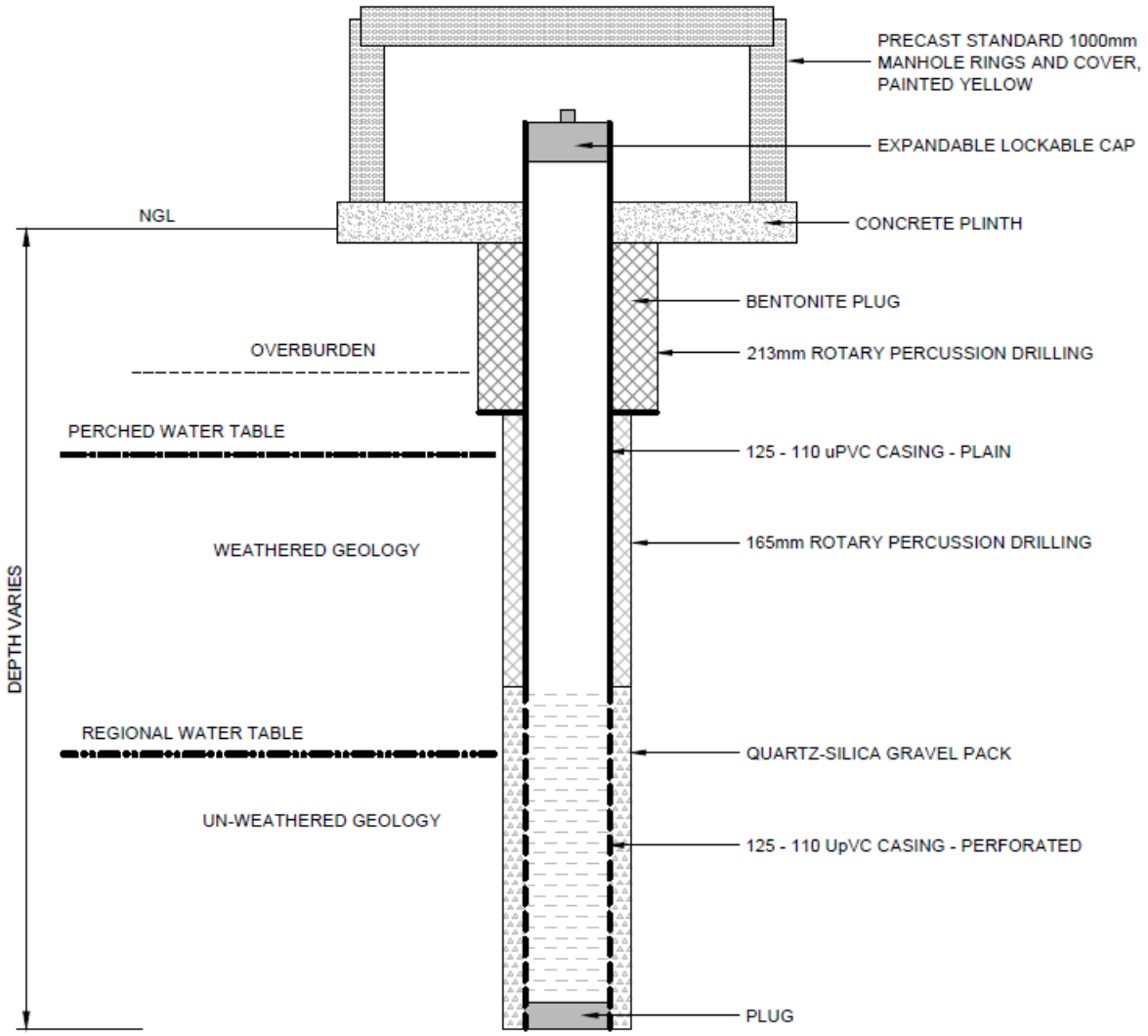
C3.4.8 PART PAE : ENVIRONMENTAL MONITORING

PAE 1.1 Scope

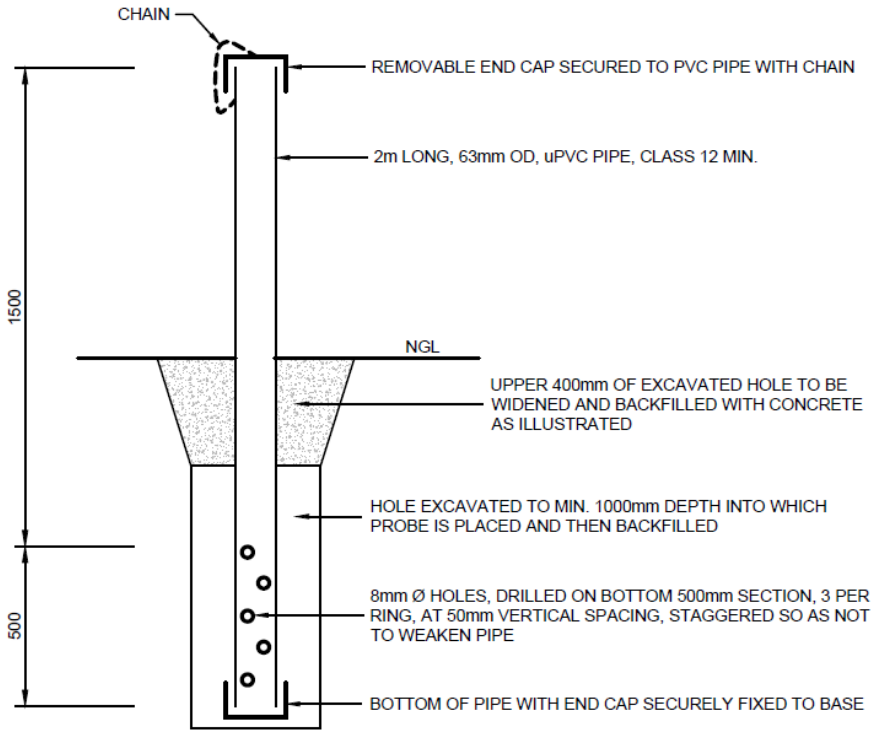
This item covers all works necessary for the installation of groundwater monitoring boreholes and all works necessary for the installation of gas monitoring probes.

Groundwater monitoring boreholes are to be installed on or around site for the monitoring of groundwater. The exact location of the boreholes will be given to the successful Bidder and in close proximity to the site.

The allowable **drilled depth** should be 100m with a steel casing up to 30m, as per the typical detail given below.



Gas monitoring probes are to be installed on site for the monitoring of gas migration. The gas monitoring probe consists of a 2m long, 65mm diameter, heavy duty galvanised steel pipe, with 8mm diameter holes, drilled on the bottom 500mm section, 3 per ring, at 50mm vertical spacing, staggered so not to weaken pipe with a threaded plastic cap, or simple lockable cap with a bolt through and installed 1.5m below ground level, as per the detail below.



PAE 1.2 Measurement and Payment

PAE 1.2.1 Install groundwater monitoring boreholes

The Bid rate shall include full compensation for all plant, accessories, equipment, materials, labour, transport, treatment, painting, numbering, survey, contractor's mark ups etc. to install and protect the groundwater monitoring boreholes complete as per the installer's specification and approved by the Engineer.

The rate is to also include for the clearing of vegetation and/or waste for the path to the boreholes and surrounding, survey and survey peg installation of each of the boreholes at their previous coordinates and clearing after completion of works.

The groundwater monitoring boreholes positions must be shown on the as- built drawings.

PAE 1.2.2 Installation of gas monitoring probes, complete

The unit of measurement shall be the Number (No).

The Bid rate shall include for the supply and installation of the gas monitoring probes complete, including excavation, backfill, concrete foundations, poles, painting, survey, contractor's mark ups etc.

The exact positions of the probes will be shown to the successful Bidder. These gas probes positions must be shown on the as-built drawings.

C3.4.9 PART PAF : CONSTRUCTION QUALITY ASSURANCE (CQA)

PAF 1.1 Scope

This item covers all works necessary for the construction quality assurance requirements for the project.

PAF 1.2 Measurement and Payment

PAF 1.2.1 Construction Quality Assurance

The unit of measurement shall be the PC Sum.

The PC Sum covers all works and all sub-contractor payments as needed at the discretion of the Employer. The above works shall only be carried out on the written instruction and approval by the Engineer. A Contractor's mark-up is applicable to this item however the Employer has the right to negotiate the Contractor's mark up.

The PC Sum is to include for the construction quality assurance as required by the Regulatory Authority's approval letter and the CQA Plan. A copy of the CQA Plan is available upon request.

The successful Bidder may be required to provide three (3) No. quotations for the specified works and the quotations will be assessed and approved accordingly by the Employer.

