MUNICIPALITY NOTICE NO.: 020 OF 2022
CONTRACT NO.: 8/2/RNM0352

UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

CIDB CLASSIFICATION GRADE 6CE or HIGHER

Name of Tenderer: _____

Telephone No.: _____

Fax No.: _____

Email Address _____

Address: _____

_____

_____

CSD No

This tender closes at 12h00 on Wednesday, 25 May 2022 at the offices of the Ray Nkonyeni Municipality located at 10 Connor Street, Port Shepstone

NO LATE SUBMISSIONS WILL BE CONSIDERED

BID AMOUNT R_____

Issued by:	**Prepared By:**
RAY NKONYENI MUNICIPALITY P O Box 5 Port Shepstone 4240 Tel: 039 688 2000 Fax: 039 682 0327 Email: khulekani.msomi@rnm.gov.za	**BVi Consulting Engineers** P O Box 889 Westville 3630 Tel: 031 266 8382 Fax: 031 267 0728 Email: deong@bvikn.co.za

TABLE OF CONTENTS

RAY NKONYENI MUNICIPALITY

CONTRACT NO.: 8/2/RNM0352

UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

PROCUREMENT DOCUMENT

FOREWORD

This document consists of two distinct clusters, namely the **TENDER** and the **CONTRACT.**

The **TENDER** consists of two parts, namely:

- **T1: Tendering Procedures** to be complied with by every tenderer submitting a tender offer; and
- **T2: Documents to be returned by the Tenderer**, including the returnable schedules and forms to be completed by each tenderer, some of which will eventually be incorporated into the contract between the successful tenderer and the Employer.

The CONTRACT consists of four parts, namely:

- **C1: Contract Data and Agreements.**
- **C2: Pricing Data**.
- **C3: Scope of Work**
- **C4: Site Information**

TENDER

T1: TENDERING PROCEDURES

T1.1: TENDER NOTICE AND INVITATION TO TENDER

TENDER NOTICE AND INVITATION TO TENDER

UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)
MUNICIPAL NOTICE NO: 020 OF 2022
TENDER NO: 8/2/RNM0352

Bids are hereby invited to tender for the UPGRADING OF OATLANDS LANDFILL – CELL 4C within **Ray Nkonyeni Municipality** as specified in the under-mentioned bid document. Tenderers who are registered with the Construction Industry Development Board (CIDB) with a classification grading of **6CE** or higher, are eligible to submit a tender and will be considered for award.

Bid documents can be downloaded for free from the e-tenders portal https://etenders.treasury.gov.za or Ray Nkonyeni Municipal Website at http://www.rnm.gov.za from **08:00am on Friday, 22 April 2022**.

A COMPULSORY CLARIFICATION MEETING WILL BE HELD AT THE OFFICES OF THE DEPARTMENT OF TECHNICAL SERVICES AT THE MARBURG OFFICE BOARDROOM ON **WEDNESDAY, 11 MAY 2022 AT 10:00.** A SITE VISIT WILL BE UNDERTAKEN AFTER THE BRIEFING SESSION.

Tenderers to ensure that tender documents are downloaded before the clarification meeting and no late comers will be accepted.

Fully completed Bid documents, with two (2) copies of the original document in a sealed envelope, must be clearly marked with the relevant Bid Number as follows: -**TENDER NUMBER: 8/2/RNM0352 – UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1).** Completed Bids (**Original and 2 copies)** must be deposited in the bid box, situated in the foyer of the Municipal Offices at 10 Connor Street, Port Shepstone, no later than **Wednesday, 25 May 2022 at 12h00,** after closure, the tender will be open in public.

Evaluation of tenders will be done in accordance with CIDB modified Method 2 i.e. Functionality Threshold, Price and Preference. The Preferential Policy Framework Act 2000 (Act 5 of 2000) applies to this tender. Tenders will be assessed for functionality first. All bidders who score the minimum points for functionality will then be evaluated further for price and preference. All tender offers that fail to score the minimum of **70%** of points for quality will be rejected.

Stage 1 : Functionality

The Functionality will comprise of the following based on the criteria indicated in the respective tender returnable: Attach all supporting documentation for the following table.

Quality/Functionality criteria		**Maximum number of**
A. Experience of the Bidder (Past 10 years)		30
B. Key Personnel	Project Director	5
	Site Agent/Project Manager	5
	Site Supervisor/Foreman	5
C. Quality Management Plan		10
D. Programme		15
E. Construction Methodology/Installation of Geosynthetic Membrane and Liner		25
Maximum possible score for quality (M_S)		**95**

Stage 2: Financial Offer and Preference

The evaluation will be 80/20 Preference Point System for Financial Offer and Preference. The Preferential Procurement Policy Framework Act, 2000, (PPPFA) (Act No.5 of 2000) applies to this tender.

Technical enquiries may be addressed to Mr Deon Govender of BVi Consulting Engineers on Tel.: (031) 266 8382, Fax: (031) 267 0728 and Email Address: deong@bvikn.co.za or Khulekani.msomi@rnm.gov.za

Procurement enquiries may be addressed to Mr Khulekani Msomi of Ray Nkonyeni Municipality on Tel.: (039) 688 2000 and email address: khulekani.msomi@rnm.gov.za

NOTE TO BIDDERS ON BID CONDITIONS:

- The Supply Chain Management Policy of Ray Nkonyeni Municipality will apply. The Council reserves the right not to accept the lowest bid or any bid and reserves the right to accept the whole or part of the bid, or to reject all bids and cancel the notice to tender.
- Bids that are submitted late, incomplete, unsigned or by facsimile, electronically or not completed in black ink will be rejected and not accepted for further evaluation.
- Bidders to ensure that tender documents are purchased before the start of the clarification meeting, **NO** late coming will be entertained.
- Members or Directors of Companies or Service Providers who are state employees are not allowed to bid or quote.
- Unsuccessful bidders will be informed of the tender outcome through Municipal website and local newspaper/s. Aggrieved unsuccessful bidders will be allowed to lodge, within fourteen (14) days of the decision or action, a written objection or complaint to the Office of the Municipal Manager through email mm@rnm.gov.za or fax number 0865297195. Complaints or objections received after fourteen (14) days of the date of the notice **will not** be entertained.
- Bids submitted are to be valid for a period of **120 days**.

NB: FAILURE TO SUBMIT TWO (2) COPIES WILL RESULT IN DISQUALIFICATION.

Ray Nkonyeni Municipality
SM Mbili-Municipal Manager
P O Box 5
Port Shepstone
4240

T1.2: TENDER DATA

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

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

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

Clause No	Tender Data
F1.1	The Employer is Ray Nkonyeni Municipality
F1.2	The Tender Documents issued by the Employer comprise the following documents **THE TENDER** **Part T1: Tendering procedures** T1.1 – Tender notice and invitation to tender T1.2 – Tender data **Part T2: Returnable documents** T2.1 List of returnable documents T2.2 – Returnable schedules **THE CONTRACT** **Part C1: Agreements and Contract Data** C1.1 - Form of offer and acceptance C1.2 - Contract data C1.3 - Form of Guarantee C1.4 - Adjudicator's contract **Part C2: Pricing data** C2.1 - Pricing instructions C2.2 - Bill of Quantities **Part C3: Scope of work** C3 - Scope of work **Part C4: Site information** C4 - Site information 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. • "General Conditions of Contract for Construction Works – 3rd Edition 2015" issued by the South African Institution of Civil Engineering (GCC 2015) • 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). • The Preferential Procurement Policy Framework Act No 5 of 2000. • SANS 1921:2004 – Construction and Management Requirements for Works Contract, Parts 1-3.

F1.4	The Employer's Agent is: Name Mr Deon Govender Company: BVi Consulting Engineers Address: 2nd Floor – Pharos House, 70 Buckingham Terrace, Westville, 3630 Tel. 031 266 8382 Fax: 031 267 0728 Email Address: deong@bvikn.co.za
F2.1	Only those tenderers who are registered with the CIDB or are capable of being so registered prior to the evaluation of submissions, 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 6CE or higher are eligible to have their tenders evaluated. Joint ventures are eligible to submit tenders provided that: 1. every member of the joint venture is registered with the CIDB; 2. the lead partner has a contractor grading designation in the CE class of construction work; and 3. the combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 6CE class of construction work or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations.
F2.7	The arrangements for a compulsory clarification meeting are as stated in the Tender Notice and Invitation to Tender. Tenders must sign the attendance list in the name of the tendering entity. Addenda will be issued to and tenders will be received only from those tendering entities appearing on the attendance list. The onus rests with the tenderer to ensure that the person attending the clarification meeting on its behalf is appropriately qualified to understand all directives and clarifications given at the meeting.
F2.12	Alternative tender offers will not be considered.
F2.13/ F2.15	The Employer's address for delivery of tender offers and identification details to be shown on each tender offer package are as follows: **Location of tender box:** Bid Box **Physical address:** Ray Nkonyeni Municipality, 10 Connor Street, Marburg Port-Shepstone 4240 **Identification details:** Tenderer's Name, Tender Number, Title of Tender and the closing date and time of the tender.
F2.13	Telephonic, telegraphic, telex, facsimile or e-mailed offers will not be accepted
F2.13	Tenderers are required to submit all certificates as required in the returnable documents. Failure to provide these required certificates implies a non- responsive tender and warrants rejection of the tender on account of non-compliance with the requirements of the Tender Data
F2.13	A two–envelope system will not be followed.
F2.15	The closing time for submission of tender offers is **12:00 hours on Wednesday, 25 May 2022.**
F2.16	The tender offer validity period is **120 days**
F2.19	Access shall be provided for inspections and testing by personnel acting on behalf of the Employer

F2.20	The tenderer is required to submit with his tender a letter of intent from an approved insurer undertaking to provide the Performance Guarantee to the format included in this document.
F2.23	Tenderers are required to submit all certificates as required in the returnable documents. Failure to provide these required certificates implies a non- responsive tender and warrants rejection of the tender on account of non-compliance with the requirements of the Tender Data
F3.2	Addendum (if any) will be issued at least 5 calendar days before closing of tender.
F3.4	The time and location for the opening of the Tender offers will be at the offices of Ray Nkonyeni Municipality directly after Tender closing.
F3.11.1	Responsive tenders will first be assessed in terms of the evaluation criteria as set out under Clause F3.11.9. Tenders that fail to achieve the minimum qualifying score for functionality will be disqualified while tenders that achieve or surpass the prescribed minimum qualifying score for functionality will be considered further**.**
F3.11.3	The procedure for the evaluation of responsive tenders is **Method 2.**
F3.11.6	If two or more tenderers score an equal total number of points, the contract shall be awarded to the tenderer that scored the highest points for preference. If two or more tenderers score equal total points and equal preference points, the contract shall be awarded to the tendered that scored the highest points for functionality/quality. If two or more tenders score equal total points in all respects, the award shall be decided by the drawing of lots.
F3.11.7	The financial offer will be scored using Formula 2 (option 1) in Table F.1 where the value of W1 is: 1. **80** where the financial value inclusive of VAT of all responsive tenders received have a value in below R 50 000 000.
F3.11.8	Preference points will be claimed in terms of the Preferential Procurement Policy Framework Act, 2000. The points applicable shall be as follows:

B-BBEE Status Level of Contributor	**Number of points (80/20)**
1	20
2	18
3	14
4	12
5	8
6	6
7	4
8	2
Non- compliant contributor	0

Eligibility for preference points is subject to the following:

a) A tender's scorecard shall be a B-BBEE Verification Certificate issued in accordance with the revised Notice of Clarification published in the Notice 444 of 2015 published in Government Gazette 38799 on 15 May 2015 by the Department of Trade and Industry;

b) The scorecard shall be submitted as a certificate attached to this document;

c) The certificate shall:

i. Be an original certified copy of the original;

ii. Have been issued by a verification agency accredited by South African National Accreditation System (SANAS); or

iii. Have been issued prior to 30 September 2016 by a registered auditor who was approved by the Independent Regulatory Board of Auditors (IRBA); or

iv. Be in the form of sworn affidavit in the case of Exempted Micro Enterprise (EME) or Qualifying Small Enterprise (QSE); and

v. Be valid at the tender closing date; and

vi. Have a date of issue less than 12 (twelve) months prior to the tender closing date; and

d) Compliance with any other information requested in this document,

e) If a tenderer claims a preference score without submitting an acceptable verification in compliance with the requirements of this document, will result in the award of 0 (zero) points preference;

f) Failure to submit a valid verification certificate(s) and or / all the information in compliance with the requirements of this document, will result in the award of 0 (zero)points for preference; and

g) In the event of a Joint Venture (JV), a consolidated B-BBEE Verification Certificate in the name of the JV shall be submitted, as well as a valid B-BBEE verification certificate for each member of the JV; and

h) If the tender documents indicate that the tenderer intends subcontracting more than 25% of the value of the contract to any other person not qualifying for at least the points that the tendered qualities for, 0 (zero) points for preference will be awarded, unless the intended subcontractor is an EME that has capability to execute the subcontract.

F3.11.9 The quality criteria and maximum score in respect of each of the criteria are as follows:

Quality/Functionality criteria		**Maximum number of points**
A. Experience of the Bidder (Past 10 years)		30
B. Key Personnel	Project Director	5
	Site Agent/Project Manager	5
	Site Supervisor/Foreman	5
C. Quality Management Plan		10
D. Programme		15
E. Construction Methodology/Installation of Geosynthetic Membrane and Liner		25
Maximum possible score for quality (M_S)		**95**

Only Tenderers scoring **70% or more** for quality will be eligible to have their tenders evaluated further**.**

Tenderers must provide the supporting information indicated in order to allow for evaluation and scoring of a particular quality criterion. It must be noted that should the requested supporting information not be provided, a tenderer may not receive the points allocated for a particular quality criterion. A breakdown of each criterion including the minimum basis for points scoring and the associated evaluation requirements are reflected in the tables below. Tenderers are to cross reference the requirements with the Returnable Documents and ensure that the required documentation is attached in the correct location. The verification method is to be perused thoroughly to ensure that there is no missing information in the final tender submission.

DETAILED BREAKDOWN OF FUNCTIONALITY POINTS

A. Experience of the Bidder (Over the past 10 years)

Quality criteria	Basis for points allocation	Score	Max. Points	Verification method
EXPERIENCE OF THE BIDDER	**3 No.** Completed Engineered Landfills using Geosynthetic Lining Systems not less than R 5 million in construction value **2 No.** Completed Engineered Landfills using Geosynthetic Lining Systems not less than R 5 million in construction value **1 No. C**ompleted Engineered Landfill using a Geosynthetic Lining System not less than R 5 million in construction value	**(30)** **(25)** **(10)**	**(30)**	• Letter of Appointment • Certificate of Completion • Positive Reference Letter (Refer to Returnable Document 21 for associated requirements) **POINTS WILL ONLY BE ALLOCATED FOR EACH PROJECT WHERE THE TENDERER HAS SUBMITTED ALL THE REQUIRED DOCUMENTS**

Note that experience reflected for other types of construction projects other than Engineered Landfills will not be considered as similar experience. Accordingly, bidders are to clearly provide the details of the landfill projects that have successfully been completed in order to score points.

Furthermore, the date of completion must be clearly indicated considering that only projects completed within the past 10 years will be considered for scoring purposes.

B. Key Personnel

B1. Project Director

Quality criteria	Basis for points allocation	Score	Max. Points	Verification method
KEY PERSONNEL- **Project Director**	• **BSc/BTech/B Eng in the Built Environment** and more than **10 years** post graduate experience in the construction of Engineered Landfills. • **BSc/BTech/B Eng/N Dip in the Built Environment** and **5 to 10 years** post graduate experience in the construction of Engineered Landfills. • **BSc/BTech/B Eng/N Dip in the Built Environment** and **less than 5 years** post graduate experience in the construction of Engineered Landfills.	**(5)** **(4)** **(3)**	**(5)**	• Certified copies of academic qualification certificates. • Detailed CV clearly indicating all similar experience with the year of commencement and completion indicated. Refer to the Returnable Document 22 for information regarding formatting. **FAILURE TO SUBMIT A CERTIFIED QUALIFICATION CERTIFICATE WILL RESULT IN ZERO POINTS.** **QUALIFICATIONS OBTAINED FROM OUTSIDE OF SOUTH AFRICA TO BE ACCOMPANIED BY CERTIFICATION FROM SAQA (South African Qualifications Authority)**

B2. Site Agent/Project Manager

Quality criteria	Basis for points allocation	Score	Max. Points	Verification method
KEY PERSONNEL- **Site Agent/ Project Manager**	• **BSc/BTech/B Eng/N Dip in the Built Environment** and more than **5 years** post graduate experience in the construction of Engineered Landfills. • **BSc/BTech/B Eng/N Dip in the Built Environment** and **3 to 5 years** post graduate experience in the construction of Engineered Landfills. • **BSc/BTech/B Eng/N Dip in the Built Environment** and **less than 3 years** post graduate experience in the construction of Engineered Landfills.	**(5)** **(4)** **(3)**	**(5)**	• Certified copies of academic qualification certificates. • Detailed CV clearly indicating all similar experience with the year of commencement and completion indicated. Refer to the Returnable Document 22 for information regarding formatting. **FAILURE TO SUBMIT A CERTIFIED QUALIFICATION CERTIFICATE CERTIFY WILL RESULT IN ZERO POINTS.** **QUALIFICATIONS OBTAINED FROM OUTSIDE OF SOUTH AFRICA TO BE ACCOMPANIED BY CERTIFICATION FROM SAQA (South African Qualifications Authority)**

B3. Site Supervisor/Foreman

Quality criteria	Basis for points allocation	Score	Max. Points	Verification method
KEY PERSONNEL- **Site Supervisor/Foreman**	• More than **10 years** experience in the construction of Engineered Landfills. • **5 to 10 years** experience in the construction of Engineered Landfills. • **Less than 5 years** experience in the construction of Engineered Landfills.	**(5)** **(4)** **(3)**	**(5)**	• Detailed CV clearly indicating all similar experience with the year of commencement and completion indicated. Refer to the Returnable Document 22 for information regarding formatting.

C. Quality Management Plan

Quality criteria	Basis for points allocation	Score	Max. Points	Verification method
QUALITY MANAGEMENT PLAN	• ISO Accredited Quality Management System. • Bidder has a Quality Management System that is not ISO accredited but a detailed Quality Management Plan has been provided that includes the following components: o Quality Control Responsibilities o Checklists o Testing and Quality Assurance o Approval Processes o Document Control • Bidder has submitted a generic Quality Management Plan that lacks adequate detail.	**(10)** **(7)** **(5)**	**(10)**	• Copy of an ISO Accreditation Certificate. • Quality Management Plan. • Refer to Returnable Document 23.

D. Programme

Ray Nkonyeni Municipality are seeking an expedited construction period to address the current infrastructural challenges. Accordingly, more points will be allocated for a preliminary programme that reflects the bidder's ability to execute the works in a reduced amount of time.

Refer to the Contract Data for information relating to the contractual implications of a reduced time for achieving Practical Completion.