C3.5: CONTRACT AND STANDARD DRAWINGS

C3.5.1 CONTRACT DRAWINGS / DETAILS

- 301837-02-WS-LA-001-001 GENERAL LAYOUT PLAN
- 301837-02-WS-LA-001-002 LANDFILL CELL 1 LAYOUT & SECTIONS
- 301837-02-WS-LA-001-003 CONTAMINATED STORMWATER DAM LAYOUT & SECTIONS
- 301837-02-WS-LA-001-004 LEACHATE DAM LAYOUT & SECTIONS
- 301837-02-WS-LA-001-005 STORMWATER LEACHATE COLLECTION AND DETECTION LAYOUT
- 301837-02-WS-DT-001-001 TYPICAL LINER DETAILS
- 301837-02-WS-DT-001-002 TYPICAL LEACHATE DETECTION AND COLLECTION AND STORMWATER DETAILS

C3.6: ANNEXURES

C3.6.1 There are no Annexures

PART C3: SCOPE OF WORK

PART B - INFRASTRUCTURE WORKS

C3.1: PROJECT DESCRIPTION AND SCOPE OF CONTRACT

C3.1.1 Description of Works

The works consist of the following:

1. Completion of bulk earthworks to portions of Platforms 2
2. Layerworks and concrete paving to portion of Platform 2B
3. Layerworks and concrete surfacing to a section of Road 3
4. Bulk earthworks and gravel surface to a section of the Workshop Road
5. Underground Services comprising stormwater and water
6. Bulk earthworks to a portion of the Western Drain
7. Leachate rising main and pump station

C3.1.2 Description of Site and Access

The site currently forms part of Construction contract WS7411- Contract A comprising bulk earthworks roads and services

Certain areas immediately adjacent to the working area of the site are of extreme environmental sensitivity and may not be traversed by machines or used for any construction purposes. These areas must be clearly demarcated and securely barricaded to prevent access of plant and vehicles onto the sensitive areas.

C3.1.3 Nature of Ground and Subsoil Conditions

The terrain is hilly with moderate to steep areas. The underlying soil is predominantly sandstone and hard material may be encountered at shallow depths over much of the site area.

A geotechnical investigation was completed in 2023 and the resulting report will be shared with the successful tenderer. It must be noted that quantities related to intermediate, hard and boulder materials may be adjusted during the tender period once the investigation is completed.

Groundwater may be encountered in the water courses that traverse portions of the site.

C3.1.4 Scope of Works

The main items to be constructed under this contract are listed below (lengths or areas are approximate):

a) Bulk Earthworks to portions of Platforms 2 – approximately 55700m^3 of cut to fill or cut to spoil
b) Layerworks and concrete paving to portion of Platform 2B – approximately 4200m^2
c) Road 3 - portion of layerworks and concrete pavement - approximately 1600m2 and the remaining layerworks with gravel surfacing - approximately 400m2. The bulk earthworks to Road 3 is approximately 2600m3 of cut to fill or cut to spoil.
d) The gravel surface to workshop road is approximately 800m2. The bulk earthworks for workshop road is approximately 13000m3 of cut to fill or cut to spoil.
e) Bulk earthworks to portions of western cut-off drain - approximately 30000m3 of cut to fill or cut to spoil.

f) Bulk earthworks to Contaminated Stormwater Dam 1 - approximately 2600m3 of cut to fill or cut to spoil.
g) Underground Services comprising length of 180m for stormwater, and length of 210m for water mains.
h) A length of 1430m for leachate rising main and mechanical and electrical components for pumpstations, air valves, scour valves, isolation valves, non-return valves and valves chambers.

C3.1.5 Provisional programme

The contractor is to be aware of the following items that will affect the program and construction sequence:

a) On going construction of Road 0, Platform 2, Track Road and associated services.
b) Road 0 and Track Road form the link to the Landfill Cell. Track Road in particular is critical in that there is no other route down into the valley.
c) Access to the Transnet Tower is to be provided at all times.

C3.1.6 Other service providers

The contractor is to be aware of the following other operations that will occur within the extent and the site and access is to be provided for these:

a) Relocation of overhead electrical cables adjacent to MR461 and possible laying of new cables along MR461.
b) Installation of watermains along MR461
c) Access to the Transnet Tower by Transnet staff
d) Access to the sugar cane area to the west of MR461 by Tongaat Hulett

The programming for these operations will be agreed between all parties and incorporated into this contractors' program.

C3.1.7 Reference Data

The following information will be made available to the contractor;

a) Survey information (Drone survey)
b) Environmental agreements
c) Biodiversity Offset Authorisation
d) Electrical works specification and details

C3.2: PROJECT SPECIFICATION

PREAMBLE

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

C3.2.1 GENERAL

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

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

PS.1.1 Preliminary Programme

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

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

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

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

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

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

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

a) Access to the Transnet Tower is to be provided at all times.

b) Access to the works crosses the current contract WS7411 site area and co-ordination will be required between the two contracts to ensure continuous access and maintenance of haul routes.
c) Portions of works of this contract are dependent on the completion of sections of contract WS7411. These include: Platform 2B, Road 03 and Western Drain.

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

PS.2 SERVICES

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

PS.2.1 Existing Services

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

The following services are known to exist in the works area:
a) Electrical cables (overhead) adjacent to MR461 and connecting to the Transnet Tower.
b) Stormwater pipes crossing MR461
c) All the new services constructed under Contract WS7411

PS.2.2 Proving Underground Services

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

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

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

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

When a service is not located in its expected position the Contractor shall immediately report such circumstances to the Employer's Agent who will decide what further searching or other necessary action is to be carried out and shall instruct the Contractor accordingly. The cost of this additional searching shall be to the Council's cost and shall be paid for under D 8.3.8 - Proving Existing Services.

Should any service be damaged by the Contractor in carrying out the works and should it be found that the procedure as laid down in this clause has not been followed then all costs in connection with the repair of the service will be to the Contractor's account.

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

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

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

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

PS.2.3 New Services and Relocation of Existing

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

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

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

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

Services that may be affected by the contract are described as follows:

- PS.3: Watermains;
- PS.4: Sewers;
- PS.5: Stormwater;
- PS.6: Electrical Cables / Lighting;
- PS.7: Telkom / Neotel;
- PS.8: CCTV;

Further to the above, tenderers are referred to the services drawing and are to note that several minor cables / pipes may be encountered during excavation works which may require to be relocated to some extent. It is anticipated that the two week period required under PS.2.2 will allow sufficient time for these relocations.

PS.2.4 Accommodation of Services

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

PS.3 WATERMAINS

PS.3.1 General

Watermains constructed under WS7411 cross the site.

A new watermain is to be constructed linking Platform 1 and 2.

PS.4 SEWERS

Sewer reticulation constructed under WS7411 cross the site.

The sewer reticulation to be installed is primarily a septic tank and soakaway system.

At no time may this sewer system be used for anything other than discharge from the buildings as per normal useage. No waste water or effluent or other liquid waste from construction operations is to be discharged into this system. The contractor is make provision elsewhere for the safe discharge of waste water or other liquid waste from the site. The cost of this provision is to included in the Site Establishment rates allowed for in the BoQ.

Should any waste from construction operations be discharged into the sewer system, then the contractor shall, at their own cost, clean or replace the components affected, as directed by and to the satisfaction of the Engineer.

PS.4.1 Blockage of Foul Water Sewers

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

PS.5 STORMWATER

Stormwater reticulation constructed under WS7411 cross the site.

The stormwater system is divided into 2 distinct categories: clean stormwater (normal run-off from roads and platforms) and contaminated stormwater (run-off from areas that are used for the solid waste operations and where the run-off cannot be discharged directly to a natural water course.

The clean stormwater system comprises the following:

- Road crossings
- Side drains / top of cut drains or berms / toe of fill drains
- Low point collection from 'clean' platforms
- Collector pipes which discharge into a detention pond, from where the run-off is released at a controlled rate

The contaminated stormwater system comprises the following:

- Road crossings
- Low point collection from 'contaminated' platforms
- Collector pipes which discharge into a contaminated stormwater pond. There is no outfall from this pond (the water is to be tankered away or treated as part of CSW operations)

PS.5.1 Blockage of Stormwater Sewers

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

On completion of the works, the systems, including the ponds noted above, shall be cleaned of all debris that may have entered the system during the construction period. This cleaning or temporary protection of the system shall be to the contractor's expense and subject to the approval by the Engineer.

PS.6 ELECTRICAL PLANT

There are existing overhead powerlines along the existing MR461 and up to the Transnet Tower.

PS.6.1 General

PS.6.3 MV / LV Cables

MV / LV electrical reticulation constructed under WS7411 cross the site.

PS.6.4 Relocation of Existing Services

Should it be necessary to adjust the line, level and / or position of any service not catered for in the contract to enable the construction to proceed the Contractor shall on no account effect such adjustment himself but shall notify the Engineer who will arrange for the work to be carried out at no cost to the Contractor.

PS.7 TELKOM S.A. LIMITED / NEOTEL PLANT

There is no Telkom or Openserve plant in this area and no new installations are planned for this contract.

PS.8 CCTV PLANT

There is no existing CCTV plant in this area and No CCTV Plant is envisaged for this contract.

PS.9 MANAGEMENT OF THE ENVIRONMENT

The Contractor shall pay special attention to the following:

PS.9.1 Natural Vegetation

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

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

Certain areas of the natural vegetation are considered off limits to all vehicles and pedestrians. These areas will be pointed out to the Contractor by the Employer/ECO

This applies particularly to the primary KZN Sandstone Sourveld grassland along the ridge adjacent to the site which is shown on the drawings in green. This grassland is critically endangered

Any disturbance will also have to be escalated to the authorities: namely KZN Wildlife, DFFE and EDTEA for their enforcement.

Provisional location of the protected grasslands is indicated in Annexure C4.2.

PS.9.2 Fires

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

PS.9.3 Environmental Management Plan

In addition to the above, all requirements according to the Environmental Management Plan as detailed in C3.4: Particular Specifications, will be adhered to.

PS.10 OCCUPATIONAL HEALTH AND SAFETY

PS.10.1 General Statement

When considering the safety on site the Contractor's attention is drawn to the following:

- The terrain in parts of the works area, especially on road 0 and around the track road, is steep
- Numerous deep cuttings and trench excavations are planned
- The hard material encountered in cuttings or trenches may require blasting.
- Public traffic will be using MR461

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 Section 37(2) of the Occupational Health and Safety Act.

PS.10.2 Health and Safety Specifications and Plans to be submitted at tender stage

PS.10.2.1 Employer's Health and Safety Specification

The Employer's Health and Safety Specification is included in Part C3.4: Particular Specifications.

PS.10.2.2 Tenderer's Health and Safety Plan

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

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

The detailed safety plan will take into consideration the site specific risks as mentioned under PS.10.1 and must cover at least the following:

(i) A proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 9 to 29;
(ii) Pro-active identification of potential hazards and unsafe working conditions;
(iii) Provision of a safe working environment and equipment;
(iv) Statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (*Regulation 7)*;
(v) Monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
(vi) Details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 8 and other applicable regulations; and
(vii) Details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014.

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

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's

failure to obtain approval for his safety plan, shall not be used as a reason to claim for extension of time or standing time and related costs

A generic plan will not be acceptable.

PS.10.3 Cost of compliance with the OHSA Construction Regulations

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

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

C3.3: STANDARD SPECIFICATIONS

C3.3.1 Listing of the Standard Specifications:

- SANS 1200 – Standardized Specification for Civil Engineering Construction (hereafter referred to as SANS 1200). This document is obtainable separately, and Tenderers shall obtain their own copies of the applicable Sections. Only the latest available versions of these specifications are to be used.

C3.3.2 AMENDMENTS TO THE STANDARD SPECIFICATIONS

INTRODUCTION

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

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

PS A	General Specifications
PS AB	Engineer's Office
PS C	Site Clearance
PS D	Earthworks: Bulk
PS DA	Earthworks (small works)
PS DB	Earthworks for Pipe Trenches
PS DE	Earthworks (small earth dams)
PS DK	Gabions and Pitching
PS DM	Earthworks for Roads, Subgrades
PS G	Concrete
PS HA	Structural Steelwork (small works)
PS L	Medium Pressure Pipelines
PS LB	Bedding (Pipes)
PS LC	Cable Ducts
PS LD	Sewers
PS LE	Stormwater Drainage
PS M	Roads (General)
PS ME	Subbase
PS MF	Base
PS MG	Bituminous surface treatment
PS MH	Asphalt Base and Surfacing
PS MK	Kerbing and Channelling
PS MJ	Segmented Paving
PS MM	Ancillary Roadworks

SABS 1200 A - 1986 : GENERAL

PSA 3 MATERIALS

PSA 3.1 Quality

All pipes, equipment and materials necessary for the Works should be provided with the SABS Mark of Approval where applicable. The Contractor shall furnish, at his own expense and without delay, such samples as are called for or may be called for by the Engineer, who may reject all materials or workmanship not corresponding with the approved sample.

Add the following new subclause:

PSA 3.3 Ordering of Materials

The quantities set out in the Schedule of Quantities have been carefully determined from calculations based on data available at the time and should therefore be considered to be only approximate quantities. The liability shall rest entirely and solely with the Contractor to determine before ordering, the required types and quantities of the various materials required for the completion of the Works in accordance with the Specifications and the Drawings issued to the Contractor for construction purposes.

Any reliance placed by the Contractor on the estimated quantities stated in the Schedule of Quantities issued for tendering purposes, or measurements made by the Contractor from the Drawings issued for tendering purposes, shall be entirely at the Contractor's risk and the Employer accepts no liability whatever in respect of materials ordered by the Contractor on the basis of Tender Documents.

PSA 4 PLANT

PSA 4.2 Contractor's Offices, Stores and Services

Add the following:

“No housing facilities are available for the Contractor’s employees and the Contractor shall make his own arrangements to house his employees and to transport them to site.

Any temporary buildings erected by the Contractor or site offices, accommodation, stores, workshops and ablutions erected on the site must all be to size and at locations approved by the Employer.

The Contractor is responsible for all security of the Camp Site at his own cost”.

PSA 5 CONSTRUCTION

PSA 5.1 Survey

PSA 5.1.1 Setting Out of the Works

The Contractor is responsible for placing and maintaining survey control pegs to be used in setting out the Works.

A full schedule of control beacons will be issued to the successful tenderer prior to the start of the Contract giving X, Y and Z co-ordinates. These control beacons are to be used by the Contractor for all survey requirements.

Add the following new Subsubclause:

PSA 5.1.3 As Built Data

The Tenderer shall note the Lump Sum item 1.38 covering the submission of as built data.

The Contractor shall supply the Engineer with:

j) Road and platform surface levels and co-ordinates,

k) Coordinates and levels at the corner of all buildings, structures and edges of surfacing,

l) A list of surveyed invert and cover levels and co-ordinates of all drains, catchpits, downchutes, headwalls, cable duct markers and manholes constructed or modified during the course of the Contract,

m) Subsoil drainage lines, water, sewer and contaminated stormwater pipelines.

n) Fence lines

o) Co-ordinates and final levels

The Completion Certificate shall not be issued unless the above information has been forwarded to the Engineer.

PSA 5.2 Accommodation of Traffic

The Contractor shall strictly comply with the following specifications:

- The Contractors working hours are to be between 07:00 to 17:00 Monday to Friday, excluding public holidays.
- The Contractor shall erect adequate traffic signs that conform to the requirements of the S.A. Road Traffic Signs Manual, maintain and keep them in good order.
- Public traffic must be accommodated on MR416 at all times. When tying new work into the existing road, adequate barricades, signage and temporary deviations must be provided, including flagmen if necessary.

The Contractor shall take the necessary care at all times in all his operations and use of his equipment to protect the public and to facilitate the movement of traffic - Clause 5.1 SABS 1200D has reference.

PSA 5.4 Protection of Overhead and Underground Services

The Contractor is to ensure at the start of the Contract that all known services are checked to ascertain whether they interfere with construction of the Works. If obstructions are found, the Engineer is to be notified timeously in writing so that adequate steps can be taken to effect the relocation of the obstructions. No claims for delays will be entertained unless, in the opinion of the Engineer, the Contractor has taken reasonable steps timeously to have the obstruction relocated.

PSA 5.5 Dealing with Water

The Contractor shall be responsible for handling all surface and subsurface water in such a way that construction can proceed with a minimum of risk and at no time shall overland flows be blocked. To this end the Contractor shall divert flow around the working area(s) if necessary. The Contractor shall also take particular care to ensure the safety of the Works against damage by flooding.

The cost of supplying and operating the equipment for dewatering of all excavations and controlling of stormwater and subsurface water on the Works will be held to be included in the Tender Sums in Section 1 of the Schedule of Quantities and no separate payment will be made for this work.

PSA 5.7 Safety

- ***Add the following:***

"The Contractor will refer to Part C3.3, Particular Specifications, for the OHSA 1993 Safety Specification."

- ***and:***

"The Contractor shall provide security watchmen and all measures necessary to secure the works for the contract as he deems fit. The cost thereof will be deemed to be included in the relevant rates tendered. The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team.

PSA 5.9 Site Diary

A site diary in triplicate format, which shall be supplied by the Contractor must be filled in on a daily basis and submitted to the Engineer on a weekly basis. No claims will be considered without the site diary's schedules property completed (on a daily basis) and submitted.

PSA 6 TOLERANCES

PSA 6.1 Degrees of Accuracy

The Contractor shall construct each of the various parts of the Works to a degree II accuracy except where otherwise specified.

PSA 7 TESTING

Add the following new Subclause:

PSA 7.5 Acceptance Control Testing

A laboratory will not be required on site for the Engineer's use and all acceptance control testing shall be done through a commercial laboratory. The Contractor shall provide his own testing laboratory which shall be capable of carrying out all necessary testing for process control. The Contractor's laboratory shall be subject to the Engineer's approval. The Engineer shall be given free access to the results of testing carried out by the laboratory.