Quality criteria	Basis for points allocation	Score	Max. Points	Verification method
PROGRAMME	• Programme is adequately detailed with correct sequencing and a time for achieving Practical Completion for Phase 1 is less than 4 months. • Programme is adequately detailed with correct sequencing and a time for achieving Practical Completion for Phase 1 is 4 - 5 months. • Programme is adequately detailed with correct sequencing and a time for achieving Practical Completion for Phase 1 is 6 months.	**(15)** **(13)** **(10)**	**(15)**	• GANTT Chart clearly describing each activity, the commencement and completion of works and the critical path. • The Programme must be integrated with the Construction Methodology submitted. • Refer to Returnable Document 24. **NO POINTS WILL BE ALLOCATED FOR A PROGRAMME THAT INDICATES A TIME FOR ACHIEVING PRACTICAL COMPLETION BEYOND A PERIOD OF 6 MONTHS.**

E. Construction Methodology/ Installation of Geosynthetic Membrane and Liner

Quality criteria	Basis for points allocation	Score	Max. Points	Verification method
CONSTRUCTION METHODOLOGY/ INSTALLATION OF GEOSYNTHETIC MEMBRANE/ LINER	• Detailed Methodology with reference to General Construction Approach, labour, plant & equipment, contract administration, quality control & Health and Safety Management. All Relevant Returnable Schedules 26, 27, 28 & 29 relating to the Geosynthetic Membrane and Liner have been fully completed.	**(25)**	**(25)**	• Detailed Methodology that must be integrated with the submitted programme. Refer to Returnable Document 25. • Full completion of Return Schedules 26, 27, 28, 29.
	• Detailed Methodology with reference to General Construction Approach, labour, plant & equipment, contract administration, quality control & Health and Safety Management. All Relevant Returnable Schedules 26, 27, 28 & 29 relating to the Geosynthetic Membrane and Liner have been partially completed.	**(20)**		
	• Generic Methodology with reference to General Construction Approach, labour, plant & equipment, contract administration, quality control & Health and Safety Management. All Relevant Returnable Schedules 26, 27, 28 & 29 relating to the Geosynthetic Membrane and Liner have been completed.	**(15)**		

TOTAL POINTS FOR QUALITY/FUNCTIONALITY: **95**

TENDERERS WITH A SCORE OF LESS THAN **70%** WILL BE REGARDED AS NON-RESPONSIVE AND WILL NOT BE EVALUATED FURTHER.

F3.13 Tender offers will only be accepted if:

a) the tenderer or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector;
b) the tenderer is in good standing with the South African Revenue Services on his tax obligations
c) the tenderer is registered on the Central Supplier Database (CSD) for the South African government (see https: //secure.csd.gov.za)

	d) is registered with the Construction Industry Development Board in an appropriate contractor grading designation, by tender closing date; e) the tenderer or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector; f) the tenderer has not (i) abused the Employer's Supply Chain Management System; or (ii) failed to perform on any previous contract and has been given a written notice to this effect; and g) has completed the Compulsory Enterprise Questionnaires and there are no conflicts of interest which may impact on the Tenderer's ability to perform the contract in the best interest of the employer or potentially compromise the tender process and persons in the employ of the state are **not** permitted to submit tenders or participate in the contract. h) The tenderer is registered and in good standing with the compensation fund or with a licensed compensation insurer; i) 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. Additional conditions for acceptance: The Employer shall accept a tender offer should it be considered not to present any unacceptable commercial risk, only if the tenderer: a) is not under restrictions, or has principals who are under restrictions preventing participation in the Employers procurement b) can as necessary and in relation to the proposed contract demonstrate the possession of the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and personnel to perform the contract c) has the legal capacity to enter into a contract, d) is not insolvent, in receivership, bankrupt or being liquidated, does not have any affairs administered by a court or judicial officer, does not have suspended business activities, or is subject to legal proceedings with respect to any of the foregoing, e) complies with the legal requirements if any stated in the tender data and is able in the opinion of the Employer to perform the contract free of conflict of interest.
F3.17	The number of paper copies of the signed contract to be provided by the Employer is ONE (1)

T2: RETURNABLE DOCUMENTS

T2.1 LIST OF RETURNABLE DOCUMENTS

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

The list of returnable documents comprises the following: tick ☑

T2.1.1 List of compulsory returnable documents

1	Certificate of Attendance at Site Meeting	☐
2	Record of Addenda to Tender Documents	☐
3	Details of Registration with CIDB	☐
4	Proposed Amendments, Qualifications & Alternatives	☐
5	Preferential Procurement/ BBBEE Certificate	☐
6	Declaration of Interest	☐
7	Registration Certificate/ Agreement/ ID Document	☐
8	Certificate of Independent BID Determination	☐
9	Tax Clearance Certificate Requirements and Application Form	☐
10	Declaration of Bidder's Past Supply Chain Management Practises	☐
11	Certificate of Authority	☐
12	Present Commitments	☐
13	Rates and Municipal Service Clearance Certificate	☐
14	Declaration for Procurement above R10 million (All applicable taxes included)	☐
15	Compulsory Training Programme	☐
16	Declaration of Local Content	☐
17	Compulsory Enterprise Questionnaire	☐
18	Contractors Health & Safety Declaration	☐
19	Proposed Subcontractors	☐
20	Plant and Equipment	☐

NOTE: (The Tenderer is required to complete each and every schedule listed above on item T.2.1.1 and that failure to comply with the request will deem the tender disqualified.)

T2.1.2 List of returnable documents for evaluation purposes

21	Experience of the Bidder	☐
22	Schedule of Key Personnel	☐
23	Quality Management Plan	☐
24	Programme	☐
25	Construction Methodology	☐
26	Details of Geosynthetic Membrane (GSM) Manufacturer	☐
27	Details of Geosynthetic Membrane (GSM) Installer	☐
28	Details of Geosynthetic Clay Liner (GCL) Manufacturer	☐
29	Details of Geosynthetic Clay Liner (GCL) Installer	☐

1. CERTIFICATION OF ATTENDANCE AT SITE MEETING

CONTRACT No.: 8/2/RNM0352
UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

Notes to Tenderer:

1. **Unless the attendee's name, details and signature also appear on the attendance register this certificate of Attendance shall not be accepted and the tenderers offer shall be deemed non-responsive**

(Please print)

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

in my capacity as……and a duly authorized

representative of…….. (the TENDERER)

of (address)…….

in the company of……..(the ENGINEER)

attended the official Site Inspection on ……(date)

for and on behalf of the above-named Tenderer.

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

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: ……. Signature: …….

Capacity…….

Name: ……. Signature: …….

Capacity: …….

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

Name: …… Signature: ……

Capacity: ……. Date and time: ……

Municipality or Departmental Stamp

2. 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 the tender offer, amending the tender documents have been considered in this tender offer.

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

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

3. REGISTRATION WITH CIDB

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

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

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

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

4. AMENDMENTS, QUALIFICATIONS AND ALTERNATIVES

The tenderer should record any deviations or qualifications he may wish to make to the tender documents in this returnable schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter to his tender and reference such letter in this schedule.
The Tenderers attention is drawn to clause 5.8 of SANS 10845-3 regarding the employers handling of material deviations and qualifications.

(a) AMENDMENTS

PAGE, CLAUSE OR ITEM NO	PROPOSED AMENDMENTS

[Notes*: (1) Amendments to General and Special Conditions of Contract are not acceptable.*
*(2) The Tenderer must give full details of all the financial implications of the amendments and qualifications in a covering letter attached to his tender***.**

This is not an invitation for alternatives but should the Tenderer desire to make any departure for the provision of this contract he shall det out his proposals clearly hereunder.

(b) ALTERNATIVES

PROPOSED ALTERNATIVE	DESCRIPTION OF ALTERNATIVE

[Notes: *(1) Individual alternative items that do not justify an alternative tender and an alternative offer for time for completion should be listed here.*
(2) In the case of a major alternative to any part of the work, separate Bill of Quantities, programme, etc, and a detailed statement setting out the salient features of the proposed alternative must accompany the tender
(3) Alternative tenders involving technical modifications to the design of the works and methods of construction shall be treated separately from the main tender offer.

SIGNATURE: …… DATE ……
(of person authorised to sign on behalf of the Tender)

5. PREFERENTIAL PROCUREMENT / BBBEE CERTIFICATE

MBD 6.1

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT ACT

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

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT ACT.

1. GENERAL CONDITIONS

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

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

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

1.3 Points for this bid shall be awarded for:

(a) Price; and
(b) B-BBEE Status Level of Contributor.

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

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

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

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

2. DEFINITIONS

(a) **"B-BBEE"** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;
(b) "**B-BBEE status level of contributor"** means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
(c) **"bid"** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of goods or services, through price quotations, advertised competitive bidding processes or proposals;

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

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

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

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

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

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

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

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

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

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

3. POINTS AWARDED FOR PRICE

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

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

80/20 or 90/10

$$P_s = 80\left(1 - \frac{P_t - P_{min}}{P_{min}}\right) \qquad P_s = 90\left(1 - \frac{P_t - P_{min}}{P_{min}}\right)$$

Ps = Points scored for price of bid under consideration
Pt = Price of bid under consideration
Pmin = Price of lowest acceptable bid

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

4.1 Preference points will be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (90/10 system)	Number of points (80/20 system)
1	10	20
2	9	18
3	6	14
4	5	12
5	4	8
6	3	6
7	2	4
8	1	2
Non-compliant contributor	0	0

5. BID DECLARATION

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

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

6.1 B-BBEE Status Level of Contributor: = …….. (maximum of 10 or 20 points)
(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

7. SUB-CONTRACTING

Indicate the following:

i) What percentage of the contract will be subcontracted.....…….……%

ii) The name of the sub-contractor……..

iii) The B-BBEE status level of the sub-contractor.....…….

iv) Whether the sub-contractor is an EME or QSE
(Tick applicable box)

YES		NO	

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

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

8. DECLARATION WITH REGARD TO COMPANY/FIRM

8.1 Name of company/firm:…….

8.2 VAT registration number:……

8.3 Company registration number:……..

8.4 TYPE OF COMPANY/ FIRM

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

[Tick applicable box]

8.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES
……

8.6 COMPANY CLASSIFICATION

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

[*Tick applicable box*]

8.7 MUNICIPAL INFORMATION

Municipality where business is situated: .....

Registered Account Number: .....

Stand Number: .....

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

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

i) The information furnished is true and correct;
ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –

(a) disqualify the person from the bidding process;
(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
(d) recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
(e) forward the matter for criminal prosecution.

WITNESSES	
1.	..... SIGNATURE(S) OF BIDDERS(S)
2.	DATE: .....
	ADDRESS: .....

6. DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state. 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 relation to the evaluating/adjudicating authority and/or take an oath declaring his/her interest.

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

2.1 Full Name: _____

2.2 Identity Number: _____

2.3 Company Registration Number: _____

2.4 Tax Reference Number: _____

2.5 VAT Registration Number: _____

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

2.6.1 If so, furnish particulars.

_____

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

2.7.1 If so, furnish particulars.

2.8.1 If so, furnish particulars.

_____

2.9 Are you, aware of any relationship (family, friend, other)
Between a bidder and any persons in the service of the state
Who may be involved with the evaluation and or adjudication of this bid?

_____

2.8 Do you, have any relationship (family, friend, other) with persons in the service **YES/NO**

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

(a) a member of –
  (i) any municipal council:
  (ii) any provincial legislature: or
  (iii) the national Assembly or the national Council of provinces.
(b) a member of the board of directors of any municipal entity
(c) an official of any municipality or municipal entity;
(d)) an employee of any national of provincial department, national public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No 1 of 1999);
(e) a member of the accounting authority of any national or provincial public entity; or
(f) an employee of Parliament or a provincial legislature of the state and who may be involved with the evaluation and or adjudication of this bid?

2.9.1 If so, furnish particulars

_____ **YES/NO**

_____

2.10 Are any of the company directors, managers, principal shareholders, or stakeholders in service of the state?

2.10.1 If so, furnish particulars

_____

_____

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

2.11.1 If so, furnish particulars.

_____

_____

CERTIFICATION

I, _____ THE UNDERSIGNED CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT. ACCEPT THAT THE COUNCIL MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

_____ _____

SIGNATURE **DATE**

_____

POSITION

7. REGISTRATION CERTIFICATE / AGREEMENT / ID DOCUMENT

- **For Closed Corporation**

CK1 or CK2 as applicable (Founding Statement)
Certified Copies of the ID's of the Directors
Certified Shareholder Certificate

OR

- **For Companies**

A copy of Certificate of Incorporation
Certified Copies of the ID's of the Directors, and
Certified Shareholder Register

OR

- **For Joint Venture Agreements**

Joint Venture Agreement between all the parties,
As well as documents in (1) or (2) of each Joint Venture members

OR

- **For Partnership**

1. Certified Copies of ID's of the partners

OR

- **One-person Business/ Sole Trader**

2. Certified of ID

8. CERTIFICATE OF INDEPENDENT BID DETERMINATION

MBD 9

1. This Municipal Bidding Document (MBD) must form part of all bids invited.
2. Section 4 (1) (b) (iii) of the Competition Act No .89 of 1998, as amended, prohibits an agreement between, or concerted practice by , firms or a decision by an association of firms , if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging). Collusive bidding is a pe se prohibition meaning that it cannot be justify under any grounds.
3. Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:

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

1. This MBD to give service 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 contract.
2. In order to give effect to the above, the attached Certificate of Bid Determination (MBD) must be completed and submitted with the bid:
3. Includes price quotations, advertised competitive bids, limited bids and proposal.
4. 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.

I, the undersigned, in submitting the accompanying bid:

Contract No : 8/2/RNM0352
UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

_____

(Bid Number and Description)

In response to the invitation for the bid made by:

RAY NKONYENI MUNICIPALITY

(Name of the Municipality / Municipal Entity)

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

I certify , on behalf of

:_____ that:

(Name of Bidder)

1. I have read and 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 authorised by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder
4. Each person whose signature appears of this Certificate and the accompanying bid has been authorised 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 ‘’competition ‘’ shall include any individuals or organisation, other than the bidder, whether or not affiliated with the bidder, who:
    a) Has been requested to submit a bid in response to this bid invitation:
    b) Could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience, and
    c) Provides the same goods and services as the bidder and/or is in the same line of business as the bidder.
6. The bidder has arrived at the accompanying bid independently from, and without Consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium will not be construed as collusive bidding:
7. In particular without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
    a) prices
    b) geographical area where product or serve will be rendered (market allocation)
    c) method, factors or formulas used to calculate prices:
    d) the intention or decision to submit or not submit, a bid:
    e) the submission of a bid which does not meet the specification and condition of the bid: or
    f) bidding with the intention not to win the bid.

8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quantity, specification and conditions or delivery particulars of the products or services to which this bid invitation rates.
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 of Corrupt Activities Act No. 12 of 2004 or any other applicable legislation.

_____ _____

SIGNATURE **DATE**

_____ _____

POSITION **NAME OF BIDDER**

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

9. TAX CLEARANCE CERTIFICATE REQUIREMENTS AND APPLICATION FORM

MBD2

It is a condition of bid that the taxes of the successful bidder must be in order, or that satisfactory arrangements have been with South African Revenue Services (SARS) to meet the bidder's tax obligations.

1. In order to meet this requirement, bidders are required to complete in full the TCC 0001 form.

2. Applications for the Tax Clearance Certificates may also be made via e-filing. In order to use this provision, taxpayers will need to register with SARS as e-Filers through the website www.sars.gov.za

3. SARS will then furnish the bidder with a Tax Clearance Certificate that will be valid for a period of 1 (one) year from the date of approval.

4. In bids where Consortia / Joint Ventures / Sub-Contractors are involved each party must submit a separate Tax Clearance Certificate.

5. Tax Compliance Status (TCS) Pin as of 18 April 2016

a) In terms of the new Tax Compliance Status System implement by SARS on 18 April 2016 bidder's status online via SARS E-filling.
b) The taxpayers must issue the municipality with the following:

Bidders who not possession of an original Tax Clearance Certificate must provide at least 2 of the 3 numbers listed below in order to verify the Tax Clearance Certificate via SARS e-filing.

1. Tax Reference Number	
2. Tax Compliance Status Pin	
3. Tax Clearance Certificate Number	

c) If a bidder is registered on the Ray Nkonyeni Municipality Supplier's Database and the Municipality is already in an original tax clearance certificate which is valid on closing dare of bid, it MUST be indicated as such on this page hereby the attaching a copy of a new tax clearance certificate to this page will not be needed.

6. Should a Tax Clearance Certificate not be verifiable on the SARS e-filing system the bidder will be afforded an opportunity to submit a valid, verifiable Tax Clearance Certificate. It will result in the invalidation of the bid, should the bidder fail to provide a valid, verifiable Tax Certificate

[Tax Clearance Certificate obtained from SARS to be inserted here]

10. DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTISES

MBD 8

1 This Municipal Bidding Document must from part of all bids invited.

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

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

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

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

Item	Question	Yes	No
4.1	**Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as a 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 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 so, furnish particulars:		
4.2	Is the bidder or any 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 Treasure's website (www.treasury.gov.za) by clicking on its link ay the bottom of the home page**	Yes ☐	No ☐
4.2.1	If so, furnish particulars		

4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes	No
Item	**Question**	**Yes**	**No**
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 other municipality /municipal entity, that is in areas for more than three months?	Yes	No
4.4.1	If so, furnish particulars (Attach certified proof of good standing from the Municipality)		
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 on or copy with the contract	Yes	No
4.5.1	If so, furnish particulars		

CERTIFICATION

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

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

_____ _____

Signature Date

_____ _____

Position Name of bidder

11. CERTFICATE OF AUTHORITY

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

(i) COMPANY	(ii) CLOSE CORPORATION	(iii) PARTNERSHIP	(iv) JOINT VENTURE	(v) SOLE PROPRIETOR

(i) CERTIFICATE FOR COMPANY

I……. chairperson of the Board of Directors of ……. hereby confirm that by resolution of the Board (copy attached) taken on ……..……20…….

Mr/Ms ……. acting in the capacity of ……., was authorised to sign all documents in connection with this tender for Contract No _____any contract resulting from it on behalf of the company.

Chairman: ……

As Witnesses: 1……

2……

Date: ……

(ii) CERTIFICATE FOR CLOSE CORPORATION

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

acting in the capacity of ……to sign all documents in connection with the tender for Contract No _____ and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE
	…….. ……..		
	…….. ……..		

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

(iii) CERTIFICATE FOR PARTNERSHIP

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

……
……

hereby authorise Mr/Ms
……..…….

acting in the capacity of ……, to sign all documents in connection with the tender for Contract No _____and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

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

(iv) CERTIFICATE FOR JOINT VENTURE

We, the undersigned are submitting this tender offer in Joint Venture and hereby authorize Mr/ Ms ……., authorized of the company, …….. acting in the capacity of lead partner, sign all documents in connection with the tender offer for Contract No _____ and any contract resulting from it on our behalf.

This authorization is evidenced by the attached power of attorney signed by legally authorized signatories of all the partners to the Joint Venture.

NAME OF FIRM	ADDRESS	AUTHORISING SIGNATURE, NAME AND CAPACITY
Lead partner	…….. …….. ……..	

	…… …… ……	

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

(v) CERTIFICATE FOR SOLE PROPRIETOR

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

……

……..…….. acting in the capacity of ……, to sign all documents in connection with the tender for Contract No _____ and any contract resulting from it on our behalf.

Signature of Sole owner ……..……...

As Witnesses:

1. ……..

2. ……..

Date: ……..……...

12. PRESENT COMMITMENTS

Notes to Tenderer:

(a) The tenderer shall list below all contracts currently under construction or awarded and about to commence and tenders for which offers been submitted but awards not yet made.
(b) In the event of a joint venture enterprise, details of all the members of the joint venture shall similarly be attached to this form.
(c) The lists must be restricted to not more than 5 contracts and 5 tenders. If a tenderer's actual commitments or potential commitments are greater than 5 each, those listed should be in descending order or expected final contact value or sun tendered

Contracts Awarded				
Employer	Project	Expected Value of contract (Inclusive of VAT)	Duration (Months)	Expected Completion Date

Tenders not Yet Awarded				
Employer	Project	Tendered Amount (Inclusive of VAT)	Tendered Duration (Months)	Expected Commencement Date

_____ _____

Signature of Tenderer Date

13. RATES AND MUNICIPAL SERVICES CLEARANCE CERTIFICATE

The tenderer is to affix to this page:

- Proof that they are not in arrears for more than 3 months with municipal rated and taxes and municipal service charges. The latest municipal account is to be attached.
- Signed copy of the lease agreement if the tenderer is currently leasing premises and not responsible paying municipal accounts together with a letter from the landlord stating that no levies are in arrears (only if applicable).

Note:

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

Attach latest municipal account statement behind this page. The Statement must not be older than three months from the close of this tender.

14. DECLARATION FOR PROCUREMENT ABOVE 10 MILLION (ALL APPLICABLE TAXES INCLUDED)

MBD5

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

1. Are you by law required to prepare annual financial statements for auditing? **Yes**/ **No**

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

……..

……

……

2. Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days **Yes**/ **No**

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

2.2 If yes, provide particulars

……..

……..

……..

3. Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract? **Yes**/ **No**

3.1 If Yes, furnish particulars

……

……..

……..

4. Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality/ municipal entity is expected to be transferred out of the Republic? **Yes**/ **No**

4.1 If yes, furnish particulars

……

……

……

CERTIFICATION

I, THE UNDERSIGNED …….. CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.

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

_____ _____
Signature of Tenderer Date

_____ _____
Position Name of Bidder

15. TRAINING PROGRAMME

Set out the details of the proposed training for Labourers and QSEs and EMEs in the schedule below:

A: TRAINING OF LOCAL LABOURERS OF THE CONTRACTOR'S AND HIS SUB-CONTRACTOR'S WORKFORCE				
TOTAL ESTIMATED COSTS				

B: TRAINING OF LOCAL QSE & EME CONTRACTORS					
LIST OF COURSES FOR BUSINESS DEVELOPMENT	**LIST OF COURSES FOR MANAGEMENT SKILLS**	**LIST OF OTHER COURSES (SPECIFY)**	**ACCREDITED INSTITUTIONS THAT WILL PRESENT THE COURSES**	**DURATION OF EACH COURSE (DAYS)**	**ESTIMATED COST**
TOTAL ESTIMATED COST					

16. DECLARATION OF LOCAL CONTENT

MBD 6.2

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT FOR DESIGNATED SECTORS

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

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

1. General Conditions

1.1. Preferential Procurement Regulations, 2011 (Regulation 9) makes provision for the promotion of local production and content.

1.2. Regulation 9.(1) prescribes that in the case of designated sectors, where in the award of bids local production and content is of critical importance, such bids must be advertised with the specific bidding condition that only locally produced goods, services or works or locally manufactured goods, with a stipulated minimum threshold for local production and content will be considered.

1.3. Where necessary, for bids referred to in paragraph 1.2 above, a two-stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.

1.4. A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.

1.5. The local content (LC) expressed as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 2011 as follows:

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

Where
x is the imported content in Rand
y is the bid price in Rand excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by the South African Reserve Bank (SARB) at 12:00 on the date of advertisement of the bid as required in paragraph 4.1 below.

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

1.6. A bid may be disqualified if –

(a) this Declaration Certificate and the Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation; and

(b) the bidder fails to declare that the Local Content Declaration Templates (Annex C, D and E) have been audited and certified as correct.

2. Definitions

2.1. **"bid"** includes written price quotations, advertised competitive bids or proposals;

2.2. **"bid price"** price offered by the bidder, excluding value added tax (VAT);

2.3. **"contract"** means the agreement that results from the acceptance of a bid by an organ of state;

2.4. **"designated sector"** means a sector, sub-sector or industry that has been designated by the Department of Trade and Industry in line with national development and industrial policies for local production, where only locally produced services, works or goods or locally manufactured goods meet the stipulated minimum threshold for local production and content;

2.5. **"duly sign** "means a Declaration Certificate for Local Content that has been signed by the Chief Financial Officer or other legally responsible person nominated in writing by the Chief Executive, or senior member / person with management responsibility (close corporation, partnership or individual).

2.6. **"imported content"** means that portion of the bid price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or its subcontractors) and which costs are inclusive of the costs abroad (this includes labor and intellectual property costs), plus freight and other direct importation costs, such as landing costs, dock duties, import duty, sales duty or other similar tax or duty at the South African port of entry;

2.7. **"local content"** means that portion of the bid price, which is not included in the imported content, provided that local manufacture does take place;

2.8. **"stipulated minimum threshold"** means that portion of local production and content as determined by the Department of Trade and Industry; and

2.9. **"sub-contract"** means the primary contractor's assigning, leasing, making out work to, or employing another person to support such primary contractor in the execution of part of a project in terms of the contract.

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

Description of services, works or goods	Stipulated minimum threshold
Cement	**100%**
Pipes & Fittings	**100%**
Gabions	**100%**
Concrete	**100%**
Stone Aggregate (All sizes)	**100%**

4. Does any portion of the services, works or goods offered have any imported content?
(***Tick applicable box***)

YES		NO	

4.1 If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.5 of the general conditions must be the rate(s) published by the SARB for the specific currency at 12:00 on the date of advertisement of the bid.

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

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

Currency	**Rates of exchange**
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

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

5. Were the Local Content Declaration Templates (Annex C, D and E) audited and certified as correct?
(***Tick applicable box***)

YES		NO	

5.1. If yes, provide the following particulars:

(a) Full name of auditor: .....

(b) Practice number: .....

(c) Telephone and cell number: .....

(d) Email address: .....

(Documentary proof regarding the declaration will, when required, be submitted to the satisfaction of the Accounting Officer / Accounting Authority)

6. Where, after the award of a bid, challenges are experienced in meeting the stipulated minimum threshold for local content the DTI must be informed accordingly in order for the DTI to verify and in consultation with the Accounting Officer / Accounting Authority provide directives in this regard.

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

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

IN RESPECT OF BID NO. .....

ISSUED BY: (Procurement Authority / Name of Municipality / Municipal Entity): .....

NB

1 The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.

2 Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on http://www.thedti.gov.za/industrial development/ip.jsp. Bidders should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. **Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below.** Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

I, the undersigned, ……..... (full names),

do hereby declare, in my capacity as

…… ……..

of .....(name of bidder entity), the following:

(a) The facts contained herein are within my own personal knowledge.

(b) I have satisfied myself that

(i) the goods/services/works to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011; and
(ii) the declaration templates have been audited and certified to be correct.

(c)The local content percentages (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C;

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

If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above. The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 4.1 above and the information contained in Declaration D and E.

(d) I accept that the Ray Nkonyeni Municipality has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.

(e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Ray Nkonyeni Municipality imposing any or all of the remedies as provided for in Regulation 13 of the Preferential Procurement Regulations, 2011 promulgated under the Preferential Policy Framework Act (PPPFA), 2000 (Act No. 5 of 2000).

SIGNATURE: _____ **DATE:** _____

WITNESS No. 1 _____ **DATE:** _____

WITNESS No. 2 _____ **DATE:** _____

SATS 1286.2011

Annex C

Local Content Declaration - Summary Schedule

(C1)	Tender No.
(C2)	Tender description:
(C3)	Designated product(s)
(C4)	Tender Authority:
(C5)	Tendering Entity name:
(C6)	Tender Exchange Rate: Pula ____ EU ____ GBP ____
(C7)	Specified local content %

Note: VAT to be excluded from all calculations

	Calculation of local content							Tender summary			
Tender item no's	List of items	Tender price - each (excl VAT)	Exempted imported value	Tender value net of exempted imported content	Imported value	Local value	Local content % (per item)	Tender Qty	Total tender value	Total exempted imported content	Total Imported content
(C8)	(C9)	(C10)	(C11)	(C12)	(C13)	(C14)	(C15)	(C16)	(C17)	(C18)	(C19)

(C20) Total tender value	R 0	
(C21) Total Exempt imported content		R 0
(C22) Total Tender value net of exempt imported content		R 0
(C23) Total Imported content		R 0
(C24) Total local content		R 0
(C25) Average local content % of tender		

Signature of tenderer from Annex B

Date: _____

SATS 1286.2011

Annex D

Imported Content Declaration - Supporting Schedule to Annex C

Tender No.						**Note: VAT to be excluded from all calculations**	
Tender description:							
Designated Products:							
Tender Authority:							
Tendering Entity name:							
Tender Exchange Rate:	Pula		EU	R 9.00	GBP	R 12.00	

A. Exempted imported content

				Calculation of imported content						Summary	
Tender item no's	**Description of imported content**	**Local supplier**	**Overseas Supplier**	**Forign currency value as per Commercial Invoice**	**Tender Exchange Rate**	**Local value of imports**	**Freight costs to port of entry**	**All locally incurred landing costs & duties**	**Total landed cost excl VAT**	**Tender Qty**	**Exempted imported value**
(D7)	*(D8)*	*(D9)*	*(D10)*	*(D11)*	*(D12)*	*(D13)*	*(D14)*	*(D15)*	*(D16)*	*(D17)*	*(D18)*

(D19) **Total exempt imported value** R 0

This total must correspond with Annex C - C 21

B. Imported directly by the Tenderer

				Calculation of imported content						Summary	
Tender item no's	**Description of imported content**	**Unit of measure**	**Overseas Supplier**	**Forign currency value as per Commercial Invoice**	**Tender Rate of Exchange**	**Local value of imports**	**Freight costs to port of entry**	**All locally incurred landing costs & duties**	**Total landed cost excl VAT**	**Tender Qty**	**Total imported value**
(D20)	*(D21)*	*(D22)*	*(D23)*	*(D24)*	*(D25)*	*(D26)*	*(D27)*	*(D28)*	*(D29)*	*(D30)*	*(D31)*
	`										

(D32) **Total imported value by tenderer** R 0

C. Imported by a 3rd party and supplied to the Tenderer

				Calculation of imported content						Summary	
Description of imported content	**Unit of measure**	**Local supplier**	**Overseas Supplier**	**Forign currency value as per Commercial Invoice**	**Tender Rate of Exchange**	**Local value of imports**	**Freight costs to port of entry**	**All locally incurred landing costs & duties**	**Total landed cost excl VAT**	**Quantity imported**	**Total imported value**
(D33)	*(D34)*	*(D35)*	*(D36)*	*(D37)*	*(D38)*	*(D39)*	*(D40)*	*(D41)*	*(D42)*	*(D43)*	*(D44)*
`											

(D45) **Total imported value by 3rd party** R 0

D. Other foreign currency payments

			Calculation of foreign currency payments		Summary of payments
Type of payment	**Local supplier making the payment**	**Overseas beneficiary**	**Foreign currency value paid**	**Tender Rate of Exchange**	**Local value of payments**
(D46)	*(D47)*	*(D48)*	*(D49)*	*(D50)*	*(D51)*

(D52) **Total of foreign currency payments declared by tenderer and/or 3rd party**

Signature of tenderer from Annex B

(D53) **Total of imported content & foreign currency payments - *(D32), (D45) & (D52)* above** R 0

This total must correspond with Annex C - C 23

Date:

SATS 1286.2011

Annex E

Local Content Declaration - Supporting Schedule to Annex C

(E1)	Tender No.	
(E2)	Tender description:	
(E3)	Designated products:	
(E4)	Tender Authority:	
(E5)	Tendering Entity name:	

Note: VAT to be excluded from all calculations

Local Products (Goods, Services and Works)	Description of items purchased	Local suppliers	Value
	(E6)	*(E7)*	*(E8)*
		(E9) **Total local products (Goods, Services and Works)**	

(E10) **Manpower costs** (Tenderer's manpower cost) ____

(E11) **Factory overheads** (Rental, depreciation & amortisation, utility costs, consumables etc.) ____

(E12) **Administration overheads and mark-up** (Marketing, insurance, financing, interest etc.) ____

(E13) **Total local content** ____

This total must correspond with Annex C - C24

Signature of tenderer from Annex B

____

Date:

17. COMPULSORY ENTERPRISE QUESTIONAIRE

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

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

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

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

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	Identity number*	Personal income tax number*

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

Section 5: Particulars of companies and close corporations

Company registration number . . . . . .

Close corporation number . . . . . .

Tax reference number . . . . . .

Section 6: Record of service of the state

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

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

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

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

*insert separate page if necessary

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

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

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

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

*insert separate page if necessary

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

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

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

(a)

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

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

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

NAME: …… POSITION: ……

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

18. CONTRACTOR'S HEALTH AND SAFETY DECLARATION

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

(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) List the 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 hereby undertake, if my 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 confirm that copies of my 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 Engineer, visitors, and officials and inspectors of the Department of Labour.

7. I hereby confirm that adequate provision has been made in my 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 agree that my failure to complete and execute this declaration to the satisfaction of the Client will mean that I am unable to comply with the requirements of the OHSA 1993 Construction Regulations 2014, and accept that my tender will be prejudiced and may be rejected at the discretion of the Client.

NAME : ..... (Block Capitals)

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

19. PROPOSED SUBCONTRACTORS

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

SPECIALISED ITEM	**INDICATE IF SUB-CONTRACTED (Tick correct option)**	
	YES	**NO**

In order to complete the works under this contract. I/We propose to employ the following sub-contractors to carry out the portion/ type of work as detailed. **Affix original or certified proof of 3 previous projects for each sub-contractor.**

Sub-contractor: Name, Address and Telephone No	**Portion/ Type of work to be undertaken**

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

20. PLANT AND EQUIPMENT

The Tenderer is to provide details of all major plant and equipment that shall be used for the execution of construction works. Proof of ownership is to be submitted.

Description, Size, Capacity etc.	**Quantity**	**Is the Plant Owned by Tenderer (Yes / No)**
	Provided by Tenderer	

*Attach additional pages if more space is required.

NAME: …… POSITION: ……..

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

T2.1.2 LIST OF RETURNABLE DOCUMENTS FOR EVALUATION PURPOSES

21. EXPERIENCE OF THE BIDDER

The Tenderer will receive a maximum of 30 points based on information provided in this schedule.

Please note the following:

1. Points will only be allocated for successfully completed Engineered Landfill projects using Geosynthetic Lining Systems. No points will be allocated for other types of construction projects.

2. The tenderer must list projects completed within the last 10 years with a construction value not less than R 5 million (Incl. Vat).

3. Positive feedback in a Reference Letter from the Consultant or Employer for the listed project is required to substantiate a successfully completed project. Failure to submit a reference letter with positive feedback will result in no points being allocated for a particular project. The format provided in this returnable schedule must be used for all Reference Letters.

4. Appointment letters and Completion Certificates must also be submitted for every project claimed.

5. Failure to submit all relevant information per project will result in the forfeiture of all points for that particular project.

6. The experience of the Principal Tenderer or Joint Venture Partners will be evaluated on the basis of experience in similar projects.

EMPLOYER (Name, Tel and Fax number)	**CONSULTING ENGINEER** (Name, Tel and Fax number)	**NAME OF PROJECT & NATURE OF WORK** (Brief summary with special mention of similarities with this project and Functionality Criteria)	**VALUE OF WORK**	**YEAR OF COMPLETION**

NAME: …… POSITION: ……..

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

REFERENCE LETTER TEMPLATE TO BE USED BY TENDERERS

CONTRACTOR NAME	
CLIENT NAME	
DESCRIPTION OF WORK COMPLETED	
VALUE OF WORK COMPLETED	
NAME OF CONSULTANT	
CONTACT DETAILS	
DATE	

ACTION	ABOVE AVERAGE	AVERAGE	POOR	UN-ACCEPTABLE	REMARKS
Financial Capacity					
Adequacy of plant & Equipment					
Contract Administration					
Programming of Work & time of completion					
Workmanship					
Reaction to instructions					
Relationship with labour force / community					

OTHER GENERAL COMMENTS

_____

_____

_____

Consultant's Name: _____ Signature: _____

NOTE: *All information contained in this document is confidential and is solely for the purposes of adjudicating the above referenced tender. We thank you for your assistance.*

Company date stamp

22. SCHEDULE OF KEY PERSONNEL

The tenderer shall insert in the space provided below details of the key personnel required in employ of the tenderer, in order for the tenderer to score points for Key Personnel. All certificates must be appended to this form. A maximum of 15 points shall be allocated for Key Personnel.

22.1 KEY PERSONNEL EXPERIENCE – PROJECT DIRECTOR

List the five most suitable projects of a similar nature reflect the number of years of experience that the Project Director has. Note that in order to score maximum points, over 10 years post graduate experience is required in the construction of Engineered Landfills.

CURRICULUM VITAE OF KEY PERSONNEL: PROJECT DIRECTOR
FILL IN TEMPLATE CV AND ATTACH CERTIFIED QUALIFICATIONS AND CERTIFICATES HERE

SURNAME	**:**	
FIRST NAME(S)	**:**	
DATE OF BIRTH	**:**	
PROFESSIONAL REGISTRATION No.	**:**	
YEAR OF JOINING FIRM	**:**	
ENVISAGED ROLE IN PROJECT	**:**	
YEARS OF EXPERIENCE	**:**	

SUMMARY OF PROJECT RELATED EXPERIENCE		
Project Description and Details		**Project Role and Duties**
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative		

Start Date: **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer:** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		

EDUCATION		
Year	**Institution**	**Qualification Obtained**
PROFESSIONAL REGISTRATION		
Institution		**Registration Category**
OTHER TRAINING & CERTIFICATION		
CERTIFICATION BY KEY PERSONNEL		

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

SIGNATURE: ..... DATE: ….....

NAME: …… POSITION: ……..

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

22.2 KEY PERSONNEL EXPERIENCE – SITE AGENT/PROJECT MANAGER

List the five most suitable projects of a similar nature reflect the number of years of experience that the Site Agent/Project Manager has. Note that in order to score maximum points, over 5 years post graduate experience is required in the construction of Engineered Landfills.

CURRICULUM VITAE OF KEY PERSONNEL: SITE AGENT/PROJECT MANAGER
FILL IN TEMPLATE CV AND ATTACH CERTIFIED QUALIFICATIONS AND CERTIFICATES HERE

SURNAME	**:**	
FIRST NAME(S)	**:**	
DATE OF BIRTH	**:**	
PROFESSIONAL REGISTRATION No.	**:**	
YEAR OF JOINING FIRM	**:**	
ENVISAGED ROLE IN PROJECT	**:**	
YEARS OF EXPERIENCE	**:**	

SUMMARY OF PROJECT RELATED EXPERIENCE		
Project Description and Details		**Project Role and Duties**
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		

Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer:** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		

EDUCATION		
Year	**Institution**	**Qualification Obtained**
PROFESSIONAL REGISTRATION		
Institution		**Registration Category**
OTHER TRAINING & CERTIFICATION		
CERTIFICATION BY KEY PERSONNEL		

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

SIGNATURE: ..... DATE: ….....