The cost of acceptance control testing carried out by the Engineer will not be for the Contractor's account and will be paid for under the Prime Cost Sum allowed for the Schedule of Quantities, unless the tests reveal that the material is not in accordance with the Specifications. In which case, the costs of such test shall be borne by the Contractor. Acceptance control testing will only be carried out on the written instruction of the Engineer.

PSA 8 MEASUREMENT AND PAYMENT

PSA 8.1 Measurement

Add the following new Subsubclause:

PSA 8.1.3 Security

The Tenderer must make allowance for the provision of security for his personnel, plant and equipment on the site or work points at his own cost. The cost of security is deemed to be included in Section 1: Preliminary and General.

PSA 8.5 Sums stated Provisionally by the Engineer

Amend the penultimate sentence of Subclause 8.5 to read:

"The percentage rate shall cover the Contractor's overheads, charges and profit on the work covered by the sums provisionally stated. Payment will be made on the basis of the sums actually paid for such work".

PSA 8.5 a) Employment of a Community Liaison Officer and a Social Facilitator

A Community Liaison Officer (CLO) and a Social Facilitator (SF) must be employed after consultation with the Area Based Officer/Manager and the Ward Councillor, by the Contractor, for the duration of the Contract as detailed in **Clause 10.19** and **Clause 10.20** of the Special Conditions of Contract. The CLO and SF will be selected from within the local community. Remuneration of the CLO and SF will be determined by the Engineer after consultation with the Employer and this salary will be paid by the Contractor**.**

The CLO and SF will become the entire responsibility of the Contractor as part of his normal workforce. The CLO will be appointed immediately before work commences, while the SF will be appointed as and when required.

PSA 8.6 Prime Cost Items

Amend the penultimate sentence of Subclause 8.6 to read:

"The percentage rate shall cover the Contractor's overheads, charges and profit on the work covered by the sums provisionally stated. Payment will be made on the basis of the sums actually paid for such work".

PSA 8.7 Daywork

All daywork rates are inclusive of supervision and all overheads. Daywork rates will apply irrespective of the conditions contained in Clause 5.7 of the General Conditions of Contract.

PSA 8.8 Temporary Works

PSA 8.8.2 Accommodation of Traffic

The tendered rate shall include for traffic accommodation as described in PSA 5.2 of this Document. This includes tie ins to existing roads and temporary deviations for public traffic.

Add the following new payment items:

PSA 8.9 As Built Drawings

The unit of measurement shall be the **Lump Sum** (Sum).

The tendered rate shall include for supplying the Engineer with "as built" surveys of the Works in marked up drawings, survey data in electronic format and schedules as described in PSA 5.1.3 of this Document. The survey is to include the X, Y and Z co-ordinates in an approved format.

PSA 8.10 Additional Employer's Obligations in Respect of the OHS Act

The unit of measurement shall be the **Lump Sum** (Sum).

The lump sum provided will be for any additional Employer's obligations in respect of the OHS Act. This lump sum is for the sole use by the Employer and only upon written instruction from the Engineer. A Contractor's mark-up is applicable to this item however, the Employer has the right to negotiate the Contractor's mark-up.

The rate tendered shall also allow for the requirements of the Site-Specific Health and Safety Specification and the Base Line Risk Assessment included as Annexures 3.6.1 and 3.6.2 within this document.

SABS 1200 AB - 1986 : ENGINEER'S OFFICE

PSAB 3 MATERIALS

PSAB 3.1 Nameboards

Add the following:

One Employer's nameboard shall be erected within one month of the commencement of construction and shall be placed where ordered by the Engineer. Any damage to this board shall be repaired within 14 days of a written instruction received from the Engineer. For details of the board refer to the Standard Drawings contained in this document.

Erection of One Contractor's nameboard that complies with the drawing(s) provided are required in the area of the Works, at a position approved by the Engineer, who may at any time order their removal if any objections are received.

The board shall be manufactured from materials specified in Clause 3.1 of SANS 1200 AB but shall conform in the painting, decorating and detail with the recommendations to the drawing attached.

All nameboards shall be removed 14 days prior to the date of the Final Approval Certificate.

PSAB 3.2 Office Building(s)

Replace the contents of this clause with the following: -

The Contractor shall supply, maintain and service three offices of 9m^2 minimum floor space and a ceiling height of 2.5m with lighting for the sole use of the Engineer and Employer.

The furniture stated SABS 1200 AB-1986 clause 3.2, (a.... j) shall be replaced by the following items to be provided in each site office:

(n) One desk 1.5m long x 0.9m wide with four (4) drawers (one lockable).

(o) One plan table, 1.2m long x 1.0m wide x 0.9m high, with a smooth top.

(p) One Office swivel chair, two visitors' chairs.

(q) An acceptable blind to each window.

(r) A pin board, 1.5m long x 1.2m high for displaying plans and diagrams.

(s) A whiteboard of 1m^2 size with 3 coloured markers and duster

(t) Acceptable lighting

(u) Provision of two 15-amp volt plug points with power supply

(v) An air conditioner in proper working order.

A single unit of each f the following shall be supplied:

(w) One A3 colour printer.

(x) One small electric refrigerator.

(y) a fire extinguisher which shall be properly maintained by the Contractor

The Contractor sum shall also include for a basin with running water, a lockable toilet for the exclusive use by the Engineer and Employer and 3 No. covered parking bays that shall be erected for the sole use by the Engineer, Employer and his staff.

The Contractor shall also supply, maintain and service a boardroom for 24m^2 minimum floor area able to seat 10 people for joint use by him and the Engineer. This room shall be equipped with adequate lighting, two power points, chairs, tables, a 2m^2 whiteboard, a 2.5m^2 pin board with stationary and an air-conditioner in proper working order.

The Contractor will be required to provide for daily cleaning of the Engineer's offices, boardroom and toilets. Payment for the cleaning of the offices will be deemed to be included in the Tenderer's General rates.

PSAB 4 PLANT

PSAB 4.1 Telephone

Replace clause 4.1 with the following:-

The Contractor will be required to supply the Resident Engineer and Employers graduate Engineer with a reliable internet, wifi or 3G / LTE for the duration of the Contract. The Contractor shall be responsible for the cost of all calls, installation, rental, supplies, maintenance, etc.

The Contractor will not be required to supply the Engineer with any mobile device / phone but the Contractor will be required to pay for all calls made from his phone pertaining to this Project up to a maximum amount of R1000.00 per month as soon as the contract has commenced.

PSAB 5 CONSTRUCTION

Add the following clauses:

PSAB 5.5 SURVEY EQUIPMENT

The Contractor shall upon request provide the following survey equipment on the Site from commencement to the completion of the Works.

(h) 1 upright reading automatic level with tripod;

(i) 1 metric levelling staff with protective cover bag;

(j) ranging rods;

(k) 1 x 50 metre Stilon tape measure and measuring wheel;

(l) Wooden and steel pegs and hammers as required.

The equipment shall be provided for the exclusive use of the Engineer. The Contractor shall keep the equipment continuously insured against any loss, damage or breakage, and he shall indemnify the Engineer and the Employer against any claims in this regard. The Contractor shall also maintain the equipment in good working order throughout the Contract period.

The following additional equipment/services may be required from time to time by the Engineer and shall be supplied by the Contractor when required. The equipment/service may be shared with the Engineer.

(m) Two chainmen to assist with levelling and surveying.

(n) Spray paint (selected colour)

PSAB 5.6 Site Instruction books

The Contractor shall supply a triplicate book for site correspondence and inspection requests to the Engineer. Reasonable notice shall be allowed prior to inspections. All inspections requests and approval/disapproval thereof shall be recorded by the Site staff in writing. All requests must be signed and dated by the Engineer before implementation.

The Contractor must ensure that a suitable site quality record system is put in place subject to approval by the Engineer to record that each section, or work item, complies with the relative works specification. Failure to update or provide sufficient records may result of a 10% interim payment reduction being withheld.

PSAB 8 MEASUREMENT AND PAYMENT

PSAB 8.2 Payment

Add the following payment clauses:

PSAB 8.2.1 Fixed and Time Related Charges

PSAB 8.2.2 Telephone

The unit of measurement shall be the Prime Cost Sum (PC Sum).

The Engineer shall reconcile the service provider's account each month for telephone / mobile calls made pertaining the Project and the Contractor shall reimburse the service provider directly within 7 days of receipt of the account.

PSAB 8.2.3 Survey Equipment

Payment for compliance with Clause PSAB 5.6 on the following basis:

Payment will be made for the supply of the equipment specified in clause PSAB 5.5 under the fixed P&G rate on verification by the Engineer that the equipment specified is on site. Should any of this equipment be removed from site during the course of the contract then any payments made for the supply of this equipment will be reversed out of the next interim certificate.

Payment will be made for the maintaining the above equipment in a suitable condition under the time related P&G rate.

SABS 1200C - 1980 : SITE CLEARANCE

PSC 1 SCOPE

The areas included for site clearance are generally vegetated and include sugar cane, grassland, existing roads and laydown areas.