NAME: …… POSITION: ……..

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

22.3 KEY PERSONNEL EXPERIENCE – SITE SUPERVISOR/FOREMAN

List the five most suitable projects of a similar nature reflect the number of years of experience that the Site Supervisor/Foreman has. Note that in order to score maximum points, over 10 years experience is required in the construction of Engineered Landfills.

CURRICULUM VITAE OF KEY PERSONNEL: SITE SUPERVISOR/FOREMAN
FILL IN TEMPLATE CV AND ATTACH CERTIFIED QUALIFICATIONS AND CERTIFICATES HERE

SURNAME	**:**	
FIRST NAME(S)	**:**	
DATE OF BIRTH	**:**	
PROFESSIONAL REGISTRATION No.	**:**	
YEAR OF JOINING FIRM	**:**	
ENVISAGED ROLE IN PROJECT	**:**	
YEARS OF EXPERIENCE	**:**	

SUMMARY OF PROJECT RELATED EXPERIENCE		
Project Description and Details		**Project Role and Duties**
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		

Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		
Project Details: Name and Description: **Project Value:** **Consulting Engineer:** **(**Name of Company and Contact details of Representative) **Employer:** (Name and Contact Details of Representative **Start Date:** **Completion Date:**		

EDUCATION		
Year	**Institution**	**Qualification Obtained**
PROFESSIONAL REGISTRATION		
Institution		**Registration Category**
OTHER TRAINING & CERTIFICATION		
CERTIFICATION BY KEY PERSONNEL		

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

SIGNATURE: ..... DATE: ….....

NAME: …… POSITION: ……..

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

23. QUALITY MANAGEMENT PLAN

The tenderer will receive a maximum of 10 points if an ISO accredited Quality Management System (QMS) is in place. An ISO accreditation certificate must be provided to substantiate the certification of the QMS. Should the tenderer not be in possession of ISO certification, a detailed Quality Management Plan must be submitted that complies with the requirements of this schedule.

1. Does the Tenderer have a Quality Management System which is certified in terms of **ISO 9001: 2015?**

Yes	No

1.1 If ‘’yes ‘’, tenderer to supply brief summary of structure of system

……

……

……

……

……

……

1.2 If ‘’no’’, the tenderer is to attach their Quality Management Plan that must address the following components:

- Quality Control Responsibilities within the Organization
- Checklists for Construction Activities, Plant & Equipment
- Testing and Quality Assurance Procedures
- Risk Management System and Corrective Action
- Approval Processes and Inspections
- Document Control, Submission of information and Filing

NAME: …… POSITION: ……..

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

24. PROGRAMME

The tenderer will score a maximum of 15 points if an adequately detailed GANTT chart is submitted that reflects a time for achieving Practical Completion for Phase 1 of less than 4 months. An allowance of 6 months has been made for the completion of Phase 1 in the Contract Data, however, in the interest of service delivery, more points will be awarded for an expedited construction period. The tenderer is to complete this schedule and take note of the requirements of the Programme to be submitted.

Tenderer's proposed time for achieving Practical Completion for Phase 1: ..... months

Mandatory requirements of programme:

- Format of Programme: GANTT Chart.
- Activities must be in accordance with the requirements of this contract with specific reference to the Scope of Work. A breakdown of each activity must be indicated.
- Commencement of Works and date for achieving Practical Completion to be clearly reflected.
- Procurement of Imported Materials (Liner/Membrane)
- Correct sequence of works to be reflected.
- Float allowed for must be indicated.
- Critical Path must be indicated.
- Approval and Snag processes must also be allowed for.

Note that in order to score maximum points, the tenderer must include the mandatory items referred to above as well as offer an expedited time for achieving Practical Completion. Failure to provide an adequately detailed GANTT chart will result in lower points being allocated.

NAME: …… POSITION: ……..

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

25. CONSTRUCTION METHODOLOGY

The tenderer will receive a maximum of 25 points based on information provided in the Construction Methodology under this schedule as well as the full completion of Schedule 26, 27, 28 & 29.

The Construction methodology must address the following subheadings:

- General Construction Approach (Construction Method Statement)
- Integration with the Programme submitted
- Management of Labour
- Plant & Equipment to be used
- Construction Administration
- Quality Management
- Health and Safety Management on site

In addition to the requirements above, the tenderer shall attach a preliminary Method Statement to this schedule which states clearly how the sand protection and stone leachate drainage layers, which overlie the geosynthetic primary HDPE membrane for the basin floor, shall be constructed.

Note that is it imperative for the tenderer to provide the information above as well as complete Schedule 26, 27, 28 & 29.

NAME: …… POSITION: ……..

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

26. DETAILS OF GEOSYNTHETIC MEMBRANE (GSM) MANUFACTURER

1 GENERAL

The Tenderer must enter in the spaces provided below, details regarding the GSM Manufacturer he/she intends to employ. The information requested below is the minimum required and is deemed to be material to the award of this contract. Any additional information may be attached to this form.

2 INFORMATION TO BE PROVIDED

Corporate Information and background

Name of Manufacturer ……..

Status of Manufacturer (e.g. Company, close corporation etc.): …..…….

Corporate Background: ……

……..

Main product: ……

ISO 9001:2004 Certification (Yes / No) ……

(Should the Tenderer wish to supply geosynthetic membranes manufactured by a manufacturer that does not have ISO 9001:1994 certification, the Engineer will allow for the cost of additional quality control and testing in the assessment and adjudication of the Tender)

3 Manufacturing capabilities

Size of Plant	Equipment	Number of shifts per day	Production per shift
……	……	……	……
……	……	……	……
……	……	……	……

Information of the Manufacturers' Quality Control Manual e.g. implementation method, codes of practice on which it is based etc. (Attach a certified copy of the cover to this form):

……
……

Materials

Attach the following to this form:

- A list of materials used for the production of geosynthetic (GSM) membranes.
- Material properties of above-mentioned materials.
- Certified test results.
- Geomembrane and seam samples.

Schedule of completed projects - Geosynthetic (GSM) membrane

	Project #1	Project #2	Project #3	Project #4	Project #5	Project #6
Location	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Purpose	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Start date	……	……	……	……	……	……
Finish date	……	……	……	……	……	……
Facility owner – Contact person & tel. no.	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
Project Manager	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Engineer – Contact person & tel. no.	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……
Type of material	…… ……	…… ……	…… ……	…… ……	…… ……	…… ……
Thickness	……	……	……	……	……	……
Surfaced area of Installation	……	……	……	……	……	……

Total area of GSM installation for listed projects: ……

NAME: …… POSITION: ……..

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

27. DETAILS OF GEOSYNTHETIC MEMBRANE (GSM) INSTALLER

1 SELECTED OPTION

The Tenderer must enter which option for the geosynthetic membrane (GSM) installer will be taken in the space provided below.

O **Option 1**: The Contractor is an Installer with the necessary experience and training of staff.

O **Option 2**: The Contractor will subcontract an Installer with the necessary experience and training.

2 OPTION 1: (To be completed only if Option 1 is selected)

The Tenderer must enter in the spaces provided below if he/his is an installer with the necessary experience and training. The information requested below is the minimum required and is deemed to be material to the award of this contract. Any additional information may be attached to this form.

Installing capabilities

Equipment	Personnel	Anticipated daily Production (m^2)
……...	……...	…….
……...	……...	…….
……...	……...	…….

Information on the Installers' Quality Control Manual for installation e.g., implementation method, codes of practice on which it is based etc.

……
……
……
……

Schedule of completed projects Geosynthetic Membrane (GSM)

	Project #1	Project #2	Project #3	Project #4	Project #5	Project #6
Location	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. ……
Purpose	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	…… …… ……
Start date	…….	…….	…….	…….	…….	…….
Finish date	…….	…….	…….	…….	…….	…….

Facility owner – Contact person & tel. no.	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….
Project Manager	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….
Engineer – Contact person & tel. no.	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….
Type of material	……. …….	……. …….	……. …….	……. …….	……. …….	……. …….
Thickness	…….	…….	…….	…….	…….	…….
Seaming and other equipment used	……. ……. ……. …….	……. ……. ……. …….	……. ……. ……. …….	……. ……. ……. …….	……. ……. ……. …….	……. ……. ……. …….
Surface area of installation	…….	…….	…….	…….	…….	…….

Total area of Geosynthetic Membrane (GSM) installation for listed projects:
……

Certification of Construction Quality Assurance (CQA) compliance

I, ……, as representative of (Installer) …….

of (address) ……

telephone number …….. fax number …… hereby certify that all design features, Specifications and requirements of the CQA Plan shall be complied with.

NAME: …… POSITION: ……..

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

3 OPTION 2: (To be completed only if Option 2 is selected)

INFORMATION TO BE PROVIDED

Corporate Information and background

Name of Installer:……..

Status of Installer (e.g. Company, close corporation etc.): ……..

Corporate Background: ……

……..

The Tenderer must enter the spaces provided below regarding the GSM Installer he/she intends to employ. The information requested below is the minimum required and is deemed to be material to the award of this contract. Any additional information may be attached to this form.

Installing capabilities

Equipment	**Personnel**	**Anticipated Daily Production (m^2)**
……...	……...	……...
……...	……...	……...
……...	……...	……...

Information on the Installers' Quality Control Manual for installation e.g. implementation method, codes of practice on which it is based etc.

……
……
……

Schedule of completed projects Geosynthetic Membrane (GSM)

	Project #1	**Project #2**	**Project #3**	**Project #4**	**Project #5**	**Project #6**
Location	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Purpose	…… …… …….	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Start date	……	……	……	……	……	……
Finish date	……	……	……	……	……	……
Facility owner – Contact person & tel. no.	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
Project Manager	…… ……	…… ……	…… ……	…… ……	…… ……	…… ……

	……	……	……	……	……	……
Engineer – Contact person & tel. no.	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
Type of material	…… ……	…… ……	…… ……	…… ……	…… ……	…… ……
Thickness	……	……	……	……	……	……
Seaming and other equipment used	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……
Surface area of installation	……	……	……	……	……	……

Total area of Geosynthetic Membrane (GSM) installation for listed projects:
……

Certification of Construction Quality Assurance (CQA) compliance

I, ……, as representative of (Installer) ……..

of (address) ……

……

telephone number …….. fax number …… hereby certify that all design features, Specifications and requirements of the CQA Plan shall be complied with.

NAME: …… POSITION: ……..

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

28. DETAILS OF GEOSYNTHETIC CLAY LINER (GCL) MANUFACTURER

1 GENERAL

The Tenderer must enter in the spaces provided below, details regarding the GCL Manufacturer he/she intends to employ. The information requested below is the minimum required and is deemed to be material to the award of this contract. Any additional information may be attached to this form.

2 INFORMATION TO BE PROVIDED

Corporate Information and background

Name of Manufacturer ……..

Status of Manufacturer (e.g. Company, close corporation etc.): …..…….

Corporate Background: ……

……..

Main product: ……

ISO 9001:2004 Certification (Yes / No) ……

(Should the Tenderer wish to supply geosynthetic membranes manufactured by a manufacturer that does not have ISO 9001:1994 certification, the Engineer will allow for the cost of additional quality control and testing in the assessment and adjudication of the Tender)

3 Manufacturing capabilities

Size of Plant	Equipment	Number of shifts per day	Production per shift
……	……	……	……
……	……	……	……
……	……	……	……

Information of the Manufacturers' Quality Control Manual e.g. implementation method, codes of practice on which it is based etc. (Attach a certified copy of the cover to this form):

……
……

Materials

Attach the following to this form:

- A list of materials used for the production of GCL.
- Material properties of above-mentioned materials.
- Certified test results.
- Liner samples.

Schedule of completed projects – GCL Geosynthetic Clay Liner (GCL)

	Project #1	Project #2	Project #3	Project #4	Project #5	Project #6
Location	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Purpose	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Start date	……	……	……	……	……	……
Finish date	……	……	……	……	……	……
Facility owner – Contact person & tel. no.	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
Project Manager	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Engineer – Contact person & tel. no.	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……
Type of material	…… ……	…… ……	…… ……	…… ……	…… ……	…… ……
Thickness	……	……	……	……	……	……
Surfaced area of Installation	……	……	……	……	……	……

Total area of GCL installation for listed projects: ……

NAME: …… POSITION: ……..

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

29. DETAILS OF GEOSYNTHETIC CLAY LINER (GCL) INSTALLER

1 SELECTED OPTION

The Tenderer must enter which option for the Geosynthetic Clay Liner (GCL) installer will be taken in the space provided below.

O **Option 1**: The Contractor is an Installer with the necessary experience and training of staff.

O **Option 2**: The Contractor will subcontract an Installer with the necessary experience and training.

O **Option 3**: The Contractor will have a supervisor trained by the manufacturer.

2 OPTION 1: (To be completed only if Option 1 is selected)

The Tenderer must enter in the spaces provided below if he/his is an installer with the necessary experience and training. The information requested below is the minimum required and is deemed to be material to the award of this contract. Any additional information may be attached to this form.

Installing capabilities

Equipment	Personnel	Anticipated daily Production (m^2)
……...	……...	……..
……...	……...	……..
……...	……...	……..

Information on the Installers' Quality Control Manual for installation e.g., implementation method, codes of practice on which it is based etc.

……
……
……
……

Schedule of completed projects - GCL

	Project #1	Project #2	Project #3	Project #4	Project #5	Project #6
Location	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….
Purpose	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….
Start date	…….	…….	…….	…….	…….	…….

Finish date	……	……	……	……	……	……
Facility owner – Contact person & tel. no.	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
Project Manager	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……	…… …… ……
Engineer – Contact person & tel. no.	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……	…… …… …… …… ……
Type of material	…… ……	…… ……	…… ……	…… ……	…… ……	…… ……
Thickness	……	……	……	……	……	……
Seaming and other equipment used	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……	…… …… …… ……
Surface area of installation	……	……	……	……	……	……

Total area of GCL installation for listed projects: ……

Certification of Construction Quality Assurance (CQA) compliance

I, ……, as representative of (Installer) ……..

of (address) ……

telephone number …….. fax number …… hereby certify that all design features, Specifications and requirements of the CQA Plan shall be complied with.

NAME: …… POSITION: ……..

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

3 OPTION 2: (To be completed only if Option 2 is selected)

The Tenderer must enter the spaces provided below regarding the GCL Installer he/she intends to employ. The information requested below is the minimum required and is deemed to be material to the award of this contract. Any additional information may be attached to this form.

INFORMATION TO BE PROVIDED

Corporate Information and background

Name of Installer:……

Status of Installer (e.g. Company, close corporation etc.): ……..

Corporate Background: ……

……

Installing capabilities

Equipment	**Personnel**	**Anticipated Daily Production (m^2)**
……...	……...	……...
……...	……...	……...
……...	……...	……...

Information on the Installers' Quality Control Manual for installation e.g. implementation method, codes of practice on which it is based etc.

……
……
……

Schedule of completed projects - GCL

	Project #1	**Project #2**	**Project #3**	**Project #4**	**Project #5**	**Project #6**
Location	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….
Purpose	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….	……. ……. …….
Start date	…….	…….	…….	…….	…….	…….
Finish date	…….	…….	…….	…….	…….	…….
Facility owner – Contact person & tel. no.	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….	……. ……. ……. ……. …….
Project Manager	……. …….	……. …….	……. …….	……. …….	……. …….	……. …….

	……..	……..	……..	……..	……..	……..
Engineer – Contact person & tel. no.	……. ……. ……. ……. ……..	……. ……. ……. ……. ……..	……. ……. ……. ……. ……..	……. ……. ……. ……. ……..	……. ……. ……. ……. ……..	……. ……. ……. ……. ……..
Type of material	……. ……..	……. ……..	……. ……..	……. ……..	……. ……..	……. ……..
Thickness	……..	……..	……..	……..	……..	……..
Seaming and other equipment used	……. ……. ……. ……..	……. ……. ……. ……..	……. ……. ……. ……..	……. ……. ……. ……..	……. ……. ……. ……..	……. ……. ……. ……..
Surface area of installation	……..	……..	……..	……..	……..	……..

Total area of GCL installation for listed projects: ……

Certification of Construction Quality Assurance (CQA) compliance

I, ……, as representative of (Installer) …….

of (address) ……

……..

telephone number …….. fax number …… hereby

certify that all design features, Specifications, and requirements of the CQA Plan shall be complied with.

NAME: …… POSITION: ……..

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

3 OPTION 3: (To be completed only if Option 3 is selected)

The Tenderer must enter in the spaces provided below if he/his does not have the necessary experience and training but will obtain the required training from the manufacturer of the GCL. The information requested below is the minimum required and is deemed to be material to the award of this contract. Any additional information may be attached to this form.

INFORMATION TO BE PROVIDED

Corporate Information and background

Name of Proposed Supervisor: .....

Academic Qualification: .....

Number of years of experience in contracting: .....

Brief details of construction background: .....

.....

.....

.....

.....

A detailed CV must be attached to this tender.

Name of Manufacturer providing training: .....

Status of Manufacturer (e.g. Company, close corporation etc.): .....

Corporate Background: .....

.....

.....

A detailed description of the training program must be attached with the tender.

Name of Manufacturer's proposed trainer: .....

Academic Qualification: .....

Number of years of experience in installing GCL's: .....

Brief details of trainer's experience background: .....

.....

.....

.....

.....

A detailed CV must be attached to this tender.

Installing capabilities

Equipment	Personnel	Anticipated Daily Production (m^2)
…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..

Information on the Installers' Quality Control Manual for installation e.g. implementation method, codes of practice on which it is based etc.

……
……

Schedule of completed projects by the Manufacturer's Trainer - GCL Geosynthetic Membrane (GCL)

	Project #1	Project #2	Project #3	Project #4	Project #5	Project #6
Location	…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..
Purpose	…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..	…….. …….. …….. ……..
Start date	……..	……..	……..	……..	……..	……..
Finish date	……..	……..	……..	……..	……..	……..
Facility owner – Contact person & tel. no.	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..
Project Manager	…….. …….. ……..	…….. …….. ……..	…….. …….. ……..	…….. …….. ……..	…….. …….. ……..	…….. …….. ……..
Engineer – Contact person & tel. no.	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..	…….. …….. …….. …….. ……..
Type of material	…….. ……..	…….. ……..	…….. ……..	…….. ……..	…….. ……..	…….. ……..
Thickness	……..	……..	……..	……..	……..	……..
Seaming and other equipment used	…….. …….. ……..	…….. …….. ……..	…….. …….. ……..	…….. …….. ……..	…….. …….. ……..	…….. …….. ……..
Surface area of installation	……..	……..	……..	……..	……..	……..