PSC 8 MEASUREMENT AND PAYMENT

PSC 8.1 Basic Principles

All items shall include for removing of cleared material to a designated stockpile or spoil site within the overall landfill site at a location approved by the Engineer. Should the Contractor wish to use any other area for the disposal of soil, rubble, vegetation etc., its use shall be subject to the approval of the Engineer.

If vegetated areas are removed under topsoil stripping, cut to fill or cut to spoil, shaping of waste, etc., no payment will be made for clearing and grubbing.

PSC 8.2 Scheduled Items

PSC 8.2.1 Clear and Grub

The areas to be cleared and grubbed will be shown by the Engineer and clearing and grubbing will only be undertaken upon written instruction by the Engineer.

Designated grassed areas to be stripped of topsoil in one operation, shall be paid for under Section 5 of the Bill of Quantities (removal of topsoil) and no separate payment will be made for clearing and grubbing, if applicable.

The tendered rate shall also include for the clearing and removal of all boulders greater than 0,15m^3 and of size up to 1m^3, all large trees and tree stumps of girth greater than 1m, existing waste stockpiles and the leachate collection manhole.

SABS 1200 D - 1988 : EARTHWORKS

PSD 1 SCOPE

This section of the Specification controls the construction of the earthworks for the roadworks, platforms, dams and control berms, where applicable.

PSD 3 MATERIALS

PSD 3.1 Classification for Excavation Purposes

PSD 3.1.1 Method of Classifying

Classification of material other than soft shall be agreed upon prior to excavation commencing. The Contractor shall immediately inform the Engineer if and when the nature of the material being excavated changes to such an extent that a new Classification is warranted. Failure on the part of the Contractor to notify the Engineer timeously shall entitle the Engineer to classify the excavated material at his discretion.

PSD 3.1.2 Classes of Excavation

Irrespective of Classes of excavation stated in the SABS Specifications, all excavated material shall be classified as either hard or soft excavation.

The Classification of excavation shall be as follows:

vii) Hard excavation shall be classified as excavation in material which cannot be removed and loaded by normal constructional plant without first drilling and blasting.

viii) Soft excavation shall be classified as per Subclause 3.1.2(a) and (b) of Clause 3 of SABS 1200 D.

PSD 3.3 Selection

The approval of a borrow area for a certain purpose does not necessarily mean that all material within that area is suitable for the specified purpose. What it does mean, is that the borrow area contains some suitable material. The onus is on the Contractor to ensure that only material that is indeed suitable, is removed and used for the specified purpose.

Where the Contractor is required to select material from excavations or stockpile for a specific purpose, the above provisions relating to borrow areas shall apply mutatis mutandis to excavations.

The Contractor shall not waste or contaminate materials that have been selected for a specific purpose.

PSD 5 CONSTRUCTION

PSD 5.1 Precautions

PSD 5.1.1 Safety

PSD 5.1.1.2 Safeguarding of excavations

Add the following subparagraph:

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

PSD 5.2 Methods and Procedures

PSD 5.2.1 Site Preparation

PSD 5.2.1.1 Clearing or clearing and stripping of site

The areas specified to be cleared shall be stripped of all waste, vegetable matter and surface soil to a depth of 100mm, where applicable.

PSD 5.2.2 Excavation

PSD 5.2.2.1 Excavations for general earthworks and for structures

Add the following additional subparagraphs:

g) Overbreak shall be backfilled at the Contractor's expense and shall not be measured.

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

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

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

PSD 5.2.2.2 Borrow Pits

Add the following:

"Where it is specified that material shall be obtained from a designated borrow pit, the Contractor shall be responsible and include in his rates for making all arrangements for procuring the material. No payment will be made for the removal of overburden or stockpiling or clearing at the source and no extra over payment for excavating in intermediate, hard or boulder material shall apply".

Add the following new Subsubclause:

PSD 5.2.2.4 Selection and Stockpiling

The approval or designation of a particular borrow area for a particular purpose will not imply that all the material is suitable for that purpose or should be used for that purpose. The Contractor shall select suitable material from that source, discard unsuitable material and reserve material for other purposes as necessary. When required and as ordered by the Engineer, material shall be stockpiled for later use when the excavation thereof is unavoidable in order to excavate the material required at the time.

It is likely that several separate stockpiles for different materials will be required ; eg topsoil, G10 material only suitable for fill or future daily cover, G7 material suitable for layer works, old road layers recovered from MR461, blasted rock suitable for crushing etc

PSD 5.2.3 Placing and Compaction

PSD.5.2.3.1 <u>Embankments</u>

Clause D.5.2.3.1 shall be extended to include for benching and bonding as instructed in fill and platform slopes.

Clause D.5.2.3.1 shall also be extended to include for stockpiling as detailed in SABS 1200DM generally and by Clause 5.2.2.4.

PSD 5.2.3.2 Backfilling and compaction of trenches and excavations around structures

c) Restricted Work

The width of the restricted backfill behind any structure shall be as dimensioned on the drawings and as instructed by the Engineer on site. Restricted

PSD 5.2.5 Transport for Earthworks

PSD 5.2.5.2 Overhaul

There will be no overhaul measured in this contract. All haulage (including that from commercial sources) shall be considered freehaul. The cost of haulage shall be deemed to be covered by other rates in the Schedule of Quantities.

PSD 8.3.2 Restricted Excavation

Restricted excavation shall only be paid where the excavation is against a structure or an existing service or the existing fence at the Transnet Tower. Tie ins to the existing road earthworks will not be measured for payment.
Excavations for pipes and services shall be measured under SANS section DB.

SABS 1200 DB - 1989 : EARTHWORKS (PIPE TRENCHES)

PSDB 1 SCOPE

This section of the Specifications shall be extended to include for all pipes, drains, soakaways and septic tanks.

PSDB 3 MATERIALS

PSDB 3.1 Classes of Excavation

Irrespective of Classes of excavation stated in the SABS Specifications, all excavated material, including waste material, shall be classified as either hard or soft excavation.

The Classification of excavation shall be as follows:

j) Hard excavation shall be classified as excavation in material which cannot be removed and loaded by normal constructional plant without first drilling and blasting.

ix) Soft excavation shall be classified as per Subclause 3.1.2(a) and (b) of Clause 3 of SABS 1200 D.

PSDB 3.7 Selection

Replace the words "if he so wishes" in the first line of the second paragraph with the words "at his own cost".

PSDB 5 CONSTRUCTION

PSDB 5.1 Precautions

Add the following new subclause:

PSDB 5.1.5 Trench Excavations

The precautions for excavations as specified in Clause 5.1.1 of Section 1200D shall apply to all trench excavations.

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

PSDB 5.2 Minimum base width specified

Excavations for all drains and foundations shall be excavated to the dimensions as shown on the drawings. Payment will be made based on the width shown on the drawings.

PSDB 5.4 Excavation

Add the following:

For pipes constructed in fill areas, the fill must be placed to attain a minimum of 600mm above the crown of the pipe unless indicated otherwise on the drawings, before excavating the trench to the specified width. In such instances, payment for excavation shall be calculated from this level.

Where selected layers are specified above the pipe, excavation shall be measured from the bottom of the selected layer or from 600mm above the crown whichever is the lesser.

Excavation for manholes and other structures shall be included with an allowance of 600mm around the structure to provide working space. For subsoil pipes the excavation depth shall be the full depth as shown on the drawings.

PSDB 5.6.3 Disposal of soft excavation material

Excavation material, including waste material, from the trench which is classified as soft and has become surplus because of bulking, displacement by the pipe and importation shall be stockpiled on site or used as fill, as directed by the Engineer.

PSDB 8 MEASUREMENT AND PAYMENT

PSDB 8.1 Basic Principles

PSDB 8.1.4 Overhaul

There will be no overhaul measured in this contract. All haulage (including that from commercial sources) shall be considered freehaul.

PSDB 8.3 Scheduled Items

PSDB 8.3.2 Excavation

Clause 8.3.2 a) should now read:

c) "Excavate in all materials for trenches, backfill, compact and stockpile of surplus material."

All soft surplus material from trench excavations will be stockpiled on site or used as fill as directed by the Engineer.

The tendered rate for excavation should allow for adequate support, shoring or bracing protection.

In addition to the requirements of Subclause 8.3.2, the tendered rate for excavation shall also include for trimming the excavations and for compacting the base of the trenches to 95% mod AASHTO maximum density to a depth of 150mm.

Tenderers are to note that in all cases the compaction of the trench backfill shall be to 95% mod AASHTO density with the backfill layers not exceeding 150mm in thickness. The tendered rate for excavation and backfilling in all materials shall include for the increased compaction of the trench bottom excavations and backfill to 95% mod AASHTO density.

Excavation in fill shall be measured to a maximum of 1m above the crown of the pipe or service.

SABS 1200 DK - 1996 : GABIONS AND PITCHING

PSDK 1 SCOPE

This specification shall be extended to cover the geotextile components required for the separation layer under the reno mattress and behind gabion baskets.

PSDK 3 MATERIALS

PSDK 3.1.4 Geotextile

c) Non woven needle punched geotextile.

The geotextile used for the separation layer or gabions shall be a non-woven polypropylene or polyester geofabric with a nominal mass of 340 g/m^2 and for the subsoil drains 200 g/m^2:

The geotextile must be stable in the presence of chemicals typically found in a landfill and should be resistant to attack from these chemicals.

All geotextiles should be stable at a temperature of 100 °C.

PSDK 5 CONSTRUCTION

PSDK 5.4 Geotextile

a) Geotextile

The geotextile shall be delivered to site in rolls covered with an opaque plastic sheet to prevent damage from sunlight, should the quantity allow.

All rolls (placed alongside one another or end-on-end) shall overlap by a minimum of 300mm or be sewn with a polyester thread or shall be heat bonded along overlapping edges.

A minimum thickness of 300mm of cover shall be kept between heavy equipment and the geotextile at all times.

No construction traffic shall be allowed directly on any of the laid geotextile.

PSDK 8 MEASUREMENT AND PAYMENT

PSDK 8.2 Scheduled Items

PSDK 8.2.4 Geotextile

PSDK 8.2.4.1 Non Woven Needle Punched Geotextile

The unit of measurement shall be the square metre (m^2) of filter fabric supplied and installed as specified.

The tendered rate shall include full compensation for furnishing, procuring, cutting, overlapping, jointing, placing and protecting the filter fabric as specified as well as for wastage.

PSDM EARTHWORKS (Roads, Subgrade)

PSDM 1 SCOPE

This section of the Specification controls the bulk earthworks to be carried out on the roads, the selection and stockpiling of materials, the construction of road cuts and fills, layerworks required for the roads and layerworks to the paved areas of the platforms and stockpile areas.

The selected materials making up the engineered layers, shall be sourced by the Contractor, tested for compliance to the requirements set out below, before being imported.

PSDM 3 MATERIALS

PSDM 3.1 Classification for Excavation Purposes

Irrespective of the classification of excavation contained in the SABS Specifications, all excavated material shall be Classified as that stated in PSD 3.1.2 of this Document.

PSDM 3.2 Classification for Placing Purposes

PSDM 3.2.1 General

a) The nomenclature used for the classification of the various material types to be used in the designed pavement layers is that defined in the NITRR documents TRH 4 and TRH 14.

c) Where G or C class materials are called for in these Project Specifications, the material shall conform in all respects to the requirements of G or C class materials as described in TRH 14 in preference to the material properties given in Subclause 3.2.3.

Add the following new subclauses

PSDM 3.2.10 Selected Layers

Where G5, G7 and G9 materials are called for, they shall conform in all respects to the requirements as described in the NITRR document TRH 14.

PSDM-3.2.11 Gravel Surfacing

The material supplied for the gravel surfacing is to comply with that specified for the selected layer in PSDM-3.2.10 above.

PSDM 5 CONSTRUCTION

PSDM 5.2 Methods and Procedures

PSDM 5.2.1 Stripping of Site

The topsoil to be stripped shall be stripped specified by the Engineer together with the grass and grass roots (and sugar cane) and stockpiled as directed by the Engineer.

PSDM 5.2.2 Cut and Borrow

PSDM 5.2.2.2 Dimensions of Cuts

In addition:

i) Overbreak shall be backfilled at the Contractor's expense and shall not be measured.

iii) The minimum depth of blasting shall be 750mm and where depths of less than 750mm are required to form the final surfaces, the Contractor shall allow for the extra depth of blasting.
This extra volume will not be measured nor paid for and the Contractor shall backfill the over excavation at his expense.
In hard rock cuttings, blasting shall be extended at least 750mm below formation level (bottom of selected subgrade) and the surface trimmed to shape and level and then rolled with a minimum of 5 passes of a 5t flat drum vibratory roller.

PSDM 5.2.4 Fill

PSDM 5.2.4.1 Preparation

b) Before any fill commences, the existing surface shall be surveyed, the existing ground line checked against the design grade and cross section and measured for cut and or fill quantities. The Engineer may then revise the design lines to suit the ground shape. Erosion gullies shall first be filled and, following normal practice, the top of 150mm shall be scarified and recompacted to 93% Mod AASHTO maximum density.

PSDM 5.2.4.2 Rock Fill

In addition to requirements of clause 5.2.4.2, rockfill shall be placed by pioneering methods, ie end tipped on the existing portion of the layer being placed and dozed over the edge.

PSDM 5.2.8.2 Overhaul

There will be no overhaul measured in this contract. All haulage (including that from commercial sources) shall be considered freehaul. The cost of haulage shall be deemed to be covered by other rates in the Bill of Quantities.

PSDM 5.2.9 Working on Slopes.

Where the slope, upon which the bulk fill or layerworks are to be constructed, is steeper than 1V: 5H, construction is to proceed from the lower level, in an upwards direction. The Contractor is to take cognizance of this when formulating construction methods and selecting plant.
Benches at least 3m wide shall be cut into any slope steeper than 1V: 5H before placing bulk fill.
Benches will be measured separately.

PSDM 7 TESTING

PSDM 7.2 Process Control

Where applicable, the average field cement content shall be greater than or equal to 0.6 times the specified cement content plus two times the standard deviation. A field cement content test shall be taken at the discretion of the Engineer.

PSDM 8 MEASUREMENT AND PAYMENT

PSDM 8.1 Basic Principles

Further to the requirements of Clause 8.1, the following shall apply:

a) **Bulking and Shrinkage**

For measurement and payment purposes, no allowances will be made for bulking or shrinkage and it shall be assumed that 1 cubic metre of excavated material from the site shall form 1 cubic metre of compacted fill. In the event of there being surplus material encountered on site due to bulking, the Tenderer shall allow in the relevant rates for the material to be spoiled. Similarly, should the material shrink the Tenderer shall allow for the importation of material.

b) **Volumes**

Measurement for bulk earthworks shall be made in fill from topographical survey and DTM modelling. The Tenderer is to make allowances for bulking or shrinkage or the loss of relevant materials and no extra or separate payment will be made due to the material losses.

c) **Restricted Work**

No extra or separate payment will be made for work considered to be of a restricted nature. These costs shall be deemed to be covered by other rates in the Schedule of Quantities.

d) **Stockpiling of material**

The Tenderer must note that it may be necessary to stockpile some of the excavated material before the fill areas become available. Allowance for any costs incurred in the stockpiling as described in Clause 8.3.11 must be made in the cut to fill / spoil / stockpiling rates as items have not been included in the Schedule of Quantities to cover stockpile handling.

PSDM 8.3 SCHEDULED ITEMS

PSDM 8.3.2 Removal of topsoil to stockpile

Topsoil shall be carefully stripped and stockpiled as directed by the Engineer, generally with the grass, roots etc. The depths and locations of stripping shall be determined by the Engineer on site.

PSDM 8.3.3 Treatment of Roadbed

The Bid rate shall also include for all restricted work where appropriate.

PSDM 8.3.4 Cut to Fill

The tendered rate shall include full compensation for all costs arising from the trimming of exposed surfaces to the required tolerance such that they are free of all protrusions, stones larger than 50mm, roots and other materials which may negatively affect the construction of the layers above.

PSDM 8.3.5 Selected Layers from Commercial Sources

In addition to the requirements of Clause DM-8.3.5, the following shall apply:

f) the measured volume for all imported fill shall be cubic metre (m^3) measured in place, as constructed and compacted to the specified dimensions shown on the drawings;

g) the tendered rate shall include for all additional compaction requirements as specified;

h) if applicable, the tendered rate for the stabilised layers shall also include for the operation of stabilizing as well as the provision of the approved stabilising agent at a nominal rate of 4% by mass and shall thus include all operations and materials to satisfy the requirements of stabilising as described in the relevant Clauses of Part ME.

i) If mechanical stabilisation is instructed by the Engineer, the component materials shall be measured separately. eg 70% G7 material from stockpile and 30% G4 material from commercial source.

j) Where applicable, the tendered rate shall include for all restricted work as well as for satisfying the requirements of Section PSDM 5.2.9

PSDM 8.3.7 Cut to Spoil or Stockpile

In addition to Clause PSDM 8.3.4, the tendered rate shall also include for selection of the excavated material. The excavated material taken to stockpile shall be free of any rock or boulders in excess of 200mm in size. Any rock or boulders in excess of 200mm are to be separated out of the material and taken to a separate stockpile as ordered by the Engineer.

PSDM 8.3.13 Surface Finishes

a) Topsoiling

The unit of measurement shall be the cubic metre (m^3) of topsoil applied in a layer thickness of 100mm, measured on slope, as directed by the Engineer.

The Bid rate shall include full compensation for excavating and loading the topsoil, any compensation or royalties payable, transport, off loading, placing and spreading to the required thickness, levelling off a smooth surface and for removing any stones as specified. The Bid rate shall include for all overhaul and restricted work.