Total area of GCL installation for listed projects: ……

Certification of Construction Quality Assurance (CQA) compliance

I, ……, as representative of (Installer) …….

of (address) ……

……

telephone number …….. fax number …… hereby certify that all design features, Specifications, and requirements of the CQA Plan shall be complied with.

NAME: …… POSITION: ……..

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

THE CONTRACT

C1: AGREEMENTS AND CONTRACT DATA

C2: PRICING DATA

C3: SCOPE OF WORK

C4: SITE INFORMATION

TABLE OF CONTENTS

PAGE NO.

C1: AGREEMENTS AND CONTRACT DATA

C1.1: FORM OF OFFER AND ACCEPTANCE

A: Offer

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

CONTRACT No.: 8/2/RNM0352 – UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

The Tenderer, identified in 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

Amount in Words.....

……

……

R……..……..…. (in figures).

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

For the Tenderer:

Signature: .....

Name: .....**Date:** .....

Capacity: .....

Name and address of organisation: .....

.....

Signature and name of witness:

Signature: .....

Name: .....**Date:** .....

This form is to be completed by the Employer only

B: Acceptance

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

The terms of the contract, are contained in

Part C1 Agreements and Contract Data, (which includes this Agreement)

Part C2 Pricing data

Part C3 Scope of work

Part C4 Site information

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

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

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

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

For the Employer:

Signature: ……

Name: ……

Capacity: ……

Name and address of organisation:

……

……

……

Signature and name of witness:

Signature: ……

Name: ……

Date: ……

This form is to be completed by the Employer and the successful tenderer only, upon acceptance of the successful tenderer's offer

C: Schedule of Deviations

Notes:

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

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

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

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

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

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

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

4 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.

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

FOR THE TENDERER:

Signature: .....

Name: ....

Capacity: ....

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

....

Witness:

Signature: .....

Name: .....

Date: .....

FOR THE EMPLOYER:

Signature: .....

Name: ....

Capacity: ....

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

....

Witness:

Signature: .....

Name: .....

Date: .....

C1.2: CONTRACT DATA

C1.2.1: GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract for Construction Works (3rd Edition 2015), (abbreviated title: "GCC 2015"), published by the South African Institution of Civil Engineering, is applicable to this Contract and is obtainable from **www.saice.org.za**.

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

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

It is agreed that variations from the GCC 2015 are those set out hereafter under "C1.2.1.2 SPECIAL CONDITIONS OF CONTRACT".

C1.2.1.2 SPECIAL CONDITIONS OF CONTRACT

C1.2.1.2.1 GENERAL

These Special Conditions of Contract (SCC) form an integral part of the Contract. The Special Conditions of Contract shall amplify, modify or supersede, as the case may be, the GCC 2015 to the extent specified below, and shall take precedence and shall govern.

The clauses of the Special Conditions of Contract hereafter are numbered "SCC" followed in each case by the number of the applicable clause or subclause in the GCC 2015, and the applicable heading, or (where a new special condition that has no relation to the existing clauses is introduced) by a number that follows after the last clause number in the GCC 2015, and an appropriate heading.

C1.2.1.2.2 AMENDMENTS TO THE GCC 2015

SCC 6.2.1 Delivery of security

In the last two lines of Clause 6.2.1, delete the words "the type of security for the due performance of the Contract, as selected in the Contract Data" *and replace them with the words* "a fixed performance guarantees as security for the due performance of the Contract in accordance with the Contract Data Part A: Data Provided by the Employer"*.*

Delete the entirety of Clause 6.2.2 and replace it with the following:

"SCC 6.2.2 Contractor failing to provide security

If the Contractor fails to provide the required fixed performance guarantee within the time period stipulated in the Contract Data, or if the performance guarantee shall differ substantially from the pro forma, it shall legally be deemed that the Contractor has selected a security of ten per cent retention of the value of the Works without limiting the Employer's right to terminate the Contract in terms of Clause 9.2."

SCC 6.2.3 Validity of performance guarantee

Delete the entirety of the first sentence of Clause 6.2.3 and replace it with the following:

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

SCC 6.8.2 Application of the Contract Price Adjustment Factor

Contract Price Adjustment is not applicable to this Contract.

SCC 6.8.3 Variation in cost of special materials

Contract Price Adjustment is not applicable to this Contract.

SCC 6.8.5: Foreign Currency Variation

No adjustment for the variation in rates of exchange will be made whatsoever for the procurement of materials from outside South Africa.

SCC 6.10.1.5: Works not yet built into the Permanent Works

The percentage advance on materials not yet built into the Permanent Works is **80%**. The percentage advanced on imported geosynthetic lining materials listed in the schedule "Variations of Rates of Exchange for Imported Materials" and delivered to site shall be 100%, provided that all Manufacturing Quality Assurance test results as required by the Engineer have been received and approved by the Engineer.

Additional Special Conditions of Contract

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

SCC 1.1 Definitions

Delete the entirety of Clause 1.1.1.5 and replace it with the following:

"SCC 1.1.1.5 "Commencement Date" means the date 42 calendar days after the date that the Agreement, made in terms of the Form of Offer and Acceptance, comes into effect."

SCC 5.3 Commencement of the Works

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

"SCC 5.3.1 Commencement of the Works

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

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

SCC 5.3.1.2 Application by the Employer for a permit to do construction work in terms of Regulations 3(1) and (2) of the Construction Regulations 2014, and

SCC 5.3.1.3 Receipt by the Employer of the permit to do construction work.

SCC 5.3.2 Unacceptable documentation

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

SCC 5.3.3 Time to instruct commencement of the Works

Where the Contractor delays the submission by the Employer of the application for a permit to do construction work and such permit is not received within 14 days following the Commencement Date such that the Employer's Agent's instruction to commence carrying out the Works cannot be given, without prejudice to the Employer's rights to terminate the contract under Clause 9.2, the Employer's Agent shall delay issuing the instruction to commence carrying out the Works until such time as the permit to do construction work has been

received. The Contractor shall have no entitlement under Clause 5.12 to an extension of time for Practical Completion.

Where the permit to do construction work is not received within the 14-day period following Commencement of the Contract for reasons not attributable to the Contractor, the Employer's Agent shall delay the instruction to commence the Works and the Contractor shall be entitled to make a claim in accordance with Clause 10.1."

C1.2.2: CONTRACT DATA (APPLICABLE TO THIS CONTRACT)

PART A: DATA PROVIDED BY THE EMPLOYER

REFERENCE	CONTRACT SPECIFIC DATA PROVIDED BY THE EMPLOYER
1	**GENERAL**
1.1.1.13	The Defects Liability Period is **12 months**.
1.1.1.14	The maximum time for achieving Practical Completion is **6 months** (Including non-working days and excluding special non-working days) Note that the Functionality Scoring in the Tender Data allows for points relating to the Contractor's proposed time for achieving Practical Completion. Should a period less than 6 months be submitted by the Contractor and accepted by the Employer, the penalties reflected in 5.13.1 shall be applicable to the accepted period and not the 6-month period.
1.1.1.15	The Name of Employer is **Ray Nkonyeni Municipality**
1.1.1.16	The Name of Employer's Agent is Deon Govender (*Pr Tech Eng)* – BVi Consulting Engineers
1.1.1.26	Pricing Strategy: The Contract is to be a Re-measurement Contract.
1.2.1.2	**Address of the Employer:** **Physical** 10 Connor Street Port Shepstone 4240 **Postal** P O Box 5 Port Shepstone 4240 **Email:** khulekani.msomi@rnm.gov.za **Telephone:** 039 688 2000 **Fax No.:** 039 682 0327
1.2.1.2	**Address of Employer's Agent:** **Physical** 2nd Floor – Pharos House 70 Buckingham Terrace Westville 3630 **Postal** P.O. Box 889 Westville 3630 **Email:** deong@bvikn.co.za **Telephone:** 031 266 8382 **Fax No.:** 031 267 0728
3	**EMPLOYER'S AGENT**
3.2.3	The Employer's Agent is required to obtain the specific approval of the Employer for any expenditure in excess of the Contract Price.

REFERENCE	CONTRACT SPECIFIC DATA PROVIDED BY THE EMPLOYER
5	**TIME AND RELATED MATTERS**
5.3.1 and 5.3.2	Where the Employer **is not required** to apply for a permit to do construction work in terms of Construction Regulation 3(1), the following documentation is to be submitted within 14 days from the Commencement Date: The documents required before commencing to carry out the Works: • 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) Form C1.7 'Agreement in terms of Section 37(2) of the Occupational Health and Safety Act No. 85 of 1993' to be signed by the Contractor and the Employer (refer to Clause 4.3 of the GCC 2015.
SCC 5.3.1 and SCC 5.3.2	Where the Employer **is required** to apply for a permit to do construction work in terms of Construction Regulation 3(1), the following documentation is to be submitted within 14 days from the date that the Agreement, made in terms of the Form of Offer and Acceptance, comes into effect: The documents required before commencing to carry out the Works: • 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) • Form C1.7 'Agreement in terms of Section 37(2) of the Occupational Health and Safety Act No. 85 of 1993' to be signed by the Contractor and the Employer (refer to Clause 4.3 of the GCC 2015. And: The documents required by the Employer to apply for a permit to do construction work in terms of Regulations 3(1) and (2) of the Construction Regulations 2014: • Temporary works designer's appointment duties in terms of Regulation 6(2) as have been agreed upon plus proof of registration with ECSA *[CR 3(5)(b)(iii) read with CR 5(1)(e) and CR 6(2)]*; • Evidence that the contractor has made adequate provision for the cost of Health and Safety, i.e., Bill of quantities *[CR 3(5)(b)(iii) read with CR 5(1)(g)]*; • Evidence that the Principal contractor has the necessary competencies to carry out construction work safely, viz., schedule of activities, relevant appointments and proofs of competency *[CR 5(1)(h)]*; • Valid Letter(s) of Good Standing for the appointed Principal Contractor(s) *[CR 3(5)(b)(ii) read with CR 5(1)(j)]*.
5.8.1	The non-working days are Sundays and Public Holidays The special non-working days are the construction industry year end break, all foreseeable statutory election days as declared by National Government, and the following statutory public holidays as declared by National Government: New Year's Day, Human Rights Day, Good Friday, Family Day, Freedom Day, Workers' Day, Youth Day, National Women's Day, Heritage Day, Day of Reconciliation, Christmas Day and the Day of Goodwill. The construction industry year end break commences on the first working day after 15 December and ends on the first working day after 5 January of the following year.

<table>
<tr><th>REFERENCE</th><th>CONTRACT SPECIFIC DATA PROVIDED BY THE EMPLOYER</th></tr>
<tr><td></td><td>Delete the words “sunset and sunrise” and replace with “17:00 and 07:00”.</td></tr>
<tr><td>5.12.2.2</td><td>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.
<table>
<tr><th><u>Month</u></th><th><u>Days Lost</u></th><th><u>Month</u></th><th><u>Days Lost</u></th></tr>
<tr><td>January</td><td>4*</td><td>July</td><td>1</td></tr>
<tr><td>February</td><td>3</td><td>August</td><td>2</td></tr>
<tr><td>March</td><td>3</td><td>September</td><td>2</td></tr>
<tr><td>April</td><td>2</td><td>October</td><td>3</td></tr>
<tr><td>May</td><td>2</td><td>November</td><td>3</td></tr>
<tr><td>June</td><td>1</td><td>December</td><td>2*</td></tr>
<tr><td colspan="4">* = The number of working days lost allows for the annual statutory Construction holiday in December and January of each year.</td></tr>
</table></td></tr>
<tr><td>5.13.1</td><td>The penalty for failing to complete the Works is R5,000.00 per day.</td></tr>
<tr><td>5.14.1</td><td>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. The requirements are to be regularly reviewed with respect to any variations to the Contract.</td></tr>
<tr><td>5.16.3</td><td>The latent defects period is 10 years.</td></tr>
<tr><td>6</td><td>PAYMENT AND RELATED MATTERS</td></tr>
<tr><td>6.2.1 and SCC 6.2.1</td><td>The security to be provided by the Contractor shall be:
Fixed Performance Guarantee of 10% of the Contract Sum.</td></tr>
<tr><td>6.5.1.2.3</td><td>The percentage allowance to cover overhead charges is 10%.</td></tr>
<tr><td>6.8.2 and SCC 6.8.2</td><td>Contract Price Adjustment is not applicable.</td></tr>
<tr><td>6.8.3 and SCC 6.8.3</td><td>Contract Price Adjustment is not applicable.</td></tr>
<tr><td>6.10.1.5</td><td>The percentage advance on materials not yet built into the Permanent Works is 80% (subject to provision of Indemnity for Materials on Site). The percentage advanced on imported geosynthetic lining materials listed in the schedule “Variations of Rates of Exchange for Imported Materials” and delivered to site shall be 100%, provided that all Manufacturing Quality Assurance test results as required by the Engineer have been received and approved by the Engineer.</td></tr>
</table>

REFERENCE	CONTRACT SPECIFIC DATA PROVIDED BY THE EMPLOYER
6.10.3	The percentage retention on the amounts due to the Contractor is **10%** of the Contract Sum. The limit of "retention money" is **5%** of the Contract Sum.
6.10.4	Payment to sub-contractors and labour for work completed must be made within 30 days of the submission of the invoice from the sub-contractor to the main contractor.
8	**RISKS AND RELATED MATTERS**
8.6.1.1.2	The value of Plant and materials supplied by the Employer to be included in the insurance sum is **nil**.
8.6.1.1.3	The amount to cover professional fees for repairing or reinstatement of damage to the Works to be included in the insurance sum is **nil**.
8.6.1.2	SASRIA Coupon Policy for Special Risks to be issued in joint names of the Municipality and Contractor for the full value of the works (Including Vat)
8.6.1.3	The limit of indemnity for liability insurance is **R10 000 000,00** (ten million Rand only) for any single liability claim. Liability insurance shall include spread of fire risk.
10	**CLAIMS AND DISPUTES**
10.5.3	The number of Adjudication Board Members to be appointed is one.
10.7.1	Dispute Determination shall be by Arbitration with the arbitrator chose by the sitting chairperson of the Association of Arbitrators Southern Africa NPC.

PART 2: DATA PROVIDED BY THE CONTRACTOR

The following contract specific data are applicable to this contract.

REF	CONTRACT SPECIFIC DATA PROVIDED BY THE CONTRACTOR
1. Clause 1.1.1.9: Clause 1.2.1.2:	**GENERAL** **Name of the Contractor**: …… …….. **Address of the Contractor**: Physical: Postal: ....
6. Clause 6.8.3:	**PAYMENT AND RELATED MATTERS** No special materials are identified as part of this Contract. Signed on behalf of Tenderer: …….

C1.3: PERFORMANCE GUARANTEE

PRO FORMA

PERFORMANCE GUARANTEE

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

1. GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: ……

Physical address: ……

"Employer" means: ……..

"Contractor" means: ……

"Employer's Agent" means:
……

"Works" means: ……

"Site" means: ……

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

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

Amount in words: ……

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

Amount in words: ……

Type of Performance Guarantee: ……. *(Insert Variable or Fixed)*

"Expiry Date" means: …… *(Give date)* or any other later date set by the Contractor and/or Employer provided such instruction is received prior to the Expiry Date as indicated here.

2. CONTRACT DETAILS

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

3. GUARANTOR'S LIABILITY

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

3.2 The Guarantor's period of liability shall be from the commencement date of the project up to the issue by the Employer's Agent of the Certificate of Completion of the Works.

3.3 The Employer's Agent and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of Completion of the Works has been issued.

4. CONDITIONS APPLICABLE TO THIS PERFORMANCE GUARANTEE

4.1 The Guarantor hereby acknowledges that:

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

4.1.2 Its obligation under this Performance Guarantee is restricted to the payment of money.

4.2 Subject to the Guarantor's maximum liability referred to in 3.1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.2.1 to 4.2.3:

4.2.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Employer's Agent in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2.2;

4.2.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.2.1 and the sum certified has still not been paid;

4.2.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.2.

4.3 Subject to the Guarantor's maximum liability referred to in 3.1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

4.3.1 the Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 4.3; or

4.3.2 a provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 4.3; and

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

4.4 It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4.2 and 4.3 shall not exceed the Guarantor's maximum liability in terms of 3.1.

4.5 Where the Guarantor has made payment in terms of 4.3, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

4.6 Payment by the Guarantor in terms of 4.2 or 4.3 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

4.7 Payment by the Guarantor in terms of 4.3 will only be made against the return of the original Performance Guarantee by the Employer.

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

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

4.10 This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 3.2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

4.11 This Performance Guarantee, with the required demand notices in terms of 4.2 or 4.3, shall be regarded as a liquid document for the purposes of obtaining a court order.

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

Signed at .....

Date .....

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

Capacity .....

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

Capacity .....

Witness signatory (1) .....

Witness signatory (2)

C1.4: AGREEMENT IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT No 85 OF 1993

THIS AGREEMENT is made between RAY NKONYENI MUNICIPALITY (hereinafter called the

EMPLOYER) of the one part, herein represented by: .....

.....

in his capacity as: .....

AND: .....

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

.....

in his capacity as: .....

duly authorized to sign on behalf of the Contractor.

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

CONTRACT No.: 8/2/RNM0352 – UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1) for the construction, completion, and maintenance of the works;

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

NOW THEREFORE the parties agree as follows:

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

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

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

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

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

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

on this the ..... day of …….. 20……

SIGNATURE:.....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. .....

2. .....

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

on this the …….. day of ..... 20……

SIGNATURE:.....

NAME AND SURNAME: .....

CAPACITY: .....

WITNESSES: 1. .....

2. .....

C2: PRICING DATA

TABLE OF CONTENTS

C2.1 PRICING INSTRUCTIONS

Pricing Assumptions mean the criteria as set out below, read together with all Parts of this contract document, which it will be assumed in the contract that the tenderer has taken into account when developing his prices.

1. The method of measurement published by the South African Bureau of Standards in clause 8 of the Standardised Specifications for Civil Engineering Construction is applicable, subject to the variations and amendments contained in the section “Applicable SANS 1200 standardised specifications”.

2. Descriptions in the Bills of Quantities are abbreviated and comply generally with those in the Standardised Specifications. Clause 8 of each Standardised Specification, read together with the relevant clauses of the Scope of Work, set out what ancillary or associated activities are included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standardised Specification, or the Scope of Work, conflict with the terms of the Schedule, the requirements of the Standardised Specification or Scope of Work, as applicable, shall prevail.

3. The clauses in a specification in which further information regarding the schedule item appears under "Reference clause" in the Schedule. The reference clauses indicated are not necessarily the only sources of information in respect of scheduled items. Further information and specifications may be found elsewhere in the contract documents. Standardised Specifications are identified by the letter or letters which follow SANS in the SANS 1200 series of specifications, e.g. G for SANS 1200 G.

4. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.

5. The quantities set out in the Bills of Quantities are the estimated quantities of the Contract Works, but the Contractor will be required to undertake whatever quantities may be directed by the Engineer from time to time. The Contract Price for the completed contract shall be computed from the actual quantities of work done, valued at the relevant unit rates and prices.

6. The prices and rates to be inserted in the Bills of Quantities are to be the full inclusive prices for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the tender is based, as well as overhead charges and profit. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out. If a nil rate is entered against an item, it will be considered that there is no charge for that particular item (even should the quantity subsequently increase).