The topsoil is to be obtained from site or stockpile, but any shortfall may have to be imported from commercial sources.

If topsoil is obtained from a local, but not a recognised source, the Engineer reserves the right to inspect and approve the source prior to importation. In this regard, the Contractor shall supply suitable excavating equipment to dig test pits, the costs of which are included in the rates.

In addition the Bid rate shall include for testing of the proposed topsoil to check the organic compounds in the topsoil. The Engineer shall be the sole authority to ascertain if the topsoil meets these requirements.

b) Grassing

The unit of measurement for hydroseeding or grass sodding shall be the square metre (m^2).

For Tender purposes the following hydroseeding mix must be allowed for:

Grass Species	Common Name	Application : kg / ha
Eragrostis tef	Teff	3
Eragrostis curvula	Weeping lovegrass	11
Chloris gayana	Rhodes grass	14
Cenchrus ciliarus	Blue buffalo grass	6
Cynodon dactylon	Couch / Kweek	16
Digitaria Eriantha	Smuts finger grass	5
	Total	55

The Tendered rates shall include for any restricted work.

Further to the requirements of Subclause 5.2.4.3, the tendered rate for hydroseeding shall include for adequate watering at regular and frequent intervals to ensure the proper growth of grass until the grass has established an acceptable cover and thereafter until the end of the maintenance period of the grass.

For Tendering purposes, the Contractor shall allow in his rate for 50kℓ of water to be applied evenly to the entire grassed area at fortnightly intervals. The grass must be planted and have an acceptable cover before the end of the acceptable growing season.

The Contractor shall further mow the grass on all areas where grass has been established, whenever so instructed by the Engineer, until the end of the maintenance period. For Tendering purposes this interval shall be assumed to be monthly. Weeds shall be controlled by approved means.

An acceptable grass cover shall mean that not less than 75% of the area grassed shall be covered with grass and that no bare patches exceeding 0.25m^2 in any area of 1m x 1m shall occur.

The maintenance period for grassing shall commence when an acceptable grass cover, as defined above, has been established and shall be one year.

SABS 1200 G - 1982 : CONCRETE (STRUCTURAL)

PSG 1 SCOPE

This specification has been extended to cover the construction of the concrete lined drains and the concrete pavement to the roadway.

PSG 3 MATERIALS

PSG 3.2 Cement

PSG 3.2.1 Applicable Specifications

The new SABS ENV. 197-1 (adopted in 1996): Cement – composition, specification and conformity criteria Part 1: Common Cement, replaces SABS 471 – 1971, SABS 626 – 1971 and SABS 831 – 1971 in Clause EM.2 of Part EM : Concrete Surface to Roads.

Add the following new Subclause:

PSG 3.9 Curing Compound

The curing compound used shall be a white pigmented resin based curing compound, complying with the requirements of ASTM C 309 except that the water loss as determined by the water retention test shall not exceed 0,040 g/cm².

A recent certificate from an approved testing laboratory shall be submitted certifying that the curing compound complies with the specifications. Further testing shall be carried out at regular intervals throughout the contract period on samples taken at the nozzle of the spraying equipment.

The curing compound shall be capable of being sprayed onto a wet surface without loss of stability or performance. This characteristic shall also be certified by the approved testing laboratory.

The curing compound shall be compatible with the cement used to avoid discolouration.

PSG 3.10 Silicon Seals

The joints shall be sealed with Plycol 327 applied after priming with Epidermix 317 or similarapproved systems.

PSG 3.11 Joint Filler

The joint filler shall be Plycord 10 or Sandor Strip or Ethercord or similar approved systems, with PVC tape between backup strip and the sealant.

PSG 5 CONSTRUCTION

PSG 5.1 Reinforcement

PSG 5.1.2 Fixing

Delete from the eighth line:

“or, if permitted by the Engineer, by welding”

PSG 5.5 Concrete

PSG 8.4.3 Strength Concrete for Road Pavement

Concrete used for road base shall have a minimum compressive strength of 30 MPa and a minimum flexural strength of 3.8 MPa at 28 days.

The minimum cementitious content shall be 310kg/m3 with a water cement ratio not greater

than 0.52.

No construction traffic will be permitted on the concrete pavement until the compressive strength exceeds 15MPa.

A mix design shall be prepared by an approved laboratory and submitted by the contractor for approval by the Engineer prior to laying concrete.

PSG 5.4.5 Joints in Concrete Pavements

Joints shall not be more than 4.5m apart.
Joints may be construction joints or sawcut joints. A construction joint shall be formed at the end of each day's work.
All longitudinal joints and the transverse joints to the end panel shall be recessed and tied.
Where instructed by the Engineer, joints shall be sealed.

PSG 5.5.10 Concrete Surfaces

Concrete pavement surfaces shall be fully compacted by vibration then struck off with a straightedge and finished neatly to normal base tolerances.

Concrete pavement surfaces are vulnerable to shrinkage cracking so early application of curing compound is essential and saw cutting shall be done as soon as the concrete is hard enough to be cut, even if this is after normal work hours.

Exposed concrete surface finishes for all concrete shall be a wood float finish except for the road pavement that shall have a broom or other finish to the Engineer's instruction.

PSG 5.4.5 Laying Concrete Pavement on steep slopes

Al concrete pavement laid at a slope steeper than 6% shall be laid from the bottom of the slope working uphill. Anchor panels and blocks shall be incorporated on roads with grades steeper than 3% at the spacing shown on the drawings.

PSG 8 MEASUREMENT AND PAYMENT

Basic Principle

1) No extra or separate payment will be made for work considered to be of a restricted nature, being for the narrow access corridor, the steepness of the site or for the difficulty of turnaround.

2) No extra or separate payment will be made for any additional formwork to the concrete. All formwork will be deemed to be included in the rates Bid for the concrete.

PSG 8.4 Scheduled Concrete Items

PSG 8.4.3 Strength Concrete for vee drains and minor drainage structures

The Bid rate will differentiate between the different elements of concrete works scheduled for this Contract.

The Bid rates for minor drainage structures such as concrete lined vee drains and channels shall include for the provision of all formwork, damp proof course, weep holes, reinforcing, curing of concrete, wood float finish, joints and other incidentals as detailed on the drawings and directed by the Engineer on site.

SABS 1200 LB - 1983 : BEDDING (PIPES)

PSLB 3 MATERIALS

PSLB 3.1 Selected Granular Material

Add the following:

"Alternatively clean, coarse river sand may be used".

Add the following new Subclauses:

PSLB 3.5 Bedding Sand

Where shown on the drawings the backfill for drains shall be concrete sand (fine aggregate) or selected river sand as per the relevant requirements of SABS 1083. The material must be obtained from an approved source.

PSLB 3.6 Crushed Rock Aggregate

Where shown on the drawings, the backfill for drains and subsoil drains shall be as per the relevant requirements of SABS 1083. The material must be obtained from an approved source.

This layer shall also be clean rock crushed to the following specification:

a)	Maximum Particle Size	19 mm
b)	Minimum Particle Size	<10% passing the 13 mm sieve size
c)	Crushing Strength Values obtained from 10% fines aggregate crushing test	100kN

d) The crushed rock must be washed to remove the fine particles.

e) The Engineer will assess the Flakiness Index of the crushed rock visually and reject any aggregate that does not pass the visual inspection.

PSLB 5 CONSTRUCTION

PSLB 5.1 GENERAL

PSLB 5.15 Placing and Compacting Bedding Material

b) For combined trenches, placing and compacting bedding around multiple pipes laid side by side shall be paid for only once, namely, for one placement and compaction, measured along the centre line of the trench.

PSLB 8 MEASUREMENT AND PAYMENT

PSLB 8.2 Scheduled Items

PSLB 8.2.2 Supply only of bedding by importation

PSLB 8.2.2.3 From commercial sources

Where applicable, the tendered rate shall also include for the placing of the crushed rock aggregate and coarse sand in the trenches and the levelling of the materials to the required level.

SABS 1200 ME - 1981 : SUBBASE

PSME 1 SCOPE

The scope of this specification has been extended to cover mechanical modification.

PSME 3 MATERIALS

The materials to be used for mechanical modification shall be normal road layer materials from site or commercial source which are intimately mixed together in situ to create an acceptable layer.

PSME 8 MEASUREMENT AND PAYMENT

PSME 8.2.1 The unit of measurement for modification shall be m3 of the entire layer for the mechanical modification extra over item.
The individual materials shall be paid at the tendered rate for that material for the proportion used, eg 75% of the layer volume paid for G6 from stockpile and 25% of the layer volume paid for G2 from commercial sources.

C3.4: PARTICULAR SPECIFICATIONS

There are no particular specifications for Part B – refer to Part A.