7. A price or rate is to be entered against each item in the Bills of Quantities, whether the quantities are stated or not. **An item against which no price is entered will be considered to be covered by the other prices or rates in the Bills of Quantities, and that there is no charge for that particular item** (even should the quantity subsequently increase).

8. Except where rates only are required, insert all amounts to be included in the total tendered price in the "Amount" column and show the corresponding total tendered price.

9. The units of measurement described in the Bills of Quantities are metric units. Abbreviations which may be used in these Bills of Quantities are as follows:

mm	=	millimetre	h	=	hour
m	=	metre	kg	=	kilogram
km	=	kilometre	t	=	ton (1000 kg)
m^2	=	square metre	No.	=	number
m^2.pass	=	square metre-pass	sum	=	lump sum
ha	=	hectare	MN	=	meganewton
m^3	=	cubic metre	MN.m	=	meganewton-metre
m^3.km	=	cubic metre-kilometre	P C sum	=	Prime Cost sum
l	=	litre	Prov sum	=	Provisional sum
kl	=	kilolitre	%	=	per cent
MPa	=	megapascal	kW	=	kilowatt

10. The Contract Price shall **not** be subject to Contract Price Adjustment.

C2.2 SCHEDULE OF QUANTITIES

Please refer to the Schedule of Quantities overleaf.

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATES	AMOUNT
		Schedule 1: General items				
	SANS 1200 A	**SECTION A : GENERAL ITEMS**				
		FIXED CHARGE AND VALUE-RELATED ITEMS				
A1.1	PSA 8.3.1	Contractor's fixed establishment cost	sum	1		
A1.2	PSA 8.3.5	Preparation of Safety Plan	sum	1		
A1.3		Compliance with Environmental Management Plan	sum	1		
		TIME RELATED ITEMS				
A1.4	PSA 8.4.1	a) Time related establishment costs	Sum	1		
A1.5		b) Any other time related costs	Sum	1		
	PSA 8.4.2.2	Facilities for the Contractor:				
A1.6		a) Supply of water	Sum	1		
A1.7		b) Supply of power	Sum	1		
A1.8		c) Telephone facilities	Sum	1		
A1.9		d) Protection of existing services	Sum	1		
A1.10		e) Search for, record and protect survey	Sum	1		
A1.11		f) Supervision and maintenance of Quality Control and Quality Assurance	sum	1		
A1.12		g) Training of staff	Sum	1		
A1.13		h) Provide access for authorised personnel and maintain access	Sum	1		
A1.14		i) Night watch and security facilities	Sum	1		
A1.15		j) Dealing with water	Sum	1		
A1.16		k) Contractor's testing of materials not included in the Schedule of Quantities	Sum	1		
A1.17		l) Compliance with Occupational Health and Safety requirements	Sum	1		
					Sub-total carried forward to next page	

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATES	AMOUNT
					Sub-total brought forward from previous page	
	PSA 8.5	PROVISIONAL SUMS				
A1.18	PSA 8.5.1	a) Testing of materials by the Engineer	Prov Sum	1	30 000	30 000,00
A1.19	PSA 8.5.1	b) Overheads, charges and profit on (a) above	%	30 000		
	PSA 8.5.2	Testing, Quality Assurance and Quality Control of geosynthetic membranes and liners by Engineer				
		Testing during manufacturing process prior to shipment from foreign country				
A1.20		a) Quality Conformance testing by independent laboratory	Prov Sum	1	120 000	120 000,00
A1.21		b) Overheads, charges and profit on (a) above	%	120 000		
		Quality Control				
A1.22		c) Quality Control testing by the Engineer during installation	Prov Sum	1	40 000	40 000,00
A1.23		d) Overheads, charges and profit on (c) above	%	40 000		
	PSA 8.5.3	Environmental control officer				
A1.24	a)	Services of an Environmental Control Officer	Prov. Sum	1	80 000	80 000,00
A1.25	b)	Mark up for overheads, charges and profit on a) above	%	80 000		
	PSA 8.5.3	Health and safety officer				
A1.26	a)	Services of an Health and Safety Officer	Prov. Sum	1	80 000	80 000,00
A1.27	b)	Mark up for overheads, charges and profit on a) above	%	80 000		
	PSA 8,5,3	Community Liaison Officer				
A1.28	a)	Services of a Community Liaison Officer	Prov. Sum	1	42 000	42 000,00
A1.29	b)	Mark up for overheads, charges and profit on a) above	%	42 000		
					Sub-total carried forward to next page	

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATES	AMOUNT
					Sub-total brought forward from previous page	
	PSA 8.7	DAYWORKS				
		Materials:				
A1.30		Cement	50kg bag	1		
A1.31		Building sand	m³	1		
A1.32		19mm crushed stone	m³	1		
A1.33		Bricks: ROK's	1 000	1		
A1.34		Labour (Provisional)				
A1.35		a) Qualified artisan	hr	4		
A1.36		b) Skilled labourer	hr	4		
A1.37		c) Semi-skilled labourer	hr	4		
A1.38		d) Unskilled labourer	hr	4		
A1.39		e) Foreman	hr	4		
A1.40		f) Technician	hr	4		
A1.41		g) Surveyor	hr	4		
		Plant (Provisional)				
		a) Bulldozer				
A1.42		(i) D4 kW (small)	hr	4		
A1.43		(ii) D6 kW (large)	hr	4		
A1.44		b) Grader 140h kW	hr	4		
A1.45		c) Wheel loader 924 m³ bucket	hr	4		
A1.46		d) Crawler excavator .20ton .kW	hr	4		
					Sub-total carried forward to next page	

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATES	AMOUNT
					Sub-total brought forward from previous page	
A1.47		e) Tractor - loader- backhoe…….m³ bucket	hr	4		
		f) Rollers and compactors				
A1.48		(i) Pneumatic self-propelled ..... ton	hr	4		
A1.49		(ii) Smooth self-propelled vibrating roller .....ton				
A1.50		(iii) Plate compactor	hr	4		
		g) Trucks				
A1.51		(i) Tipper truck (10 m³ min)	hr	4		
A1.52		(ii) Tipper truck (5 m³ min)	hr	4		
A1.53		(iii) Water truck (10kl min)	hr	4		
A1.54		(iv) Dump truck .....m³	hr	4		
A1.55		h) Compressor (min 10m³/minute), incl hammer and horse	hr	4		
		i) Water pumps				
A1.54		(i) 75mm diameter	hr	3		
A1.55		(ii) 150mm diameter	hr	3		
					TOTAL SCHEDULE 1, SECTION A: GENERAL ITEMS CARRIED TO SUMMARY	

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATES	AMOUNT
	SANS 1200AB	**Section AB: Engineers office**				
	PSAB 8.1	ENGINEERS FACILITIES ON SITE				
	PSAB 8.1.1	Fixed charge and value related items				
		Engineer's Office:				
AB1.1		a) Telephones, scanner, printer, copier	No	1,00		
AB1.2		b) Survey equipment	Sum	1,00		
AB1.3		c) Name board	No	1,00		
	PSAB 8.1.2	Time related items				
AB1.4		b) Telephones, scanner, printer, copier	Sum	1,00		
AB1.5		c) Survey equipment	Sum	1,00		
	PSAB 8.2	Survey and materials assistants				
AB1.6		a) Survey assistants	man.hr	40,00		
AB1.7		b) Materials assistants	man.hr	40,00		
	PSAB 8.5	PROVISIONAL SUMS				
AB1.8	PSAB 8.5.1	a) Cellular phone related charges	Prov Sum	1,00	4 000,00	4 000,00
AB1.9		b) Overheads, charges and profit on (a) above	%	4 000,00		
	PSAB 8.3.4	Vehicle				
AB1.10		a) Monthly charges for the provision of 0,5 t bakkie or similar approved	veh-month	4,00		
AB1.11		b) Rate per km for use of four wheel drive	km	10 000,00		
	PSAB 8.3.5	Engineer's Accommodation				
AB1.12	a)	Provision of rented accommodation for the Engineer	Prov. Sum	1,00	60 000,00	60 000,00
AB 1.13	b)	Overheads, charges and profit on 8.3.5 a) above	%	60 000,00		
TOTAL SCHEDULE 1, SECTION AB: ENGINEER'S OFFICE CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
		Schedule 2: Basin floor and transition embankment construction				
	SABS 1200C	**Section C : Site clearance**				
	PSC 8.2.1	Clear and grub:				
2C.1		a) Cell 4B Basin Floor	m²	400		
2C.2		b) Pipeline and cable routes 2,0m wide	m	50		
	PSC 8.2.8	Demolish and remove structures				
2C.3	(i)	Storm water headwall/manhole structures	Sum	1		
2C.4	(ii)	Leachate manholes or junction boxes	Sum	1		
TOTAL SCHEDULE 2 -SECTION C: SITE CLEARANCE CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200D	**Section D : Earthworks**				
	PSD 8.3.2	Bulk excavations				
	PSD 8.3.2(a)	Excavate in all materials and construct platform and berm/embankment or backfill or stockpile or dispose, including separation of material by type, as ordered by the Engineer.				
2D.1		Excavate material unsuitable for CCL liner. Cut to stockpile from basin area.	m^3	100,00		
2D.2		Cut to fill to form basin floor sub-grade formation level	m^3	800,00		
2D.3		Cut to fill to form stability and edge anchor berms.	m^3	600,00		
2D.4		Cut to stockpile from basin and embankment excavations	m^3	300,00		
2D.5		Cut to spoil from all excavations from basin floor	m^3	2 700,00		
2D.6		Cut to spoil from excavation in waste materials to expose liner at Cell 4(A)	m^3	1 200,00		
2D.7		Hand excavation in soft material and waste material for exposing the existing liner at Cell 4(A)	m^3	50,00		
2D.8		Hand excavation in all material for other excavations as ordered by the Engineer (Provisional)	m^3	50,00		
	PSD 8.2.3 (b)	Extra-over PSD 8.3.2(a) for:				
2D.9		Hard rock excavation (Provisional)	m^3	10,00		
2D.10		Solid waste excavation (Provisional)	m^3	50,00		
2D.11		Temporary stockpiling (Provisional)	m^3	100,00		
	PSD 8.2.3(b)	Constructing various special layers as required				
2D.12		Rip and recompact 150mm in-situ soil layer to 95% Std. Proctor at 0% to +2% OMC	m^2	1 400,00		
2D.13	PSD 8.2.3(c)	Construct a minimum 150mm thick sand sub-grade layer to basin floor (Provisional)	m^2	1 400,00		
2D.14	PSD 8.2.3(c)	150 mm thick stone leachate collection layer	m^2	1 500,00		
	PSD 8.3.3	Restricted excavation				
	PSD 8.3.3(a)	Excavate for restricted foundations, footings, pipe trenches and open drains in all materials and use for backfill or embankment or dispose				
2D.15	PSD 8.3.3(a)	Excavate trench in stability and edge berms for liner anchorage	m^3	35,00		
2D.16	PSD 8.3.3(a)	Excavations to open earth drains (Provisional)	m^3	80,00		
2D.17	PSD 8.3.3(c)	Special soil cement backfill to anchor trench (if required)	m^3	50,00		
TOTAL SCHEDULE 2 - SECTION D: EARTHWORKS CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS1200 DB	**Section DB: Earthworks (pipe trenches)**				
	8.3.2	EXCAVATION				
	PSDB 8.3.2 (a)	Excavate in all materials for trenches, dewater, backfill, compact, and dispose of surplus or unsuitable material for:				
		Leachate collection, detection, reticulation, sewer and subsoil drain pipes up to 200mm diameter				
2DB.1		Exceeding 0.0m up to 1.0m	m	160,00		
2DB.2		Exceeding 1.0m up to 2.0m	m	50,00		
2DB.3		Exceeding 2.0m up to 3.0m	m	15,00		
2DB.4		Exceeding 3.0m up to 4.0m	m	15,00		
	PSDB 8.3.2 (b)	Extra-over Payment Items PSDB 8.3.2(a) for:				
2DB.5		Hard rock excavation	m³	10,00		
2DB.6		Hand excavation	m³	50,00		
2DB.7		Excavation in waste material to spoil	m³	10,00		
2DB.8	PSDB 8.3.4(c)	Excavate by hand to expose existing services (Provisional)	m³	10,00		
	8.3.5(a)	Services that intersect a trench				
2DB 9		Electrical or communication cables all sizes single or in clusters (Provisional)	No	1,00		
2DB 10		Storm water or sewer pipes all sizes (Provisional)	No	2,00		
2DB 11		Pressure pipes all sizes (Provisional)	No	1,00		
	8.3.5(b)	Services that adjoin a trench				
2DB 12		Electrical or communication cables all sizes single or in clusters (Provisional)	m	1,00		
2DB 13		Storm water or sewer pipes all sizes (Provisional)	No	1,00		
2DB 14		Pressure pipes all sizes (Provisional)	No	1,00		
TOTAL SCHEDULE 2 - SECTION DB: EARTHWORKS (PIPE TRENCHES) CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200 DE	**Section DE : Small Earth Dams**				
2DE.1	PSDE 8.3.4	Surface preperation of basin floor to receive GCL and/or HDPE geomembrane with smooth drum roller	m^2	1 400,00		
	PSDE 8.3.5	Forming Embankment, Filters or Liner				
	PSDE 8.3.5	Extra-over PSDE 8.2.4 for importation of materials from commercial sources or from approved borrow pits				
2DE.2	PSDE 8.3.5(a)	Supply and placement of selected clay material compacted to 95% Std. Proctor at -2% to +2% OMC	m^3	800,00		
2DE.3	PSDE 8.3.5(f)	53 - 38 mm stone for leachate collection layer	m^3	250,00		
2DE.4	PSDE 8.3.5(f)	19mm stone for leakage detection trenches	m^3	100,00		
2DE.5	PSDE 8.3.5(f)	9mm stone for leakage detection trenches	m^3	25,00		
TOTAL SCHEDULE 2 - SECTION DE: EARTHWORKS (SMALL EARTH DAMS) CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200 LB	**Section LB : Bedding (Pipes)**				
	8.2.1	Provision of bedding from trench excavation or other excavations on site within the free haul distance				
2LB.1	8.2.1 (a)	Selected granular material	m³	15,00		
2LB.2	8.2.1 (b)	Selected fill material	m³	20,00		
TOTAL SCHEDULE 2 - SECTION LB: BEDDING (PIPES) CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200 LD	**Section LD: Sewers**				
		PIPES				
	8.2.1	Supply, lay, joint and bed and test pipeline				
		HDPE perforated pipes on flexible pipe bedding or as shown on drawings				
2LD.1		110mm diameter to leakage detection system	m	120,00		
2LD.2		160mm diameter to leachate collection system	m	120,00		
2LD.3		110mmm diameter to leachate collection system	m	160,00		
		Solid wall pipe, HDPE PN10 (SDR 17) Pipe with butt-welded joints				
2LD.4		110mm dia (Provisional)	m	50,00		
2LD.5		200mm dia	m	50,00		
		SPECIALS AND FITTINGS				
	8.2.2	Extra over payment item 8.2.1 for specials				
		HDPE fittings for perforated pipes				
2LD.6		160mm diameter 45º bend	No	2,00		
2LD.8		160mm x 110mm diameter (T-Piece)	No	16,00		
2LD.9		160mm diameter end cap	No	2,00		
2LD.10		110mm diameter end cap	No	16,00		
		HDPE fittings: Bends for solid wall pipes				
2LD.11		110mm diameter 45º bend	No	2,00		
2LD.12		160mm diameter 45º bend	No	1,00		
2LD.13		200mm diameter 45º bend	No	1,00		
2LD.14		160mm x 160mm diameter equal (T-Piece)	No	1,00		
		HDPE fittings and specials for pipe penetration detail				
2LD.15		Type 1	No	1,00		
2LD.16		Type 2	No	1,00		
	PSLD 8.2.3	MANHOLES				
		Construct leachate collection and leak detection manholes as per drawing				
2LD.17		Exceeding 0 up to 1.0m	No	1,00		
2LD.18		Exceeding 1.0 up to 2.0m	No	1,00		
	PSLD 8.2.14	Connect to existing leachate system				
2LD.19		At manhole	No	2,00		
					TOTAL SCHEDULE 2 - SECTION LD: SEWERS CARRIED TO SUMMARY	

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	PB	**Section P : Geosynthetic layers**				
		BASIN FLOOR (INCLUDING STABILITY BERM):				
		GEOSYNTHETICS				
		GEOTEXTILES				
		Supply of geotextile				
2P.1		Type A Geotextile for separation layers, class 2 as per GRI-GT13	m²	3 200,00		
2P.2		Type B Geotextile for protection layer to leachate collection system (1000g/m^2)	m²	1 600,00		
2P.3		Type B Geotextile for protection layer to stability berm (800g/m^2)	m²	200,00		
		Installation of geotextile				
2P.4		Type A Separation Geotextile:	m²	3 200,00		
2P.5		Type B Protection Geotextile (1000g/m^2)	m²	1 600,00		
2P.6		Type B Protection Geotextile (800g/m^2)	m²	200,00		
		GEOSYNTHETIC LINERS				
		Supply of Geosynthetic Liners				
2P.7		Smooth-smooth HDPE geomembrane (1.5 mm thick)	m²	1 600,00		
2P.8		Textured one side HDPE geomembrane (1.5 mm thick)	m²	300,00		
		Installation of geosynthetic liners				
2P.9		Smooth-smooth HDPE geomembrane (1.5 mm thick)	m²	1 600,00		
2P.10		Textured one side HDPE geomembrane (1.5 mm thick)	m²	300,00		
		GEOSYNTHETIC CLAY LINER				
2P.11		Supply	m²	1 600,00		
2P.12		Install	m²	1 600,00		
		Anchor Trenches				
2P.13		600 x 600 anchor trench along liner edge and stability berm	m	120,00		
		Construct edge tie in details as shown on drawing				
2P.14		Tie into Cell 4A liner	m	120,00		
2P.15		Allowance for Thermo-couple & Strain Guage	Prov Sum	1,00	90 000,00	90 000,00
2P.16		b) Overheads, charges and profit on (a) above	%	90 000,00		
TOTAL SCHEDULE 2 - SECTION P: GEOSYNTHETIC LAYERS CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
		Schedule 3: Valley embankment lining: First lift				
	SABS 1200C	**Section C : Site clearance**				
	PSC 8.2.1	Clear and grub:				
3C.1		Valley Embankment slopes	m²	50,00		
3C.2		Pipeline and cable routes 2,0m wide	m	20,00		
	8.2.2	Remove and grub large trees and tree stumps of girth :				
3C.3		Over 1m and up to and including 2m	No	1,00		
TOTAL SCHEDULE 3 -SECTION C: SITE CLEARANCE CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200D	**Section D : Earthworks**				
		Valley Embankments				
	PSD 8.3.2	Bulk excavations				
	PSD 8.3.2(a)	Excavate in all materials and construct platform and berm/embankment or backfill or stockpile or dispose, including separation of material by type, as ordered by the Engineer.				
3D.1	PSD 8.3.2(a)	Excavate material unsuitable for CCL liner. Cut to stockpile from embankment area	m^3	100,00		
3D.2	PSD 8.3.2(a)	Cut to fill to shape, form, trim and level embankment sides and intermediate liner anchorage terraces.	m^2	50,00		
3D.3	PSD 8.3.2(a)	Cut to fill to form edge anchor berms.	m^3	105,00		
3D.4	PSD 8.3.2(a)	Cut to stockpile from embankment sides	m^3	300,00		
3D.5	PSD 8.3.2(a)	Cut to spoil from embankment sides	m^3	300,00		
3D.6	PSD 8.3.2(a)	Hand excavation in all material for other excavations as ordered by the Engineer (Provisional)	m^3	50,00		
3D.7	PSD 8.3.2(a)	Cut to spoil from excavation in waste materials to expose liner at Cell 4(A)	m^3	150,00		
3D.8	PSD 8.3.2(a)	Hand excavation in soft material and waste material for exposing the existing liner at Cell 4(A)	m^3	50,00		
	PSD 8.2.3 (b)	Extra-over PSD 8.3.2(a) for:				
3D.9	PSD 8.2.3 (b)	Hard rock excavation (Provisional)	m^3	20,00		
3D.9	PSD 8.2.3 (b)	Temporary stockpiling (Provisional)	m^3	100,00		
	PSD 8.2.3(c)	Constructing various special layers as required				
3D.10	PSD 8.2.3(c)	Rip and recompact 150mm in-situ soil layer to 95% Std. Proctor at 0% to +2% OMC	m^2	2 800,00		
3D.11	PSD 8.2.3(c)	150mm soil cement sub-grade layer	m^2	100,00		
	PSD 8.3.3	Restricted excavation				
	PSD 8.3.3(a)	Excavate for restricted foundations, footings, pipe trenches and open drains in all materials and use for backfill or embankment or dispose				
3D.12	PSD 8.3.3(a)	Excavate trench for embankment liner anchorage	m^3	350,00		
3D.13	PSD 8.3.3(a)	Excavations to open earth drains (Provisional)	m^3	100,00		
3D.14	PSD 8.3.3(c)	Special soil cement backfill to anchor trench	m^3	50,00		
	PSD 8.3.4	Importing of materials				
	PSD 8.3.4(a)	Extra-over PSD 8.2.3(c) for importation of materials from commercial sources or from borrow pits				
3D.15	PSD 8.2.4(a)	Sand for soil-cement layer	m^3	20,00		
	8.3.8.2	Dealing with services that are at risk because of the construction of the earthworks				
3D.16		Roads	Sum	1,00		
TOTAL SCHEDULE 3 - SECTION D: EARTHWORKS CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200 DE	**Section DE : Small Earth Dams**				
3DE.1	PSDE 8.3.4	Surface preperation of embankment to receive GCL and/or HDPE geomembrane with smooth drum roller	m^2	2 800,00		
	PSDE 8.3.5	Forming Embankment, Filters or Liner				
	PSDE 8.3.5	Extra-over PSDE 8.2.4 for importation of materials from commercial sources or from approved borrow pits				
3DE.2	PSDE 8.3.5(f)	53 - 38 mm stone for leachate collection layer	m^3	420,00		
TOTAL SCHEDULE 3 - SECTION DE: EARTHWORKS (SMALL EARTH DAMS) CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200 DK	**Section DK: Gabions and pitching**				
	8.2.2	Gabions, PVC coated, brown colour				
3DK.1		1.0m x 0.5m x 0.5m cage, at valley embankment anchor trench	m³	50,00		
3DK.2		Mattress, 0.3m thick	m³	5,00		
	8.2.5	Stone Pitching				
3DK.3		Storm water outlets	m²	20,00		
TOTAL SCHEDULE 3 - SECTION DK: GABIONS AND PITCHING CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	PB	**Section P : Geosynthetic layers**				
		GEOSYNTHETICS				
		GEOTEXTILES				
		Supply of geotextile				
3P.1		Type A Separation Geotextile for top of leachate collection layer and leachate detection layer	m²	5 600,00		
3P.2		Type B Protection Geotextile (1000g/m^2)	m²	2 800,00		
3P.3		Type B Protection Geotextile (800g/m^2)	m²	400,00		
3P.4		Type C geotextile to control erosion to side slopes (where required)	m²	500,00		
		Installation of geotextile				
3P.5		Type A Separation Geotextile for top of leachate collection layer and leachate detection layer	m²	5 600,00		
3P.6		Type B Protection Geotextile (1000g/m^2)	m²	2 800,00		
3P.7		Type B Protection Geotextile (800g/m^2)	m²	400,00		
3P.8		Type C geotextile to control erosion to side slopes (where required)	m²	500,00		
		GEOSYNTHETIC LINERS				
		Supply of geosynthetic liners				
3P.9		HDPE geomembrane, textured on one side (1.5mm thick)	m²	2 800,00		
3P.10		Type D Geogrid	m²	1 000,00		
		Installation of geosynthetic liners				
3P.11		HDPE geomembrane, textured on one side (1.5mm thick)	m²	2 800,00		
3P.12		Type D Geogrid	m²	1 000,00		
		GEOSYNTHETIC CLAY LINER				
3P.13		Supply	m²	2 800,00		
3P.14		Install	m²	2 800,00		
		ANCHOR TRENCHES				
3P.15		600 x 600 anchor trench along liner edge	m	220,00		
3P.16		Tie into Cell 4A liner	m	120,00		
		Additional seaming of geomembranes (Provisional Item):				
3P.17		a) Double hot wedge weld:	m	100,00		
3P.18		b) Extrusion fillet weld	m	100,00		
TOTAL SCHEDULE 3 - SECTION P: GEOSYNTHETIC LAYERS :CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
		Schedule 4: Stormwater				
	SABS 1200C	**Section C : Site clearance**				
	PSC 8.2.1	Clear and grub:				
4C.1		Stormwater channel	m²	50,00		
4C.2		Pipeline and cable routes 2,0m wide	m	150,00		
TOTAL SCHEDULE 4-SECTION C: SITE CLEARANCE CARRIED TO SUMMARY						

ITEM No.	PAYMENT CLAUSE	DECSRIPTION	UNIT	QTY	RATE	AMOUNT
	SABS 1200D	**Earthworks**				
4D.1	PSD 8.3.3(a)	Excavate trench for embankment liner anchorage	m³	280,00		
4D.2	PSD 8.3.3(a)	Excavation of Trapezoidal Stormwater channel	m³	210,00		
4D.3	PSD 8.3.3(c)	Special soil cement backfill to anchor trench	m³	280,00		
	PSD 8.3.4	Importing of materials				
	PSD 8.3.4(a)	Extra-over PSD 8.2.3(c) for importation of materials from commercial sources or from borrow pits				
4D.4	PSD 8.2.4(a)	Sand for soil-cement layer	m³	200,00		
TOTAL SCHEDULE 4-SECTION C: EARTHWORKS CARRIED TO SUMMARY						

SECTION	DESCRIPTION	AMOUNT
	SCHEDULE 1: GENERAL ITEMS	
A	GENERAL ITEMS	
AB	ENGINEERS OFFICE	
	SUB-TOTAL: SCHEDULE 1	
	SCHEDULE 2: BASIN FLOOR CONSTRUCTION	
C	SITE CLEARANCE	
D	EARTHWORKS	
DB	EARTHWORKS (PIPE TRENCHES)	
DE	EARTHWORKS (SMALL EARTH DAMS)	
LB	BEDDING (PIPES)	
LD	SEWERS	
P	GEOSYNTHETIC LAYERS	
	SUB-TOTAL: SCHEDULE 2	
	SCHEDULE 3: VALLEY EMBANKMENT LINING: FIRST LIFT	
C	SITE CLEARANCE	
D	EARTHWORKS	
DE	EARTHWORKS (SMALL EARTH DAMS)	
DK	GABIONS AND PITCHING	
P	GEOSYNTHETIC LAYERS	
	SUB-TOTAL: SCHEDULE 3	
	SCHEDULE 4: STORMWATER	
C	SITE CLEARANCE	
D	EARTHWORKS	
	SUB-TOTAL: SCHEDULE 4	
SUB-TOTAL Schedule 1: Preliminary & General		
SUB-TOTAL Schedule 2: Basin Floor Construction		
SUB-TOTAL Schedule 3: Valley Embankment Lining:First Lift		
SUB-TOTAL Schedule 4: Stormwater		
	SUB-TOTAL A	
	CONTIGENCIES (10% x SUB-TOTAL A)	
	SUB-TOTAL B	
	VALUE ADDED TAX (15% x SUB-TOTAL B)	
	TOTAL CARRIED FORWARD TO FORM OF OFFER	

C3: SCOPE OF WORK

C3.1. DESCRIPTION OF THE WORKS

This section forms part of the tender documentation for the proposed new general waste cell (Cell 4C) at the Oatlands General Waste Landfill, located approximately 5km due west of Margate on the south coast of KwaZulu Nata. The new general waste cell (Cell 4C) is to tie into an existing cell (Cell 4A) and is to be lined as per a Class B liner type as legislated by Regulation 636, National Norms and Standards for Disposal of Waste to Landfill, 23 August 2013. The Oatlands Landfill falls under the Ray Nkonyeni Municipality who own and manage the site which serves the surrounding communities.

C3.2. SCOPE OF THE WORKS

The new general waste cell (Cell 4C) is sited adjacent to an existing waste cell (Cell 4A). The site will remain operational during the construction period and landfilling operations are not to be impeded by construction activities. The construction of a general waste cell carries long-term significant environmental importance and therefore the construction of such a facility must be carried out by a suitably competent contractor who is familiar with the various key aspects related to landfill lining systems.

The scope of work includes but is not limited to:

- Removal of unsuitable material to spoil.
- Mass earthworks.
    - The removal of waste to expose the existing liner
    - Cut to fill % cut to spoil operations to develop the cell platform (base) and side-slopes.
- Placement of geosynthetic liners
    - Compacted Clay Layers – CCL, or (on in combination with)
    - Geosynthetic Clay Liners – GCL
    - High Density Polyethylene Geomembrane – HDPE GM
    - Geotextiles (separation and protection)
        - Woven
        - Non-woven
    - Geogrids
- Construction of leachate collection systems
- Construction of natural filter drains.
    - Leakage Detection/Sub-soil drains
- Construction of concrete lined solution trenches
- Laying, welding and pressure testing of HDPE pipeline(s).

C3.3. DRAWINGS

The drawings contained in this tender document form part of the tender documents and shall be used for tender purposes only. The work shall be carried out in accordance with the latest available revision of the drawings. Detailed construction drawings will be formally issued to the successful bidder after the works has been awarded.

Any information in the possession of the Contractor necessary for the Resident Employer's Agent to complete his as-built drawings shall be supplied to the Resident Employer's Agent before a Certificate of Completion will be issued.

Only figured dimensions shall be used and drawings may not be scaled unless so instructed by the Employers Agent. The Employers Agent will supply any dimensions which may have been omitted from the drawings.

The levels given on the structural drawings are subject to confirmation on the site, and the Contractor shall submit all levels to the Employers Agent for confirmation before he commences any structural construction work. This includes tie-in points to existing infrastructure, such as manholes, pipelines, and stormwater trenches. The Contractor shall also check all clearances given on the drawings and shall inform the Employer's Agent of any discrepancies.

The list of drawings applicable to this part of the works is shown below:

STRATEGIC STOCKPILE DRAWING LIST			
Drawing No.	**Revision.**	**Stage**	**DESCRIPTION**
5719-00-001	Rev A	Tender	Cell 4C Oatlands General Arrangement
5719-00-002	Rev A	Tender	Cell 4C - Layout
5719-00-003-2	Rev A	Tender	Cell 4C - Typical Section and Details With Geosynthetic Clay Liner
5719-00-004	Rev A	Tender	Cell 4C -Leachate Detection/Sub-Soil Drain

C3.4. PROJECT SPECIFICATIONS

C3.4.1. Standard Specifications

The most current revisions of the following SANS 1200 Standard Specifications for Civil Employers Agenting Construction shall form part of this Contract (these specifications are available at the Contractor's expense from the SA Bureau of Standards, 1 Dr Lategan Road, Groenkloof, Private bag X 191 Pretoria, 0001):

- SANS 1200 A: General
- SANS 1200 C: Site clearance
- SANS 1200 D: Earthworks
- SANS 1200 DB: Earthworks (Pipe Trenches)
- SANS 1200 DE: Earthworks (Small Earth Dams)
- SANS 1200 DK: Gabions and pitching
- SANS 1200 DM: Earthworks (Roads - Subgrade)
- SANS 1200 G: Concrete (Structural)
- SANS 1200 GA: Concrete (Small works)
- SANS 1200 L: Medium-Pressure Pipelines
- SANS 1200 LB: Bedding (Pipes)
- SANS 1200 LD: Sewers
- SANS 1200 LE: Storm water Drainage
- SANS 1200 M: Roads (General)
- SANS 1200 ME: Sub-base
- SANS 1200 MM: Ancillary Roadworks

C3.4.2. Variations to the Standard Specifications

Attention is drawn to the Particular Specifications below:

- Particular Specification PA: Variations to SANS1200
- Particular Specification PB: Supply and Installation of Geosynthetics

The letter after the letters "PS" in the numbering refers to the SABS 1200 Specification to which a particular variation applies. For example, Clauses numbered PSA apply to SANS 1200A, etc.

PA: Variation to standardized SANS 1200

SANS 1200A: GENERAL

PSA 3 Materials

PSA 3.1 Quality

Substitute the second sentence of the first paragraph of A 3.1 with the following:

Materials shall bear the official mark of the appropriate standard. The Contractor is responsible for the cost of all testing to ascertain that the materials do comply with the specified minimum requirements of the relative materials and no additional payment will be made for such testing.

The Contractor shall inform the Employers Agent of any control testing to be done timeously and at least 48 hours before such tests are required and must allow in his program for the time necessary for the tests and the processing of the results thereof. For testing that takes up more than two weeks, the Contractor shall provide a schedule to the Employers Agent for the testing from sampling up to the submission of the results.

PSA 5 Construction

PSA 5.1 Survey

PSA 5.1.1 Setting out of Works

Substitute the first sentence of A 5.1.1 with the following:

The works shall be set out as shown on the drawings.

Add the following to sub-clause to 5.1.1:

Setting out of the works is the sole responsibility of the Contractor and shall be done from fixed points as indicated on the drawings. The Contractor shall, within two (2) weeks after the site has been handed over to him, ascertain himself of the correctness of all points. Any discrepancy shall immediately be reported in writing to the Employers Agent. Any costs or subsequent costs arising from discrepancies that had not been reported to the Employers Agent within the aforementioned period shall be the sole responsibility of the Contractor.

Setting out of the works will not be measured and paid for directly, and compensation for the work involved in setting out shall be deemed to be covered by the tendered rates for the various items of work included under the contract.

PSA 5.2 Watching, Barricading, Electric Lighting and Traffic Crossing

Add the following to A 5.2:

All excavations must be marked with, reflective barricading tape and warning signs to satisfaction of the Employers Agent. In the case where deep excavations are in close proximity of moving machinery and vehicle traffic, a berm will be constructed to ensure access is restricted to only the designated entrance and exit points.

PSA 5.4 Protection of Overhead and Underground Services

Add the following to A5.4:

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

Detected existing services shall also be indicated on the "As-built" drawings.

Where the Contractor is responsible for the cost of repairs carried out by the Employer or others, the costs will be recovered by means of a deduction from the Contractor's monthly payment certificate.

PSA 7 Testing

PSA 7.4 Statistical Analysis of Control Tests

Substitute A 7.4 with the following:

Test results shall not be evaluated by statistical methods. All results shall comply with the specified minimum requirements of the materials concerned.

SANS 1200 D: EARTHWORKS

PSD 3 Materials

PSD 3.1 Classification of excavation purposes

PSD 3.1.2 Classes of excavation.

c) Hard rock excavation

Substitute the following this sub-clause with:

If hard rock excavation is encountered the Contractor shall notify the Employers Agent and prove that the excavation does not conform to soft and intermediate excavation which that case will lead to a design change of the basin levels. The Contractor shall timeously notify the Employers Agent of the suspected hard excavation to ensure the design can be modified to prevent any excavation of hard material.

PSD 3.2.1 Material Suitable for Embankments and Terraces

Add the following Sub-clause

The selected material must be free of roots, rocks, debris, organic and any other deleterious materials. This material is referred to as “silty-clay” or “silty sand” in this Project. For this purpose, and to comply with below specifications, the Contractor is to assume screening and processing of the material will be required to the requirements specified in Table 3, and to be priced accordingly.

Table 1: Material Properties & Testing Regime for Protection/Separation Layer

Material Property	Required Range	Test Method	Test Frequency
GRADING			
Max Particle Size (mm)	100% passing 6mm	COLTO TMH 1 – Method A1	1 per 10 000 m^2
Visual-Method Soil Classification	--	ASTM D2488	Continual during excavation and placement of soils
ATTERBERG LIMITS			
Plasticity Index	<10	COLTO TMH 1 – Method A2,3	1 per 10 000 m^2
SHEAR PROPERTIES (under Saturated Conditions)			
Internal Friction Angle	≥20 degrees	ISO 17892-10:2018	1 per 10 000m^2
COMPACTION (based on Procter Density)			
Nuclear Density Gauge	Min. 95% MDD	ASTM D6938	1 per 1 000m^2
Sand Replacement Test	Min. 95% MDD	ASTM D1556	1 for every 20 NDG Tests
Free of Roots, Debris, etc	--	Visual Inspection by CQAO	Prior to next layer being deployed

PSD 3.3 Selection

PSD 3.3.1 General

Substitute the second paragraph of D3.3.1 with the following:

The Contractor shall deal in such a way with materials from all excavations to ensure that suitable material is not contaminated with unsuitable material. If suitable material is contaminated, such contaminated material shall be removed and replaced with material of standard at least equal to the in situ suitable material, all at the Contractor's expense. No additional payment shall be made in respect of this and all relevant costs shall be deemed to be included in the tendered rates.

PSD 5 Construction

PSD 5.1 Precautions

PSD 5.1.1 Safety

PSD 5.1.1.2 Safeguarding of Excavations

Add the following Sub-clause after 2f):

The Contractor shall be responsible for the design and construction of measures to ensure stability of the excavation walls. Such designs shall be done by suitably qualified specialists and before the measures are implemented the designs shall be submitted to the Employers Agent for his information.

PSD 5.1.1.3 Explosives

The use of explosives will not be permitted unless expressly agreed to by the Client or an appointed representative.

PSD 5.1.2 Existing Services

PSD 5.1.2.2 Detection, location and exposure

Add the following to D5.1.2.2:

If existing services are not shown on the drawings but the existence thereof can be reasonably expected, the Contractor shall, in conjunction with all relevant authorities, determine the exact depth and location of such services before the commencement of construction.

After locating the exact position of services, whether indicated on the drawings or not, such services shall be deemed to be known services and the Contractor shall be liable for all costs and subsequent costs arising from the damage thereof as a result of the Contractor's activities. These services must also be indicated on the "As Built" drawings.

PSD 5.1.4 Nuisance

PSD 5.1.4.1 Dust Nuisance

Add the following to D5.1.4.1:

The Contractor is responsible for dust control and is liable for all claims that may result from dust nuisance on all parts of the site and at all times from the date of handing over of the site to the completion date of the contract. No payment regarding the above-mentioned will be made and all costs shall be deemed to be covered by the tendered rates.