C3.5: CONTRACT AND STANDARD DRAWINGS

C3.5.1 CONTRACT DRAWINGS / DETAILS

- 301837-06-C-LA-201-001 EXTENT OF CONSTRUCTION
- 301837-06-C-LA-202-002 SERVICES LAYOUT SHEET 2/3
- 301837-05-C-LL-206-001 PLAN & LONGITUDINAL SECTION ROAD 3 CH0 TO 217.165 SHEET 1/1
- 301837-05-C-LL-207-001 PLAN & LONGITUDINAL SECTION WORKSHOP ROAD CH0 TO 166.126 SHEET 1/1
- 301837-06-C-LL-209-001 PLAN & LONGITUDINAL SECTION WESTERN CUT-OFF DRAIN
- 301837-06-C-LS-203-001 CLEAN STORMWATER LONGITUDINAL SECTIONS NETWORKS 22, 23 AND 24
- 301837-05-C-CS-206-001 CROSS SECTIONS ROAD 3 CHAINAGES 0 TO 160 SHEET 1/2
- 301837-05-C-CS-206-002 CROSS SECTIONS ROAD 3 CHAINAGES 160 TO 217,165 SHEET 2/2
- 301837-05-C-CS-207-001 CROSS SECTIONS WORKSHOP ROAD CHAINAGES 0 TO 160 SHEET 1/1
- 301837-08-C-DT-201-001 TYPICAL ROAD SECTIONS
- 301837-08-C-DT-201-003 TYPICAL ROADS AND EARTHWORKS DETAILS

C3.5.2 STANDARD DRAWINGS

The Standard Drawings to which these Standard Engineering Specifications refer are listed below.

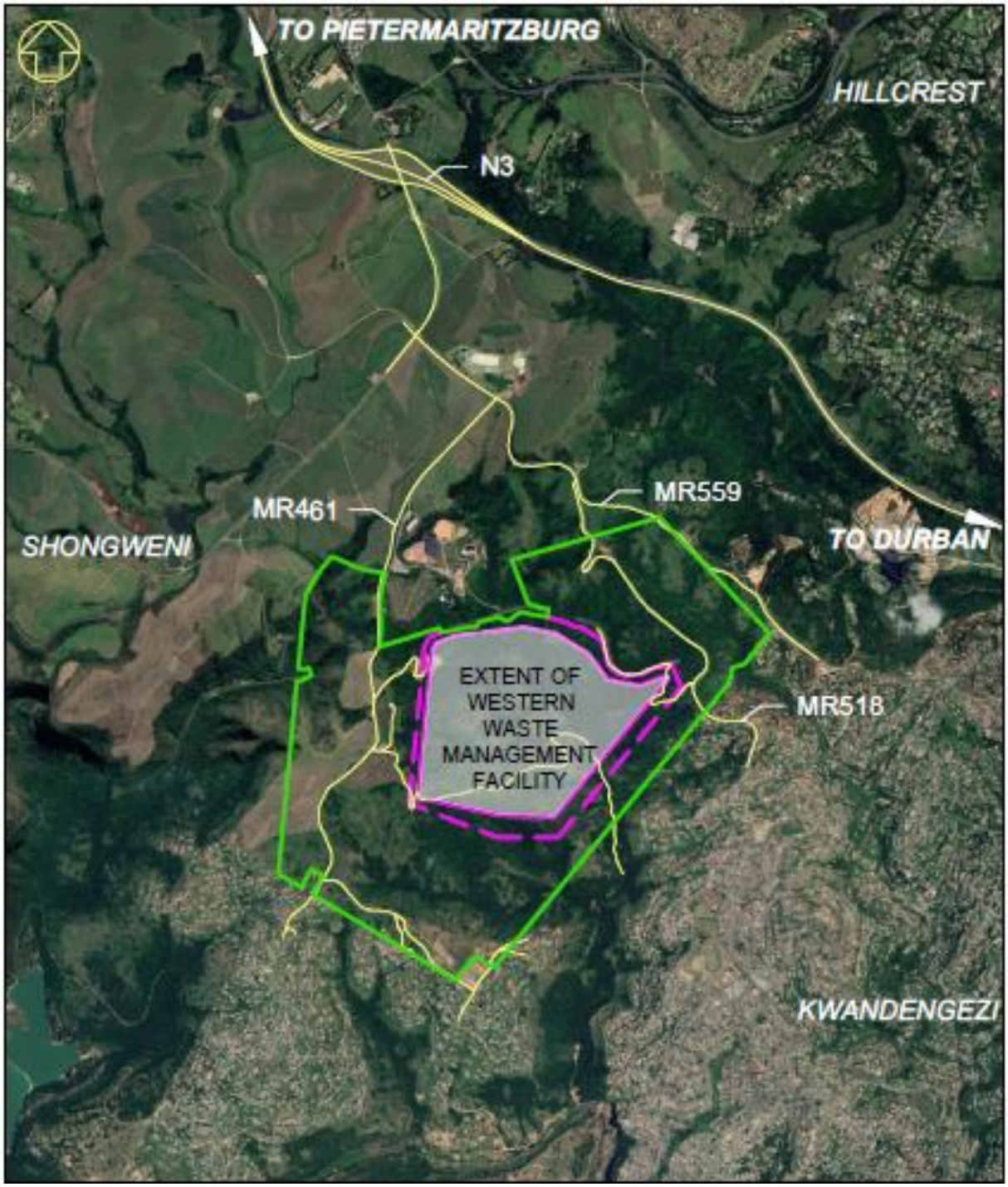
Dwg No	Description	Date of Issue	
38570	Ring Manholes	February	1990
38571	Brick Manhole Details	February	1990
38572	Stormwater Inlet Details	February	1990
38573	Stormwater Inlet Special Details	February	1990
38574	Sewer Manholes: Ramp, Backdrop and Channelling Details	February	1990
38575	Sub-Soil Drain, Pipe Bedding and Pipe Protection Details	February	1990
38576	Headwall Details	February	1990
38577	Kerbing Details	February	1990
38578	Concrete Median Barriers	February	1990
38579	Vehicular and Pedestrian Scoops	February	1990
38580	Concrete Bollard and Steel Guard Rail	February	1990
38581	Retaining Wall, PC Steps, Staircase, Cable Ducts and Headwalls	February	1990
38582	Precast Concrete Fencing and Aluminium Gates	February	1990
38583	Wire Mesh Fence and Gate Details	February	1990
38584	Standard Hydrant Thrust Blocks and Trenches	February	1990
38585	Water Connections, Pipework and Fittings	February	1990
38586	DP & TC Manholes - Rectangular	February	1990
38587	DP & TC Manholes - “L” Shaped	February	1990
38588	DP & TC Manholes - “T” Shaped	February	1990
38589	DP & TC Cable Ducts and Junction Box Details	February	1990
43120	Typical Details of Grid Inlets	February	1990

C3.6: ANNEXURES

C3.6.1 There are no Annexures

PART C4: SITE INFORMATION

C4.1 LOCALITY PLAN



C4.2 CONDITIONS ON SITE

Nature of Ground and Subsoil Conditions

An initial Geotechnical and Hydrogeological study was conducted by Geomeasure Services in 2001.

The landfill footprint is directly underlain by decomposed granite, which is weathered to a depth varying from 2m to 17m, with an average depth of rippable material exceeding 6m.

This material is considered suitable for cover as well as road layers up to sub-base, but is not suitable for impervious lining or drainage layers.

The western plateau above the landfill site is underlain by Natal formation sandstones. This area will not be used for landfill but will underlie the entrance infrastructure and access road.

Twelve TP's were initially excavated on site, in order to be profiled and sampled for a better understanding the general engineering properties of the subsurface soil / rock conditions in view of the proposed landfill site.

The results of the test pits indicated refusal depths ranging between 0.8 and 2.1 m below existing ground level, with an average depth of 1.64 m.

A further detailed geotechnical investigation of the area of the initial development was undertaken by Geosure (Pty) Ltd in February 2023 (A copy of this report is available upon request).

Details of the geology are described in detail in the reporting but summarised below for completeness.

Inferred Local Geology – Proposed Landfill Area

At the positions investigated, the geological units observed are listed below in stratigraphic order (from youngest to oldest):

a) Uncontrolled Fill (includes particle contaminants).

b) Colluvium (fine hillwash).

c) Talus (gravity deposits).

d) Residual siltstone (fully decomposed former siltstone rock).

e) Residual sandstone (fully decomposed former sandstone rock).

f) Residual granite (fully decomposed former granite rock).

g) Weathered Siltstone Rock. Natal Group.

h) Weathered Sandstone Rock. Natal Group.

i) Weathered Granoite Rock. Natal Structural and Metamorphic Province.

It was confirmed that no suitable material was available on site to be used as a compacted clay liner, therefore a geosynthetic clay liner (GCL) will be utilised in the containment barrier.

In addition, no indication of dolerite intrusion or notable faulting was observed as underlying the landfill area to date.

In the valley lines the soils may be soft and wet with groundwater being encountered. Temporary and permanent subsoil drainage is required in these areas.

C4.3 TEST RESULTS

There are no specific test results however, the previous Geotechnical Investigation reports are available upon request.