PSD 5.1.4.3 Excavated Material not to endanger or interfere

Material excavated shall be placed in the spoil area designated by Ray Nkonyeni Municipality, an appointed representative or the Employers Agent. The material shall be spread evenly over the area as the work proceeds in such a manner that its surface remains free draining. Any dumping which occurs outside the designated area will be removed to the proper area at the Contractor's cost. Material suitable for backfilling where required shall be stockpiled separately for later re-use.

PSD 5.2 Methods and Procedure

PSD 5.2.1.2 Conservation of topsoil

Remove the last sentence of D5.2.1.2 and add:

The designated areas for stockpiling of topsoil will be provided by the client and will be stockpiled accordingly. The removal of topsoil shall only occur in areas approved by the Employers Agent.

PSD 5.2.3 Placing and Compaction

PSD 5.2.3.1 Embankments and Fill

Add the following clauses to D5.2.3.1

A production lot shall be taken to mean a portion of fill in a particular zone of the embankment placed and compacted in one process, using material from a single zone in the excavation. If production continues uninterrupted, a production lot will usually be taken as the product of one day's work and shall not exceed two days production. A production lot of reduced quantity will be assumed, if:

- the fill material being used shows abnormal variation in quality,
- an area is obviously of lesser quality than the rest,
- a very high production rate is maintained.

Density tests shall be carried out within twenty-four (24) hours of completion of compaction on the particular layer concerned. The results thereof shall be submitted to the *Employers Agent* without delay, in any case not later than 24 hours after these become available.

The report will include:

- Time of compaction
- Time of testing
- Description of position of testing in either co-ordinates or chainage and offset from centre line of the wall.
- Prevailing weather conditions

The acceptance criteria for density test results for fill and in-situ compaction shall be as follows:

Specified Density	Minimum Average Density for Number of Tests						Minimum Value of any Single Test in a lot of:					
% of STD	4	5	6	7	8	9+	4	5	6	7	8	9+
93	93.1	93.4	93.6	93.7	93.9	94.0	89.4	89.2	89.0	88.9	88.8	88.7
95	95.1	95.4	95.6	95.7	95.9	96.0	91.4	91.2	91.0	90.9	90.8	90.7
98	98.1	98.4	98.6	98.7	98.9	99.0	94.4	94.2	94.0	93.9	93.8	93.7

- A production lot is defined as a maximum area of approximately 600 m^2.
- For control testing the following procedure will be followed for each production lot:

- Sample materials at the centre of each of the four quadrants of the perceived borrow area to be used for the production lot.
- Carry out Std. Proctor Maximum Dry Density and Optimum Moisture Content tests as well as in-situ moisture content tests on all four samples and obtain average values for Std. Proctor M.D.D. and O.M.C.
- Carry out 16 in-situ field density and moisture content tests evenly spaced on each production lot.
- Obtain average in-situ density and average in-situ moisture content.
- Production lot passes if the average in-situ density is ≥ 96% of the average Std. Proctor M.D.D. and a minimum recorded single value of 90.7% of Std. Proctor M.D.D. as per table above for more than 9 tests. The moisture content must be between -2% and +2% of average O.M.C.

If the production lot does not conform to the above criteria re-compact or adjust moisture content and re-compact until the above criteria are met

PSD 5.2.3.2 Backfilling of Trenches and Backfilling of Filling against Structures

Replace the second paragraph of D5.2.3.2 with:

Where shown on the detail design drawings or as instructed by the Employers Agent all trenches and excavations around structures shall be carefully backfilled with suitable approved excavated material from the basin in layers not exceeding 150mm.

When placing backfill and fill, the following precautions shall be taken:

In so far as it is possible, the material shall be placed simultaneously to approximately the same elevation on both sides of a structure or structural member where appropriate. If conditions require that backfill for fill be placed appreciably higher on one side than on the opposite side, the additional material on the higher side shall not be placed until authorised by the Employers Agent and preferably not until the concrete had been place for 14 days, or until tests show that the concrete has attained sufficient strengths to withstand any pressure safely that has been created by the backfill or fill or by the method of construction.

- The material behind structural members restrained at the top by the superstructure, e.g. portal-type structures, shall be placed as stated on the Drawings or as directed by the Employers Agent.
- The material behind the walls of concrete culverts shall not be placed until the top slab has been placed and cured, unless otherwise authorised by the Employers Agent.

Excavated areas around structures, between the structure and the vertical walls of surrounding excavation, shall be backfilled with suitable approved material from the basin excavation in horizontal layers not exceeding 150mm in depth after compaction, to the level of the original ground surface or to the level specified on the Drawings.

Each layer shall be moistened or dried to the optimum moisture content for the material and be compacted to a density of not less than 90% of modified AASHTO density, except that, in a road prism, the material shall be compacted to a density of not less than 95% Standard Proctor density at -2% to +2% OMC. In cases where backfill next to structures such as the leachate collection and leakage detection drain outlet pipe structures occur the compaction shall be 98% Standard Proctor density at -2% to +2% OMC.

PSD 7 Testing

PSD 7.2 Taking and Testing of Samples

Add the following to sub-clause D 7.2:

The frequency of testing to satisfy conformance of the materials used in the construction activities are as follows:

- A minimum of one sample for every 2500 m^3 of material placed for any construction activity, to determine the material conformance in terms of grading, Atterberg limits and Standard Proctor density at OMC.
- A minimum of one sample for every 2500 m^2 of material placed for any construction activity, with the exception of pipe trenches which shall be every 50 m^3 to determine the conformance of the compaction

specification of the material. The material density shall be measured with a nuclear density apparatus, and any penetrations of the compacted clay layer shall be backfilled with similar material. One corresponding sand replacement test shall be carried out for every 10 nuclear density tests conducted.

- The accuracy of any nuclear density meter shall be proved by performing at least five comparative nuclear density and sand replacement tests on each type of soil used in the embankment and clay liner before the results of the nuclear density meter will be accepted as valid. Thereafter the correlation between the nuclear density meter and sand replacement tests shall be reviewed on a fortnightly basis.
- Each nuclear density meter shall be required to have a certificate provided by the supplier of the machine stating that the machine is in good working order. Each density meter shall be re-calibrated by the supplier at least once a year. Certificates of proof of re-calibration will be required.
- In the event of disagreement on the quality of compaction, results of sand replacement tests shall be accepted in preference to nuclear density meter test results.
- A minimum of one sample for every 2500 m^2 of material placed for any construction activity, with the exception of pipe trenches which shall be every 200 m^3 to determine the material classification in terms of the COLTO or TRH 14 specification.
- A minimum of one in situ permeability test for every 25 00 m^2 of compacted clay layer that is placed to determine the conformance of the material to the permeability requirements. The in-situ permeability can be determined by the use of a double ring infiltrometer.
- All test results to be kept on file. A copy thereof shall be submitted to the Employers Agent upon completion of each test for the full duration of the contract.

SANS 1200 DE: SMALL EARTH DAMS

PSDE 3 Materials

PSDE 3.2.2 Filter Materials

Add the following clauses to 3.2.2(d):

Leachate Collection Layer

Stone aggregate leachate collection layer shall be a minimum 150mm thick layer of natural gravel or crushed stone material, screened to 53mm rubble obtained from commercial sources. The minimum allowable particle size shall be 38 mm, with an aggregate crushing value in excess of 29. The stone layer will be thicker over pipework, as indicated on the drawings. The material shall have an internal friction angle equal to or greater than 25˚.

Natural filter Drains

Layer thicknesses of the filter drains to be confirmed by excavation of test holes into each layer at a nominal spacing of 25 lineal metres, these holes are to be witnessed by the Employers Agent.

The Contractor is to submit all test results (gradings and thicknesses) for the section of drain under construction for each individual layer, this is to be approved and signed off by the Employers Agent prior to placing the next layer.

19 mm Stone

The 19 mm stone shall be a hard, durable, single sized crushed stone complying with the following grading:

Sieve Size [mm]	**Material Passing [%]**
26.5	50 - 100
19.0	10 - 100
13.2	0 - 65
9.5	0 - 20
6.7	0 - 10

6.7 mm Stone

Pea gravel shall be a hard, clean and durable crushed stone and shall comply with the grading envelope shown below.

Sieve Size [mm]	**Material Passing [%]**
9.5	70 - 100
6.7	45 – 95
4.75	30 - 75
2.36	0 - 40
1.18	0 - 10

Filter sand

Filter sand shall consist of clean hard particles and shall comply with the grading envelope shown below.

Sieve Size [mm]	Material Passing [%]
19.0	85 - 100
9.5	70 - 100
6.7	70 - 100
4.75	60 - 100
1.18	25 - 95
0.6	10 - 55
0.3	0 - 25
0.15	0 - 10

Please note that the above envelopes are subject to change and will be formalised once the conditions on site have been established and confirmed.

PSDE 3.2.5 Compacted Clay Liner (CCL)

Add the following clause

Where natural clay is to be used for compacted clay liners (CCL) layers, whether the clay be locally sourced from the site or commercially obtained, The clay is to fall within the following requirements and must achieve a minimum permeability of 1 x 10^{-7} cm/s:

Grading		**Limits**
Passing 0.425 mm sieve	%	60 - 100
Percentage clay (0.002 mm)	%	20 - 35
Atterberg Limits		
Liquid Limit	%	30 - 60
Plasticity Index		10 - 30
Linear Shrinkage	%	4 - 14
Compaction (Std Proctor)		
Optimum Moisture Content	%	10 - 25
Maximum Dry Density	kg/m^3	1350 - 1850

PSDE 5 Construction

PSDE 5.2.2.2 Preparation of exposed surfaces

Add the following Sub-clause:

All excavations shall be inspected and approved by the Employer's Agent before any construction (including earth embankment, casting of foundations, placing of blinding and laying of pipework under structures) is commenced.

Should some areas of the exposed surface prove to be too rough (containing sharp rock edges etc.) that may inhibit proper compaction of the first embankment layer, those areas shall be smoothened, and crevices filled with mass concrete grade 10/20 to the satisfaction of the Employer's Agent.

PSDE 5.2.3.2 Embankment

Add the following Sub-Clause to DE 5.2.3.2:

(j) The construction of the CCL (in the landfill basal lining) layers shall be done in 150mm lifts or as otherwise indicated on drawings and suitably compacted to achieve the permeability requirements. Compaction must not be less than 95% MDD -2% to +2%. The CCL once completed may not be allowed to dry, erode (through wind or water) and desiccate (crack). The Civil Contractor must ensure the completed layers are kept moist and suitably protected. Survey and required compaction tests (for each layer) are to be completed within 24 hours of the layer being completed. Voids created in the CCL layer(s) during construction (including, but not limited to, penetrations for test samples, grade stakes, and other penetrations necessary for construction) shall be repaired by placing suitable clay and compacting it in place in lifts no thicker than 50 mm and tamping each lift with a steel rod. Each lift shall be tamped a minimum of 25 times altering the location of the rod within the void for each blow. This method may not be employed in areas where desiccation (cracking) has occurred. In areas where desiccation has occurred the entire layer is to be re-processed by the Civil Contractor and retested, if requested by the Employer's Agent. Obtain compacted clay liner material from the approved excavation or borrow location. The CQAO will promptly notify the Main Contractor as well as the Employer's Agent of test results that affect the work. In the event of failing tests, Employer's Agent to verify that the Contractor adequately reworks the areas which do not meet the Project Specifications. The CQAO will also verify that the CQA survey has been completed and that the Record Drawing furnished by the surveyor indicates compliance with the lines, grades, elevations, and tolerances as indicated by the Project specifications.

PSDE 5.2.3.3 Rockfill, riprap, drains and filters

Add the following Sub-Clause to DE 5.2.3.3:

Care must be taken when placing gravel and sand material on any geosynthetic ensuring that the underlying geosynthetic is not damaged during placement.

PSDE 5.2.5.1 Free haul

Add the following Sub-Clause to DE 5.2.5.1:

Any material movement whether by truck or any other method of transport on the designated site area, which is from the designated stockpile areas (within the site boundary) shall be considered as free haul and should be allowed for in the tendered rates.

PSDE 7 Testing

PSD 7.2 Taking and Testing of Samples

Add the following to sub-clause DE 7.2:

Compacted Clay Liner

CQA observation and/or testing is required during construction to verify that the compacted clay liner construction is in accordance with the Project Specifications.

The tests to be performed, including testing frequency, are presented in Table 2. The testing frequencies specified in Table 2 may be increased when construction conditions warrant additional tests.

Table 2: Material Properties & Testing Regime for Compacted Clay Liner Layer

Material Property	**Required Range**	**Test Method**	**Minimum Assurance/ Test Frequency**	**QC Testing**

GRADING				
Max Particle Size (mm) – BASAL LINING	100% passing 6mm	COLTO TMH 1 – Method A1	1 per 2 500 m^2	As per SANS 1200D
Percentage Passing 0.075mm Sieve	≥ 35%	COLTO TMH 1 – Method A5, A6	1 per 2 500 m^2	As per SANS 1200D
Visual-Method Soil Classification	--	ASTM D2488	Continual during excavation and placement of soils	As per SANS 1200D
ATTERBERG LIMITS				
Plasticity Index	3<x<30	COLTO TMH 1 – Method A2,3	1 per 2 500 m^2	As per SANS 1200D
SHEAR PROPERTIES (under Saturated Conditions)				
Internal Friction Angle	≥18 degrees	ISO 17892-10:2018	1 per 2 500m^2	As per SANS 1200D
Drained Cohesion	≥ 5 kPa		1 per 2 500m^2	As per SANS 1200D
PERMEABILITY (BASAL LINING), compacted in place at OMC +-2%				
Falling Head Permeator (at 30 kPa Confining Pressure)	< $1x10^{-6}$ cm/s	ISO 17892-11:2019	1 per 25 000m^2	As per SANS 1200D
Double Ring Infiltrometer	Min. 95% MDD	ISO 22282-5:2012	1 per 2 500m^2	As per SANS 1200D

The frequency of testing to satisfy conformance of the materials used in the construction activities are:

- 1) A minimum of one sample for every 2500 m^2 of material placed for any construction activity, to determine the material conformance in terms of grading, Atterberg limits and Standard Proctor density at OMC.
- 2) A minimum of one sample for every 200 m^3 of material placed for any construction activity, with the exception of pipe trenches which shall be every 50 m^3 to determine the conformance of the compaction specification of the material. The material density shall be measured with a nuclear density apparatus, and any penetrations of the compacted clay layer shall be backfilled with similar material. **Note**: The Contractor shall be required to perform at least 3 density check tests per day on the CCL layers at positions approved by the Employer's Agent.
    - The accuracy of any nuclear density meter shall be proved by performing at least five comparative nuclear density and sand replacement tests on each type of soil used in the embankment and clay liner before the results of the nuclear density meter will be accepted as valid. Thereafter the correlation between the nuclear density meter and sand replacement tests shall be reviewed on a fortnightly basis.
    - Each nuclear density meter shall be required to have a certificate provided by the supplier of the machine stating that the machine is in good working order. Each density meter shall be re-calibrated by the supplier at least once a year. Certificates of proof of re-calibration will be required.
    - In the event of disagreement on the quality of compaction, results of sand replacement tests shall be accepted in preference to nuclear density meter test results.
- A minimum of one sample for every 2500 m^2 of material placed for any construction activity, with the

exception of pipe trenches which shall be every 200 m^3 to determine the material classification in terms of the COLTO or TRH 14 specification.

- A minimum of one in situ permeability test for every 22 500 m^2 (the frequency of testing is calculated using a layer thickness of 150mm) of compacted clay layer that is placed to determine the conformance of the material to the permeability requirements. The in-situ permeability can be determined by the use of a double ring infiltrometer.
- 5All test results to be kept on file. A copy thereof shall be submitted to the Employers Agent upon completion of each test for the full duration of the contract.

Filter Materials

Once a suitable source has been identified and approved, testing to confirm ongoing conformance of the materials is to be undertaken at a rate of 1 test per 10,000m^2 except in pipe trenches where conformance shall be undertaken at 1 test per 100m^3 of material placed. The testing regime may be altered at the discretion of the Employers Agent based on the materials variability and shall be done so in writing.

SANS 1200 L: MEDIUM PRESSURE PIPELINES

PSL 2 Interpretations

PSL 2.2 Application

Add the following to L 2.2:

The following specification will be applicable to High Density Polyethylene (HDPE) solid and perforated (slotted) pipes.

PSL 3 Materials

PSL 3.12 HDPE pipes material quality.

Unless specified otherwise in the detailed design drawings the HDPE used shall be PE 100 pipes Class 10 for solid pipes.

SANS 1200 LB: BEDDING (PIPES)

PSLB 1 Scope

Add the following to LB 1.1:

This specification also covers the bedding required for HDPE pipes.

PSLB 3 Materials

PSLB 3.1 Selected Granular Material

Substitute LB 3.1 with the following:

Selected granular material shall be an aggregate, sand or granular material, all of a non-cohesive nature and free from any organic material, of which the grading analysis shows 100 % passing a 13,2 mm sieve and not more than 5 % passing a 0,075 mm sieve.

PSLB 3.3 Bedding

Add the following to LB 3.3:

All pipes shall be classified as flexible pipes and shall be laid on the appropriate bedding unless specified otherwise in the detailed Employers Agenting drawings.

SANS 1200 LD: SEWERS

PSLD 1 Scope

Add the following to LD 1.1:

This specification also covers the HDPE pipes and fittings for both leachate management and leak detection.

PSLD 3 Materials

PSLD 3.1 General

Add the following:

The Contractor shall provide adequate storage facilities for pipes, couplings and specials to conform to the following:

Stacking of pipes:

When stacking of the pipes are necessary, the Contractor shall make the necessary arrangements for stacking areas, and shall stack as recommended by the manufacturer

PSLD 3.1.8 HDPE slotted drainage pipes (for leak detection)

Add the following to LB 3.1.8:

HDPE slotted drainage pipes shall be so called “double-wall” pipes with a corrugated outside and smooth inside with minimum ring stiffness of 450 kPa. Pipes shall be manufactured from a High-Density Polyethylene and the slots shall be approximately 1.0mm wide and full thickness of pipe wall. They shall have a total open surface area of greater than 2500 mm2/m for 75mm diameter pipes and greater than 5000mm2/m for other pipes. Function of this pipe is to receive liquid flow, through the slots into the pipe and the liquid flow to travel along invert of pipe, under gravity, to the pipe outlet. Pipe will be machine manufactured, complete with slots.

Joints shall be made by means of push fit couplings supplied by the pipe manufacturer. All pipes shall be classified as flexible pipes and shall be laid on the appropriate bedding unless specified otherwise in the detailed Employers Agenting drawings.

PSLD 3.1.9 HDPE solid wall drainage pipes

Add the following to LB 3.1.9:

HDPE solid drainage pipes shall be manufactured from a High-Density Polyethylene and shall conform to PN10 PE100, according to SANS/ISO 4427:2008.

Joints shall be made by the butt-welding process.

PSLD 3.1.10 HDPE solid perforated drainage pipes (for leachate collection)

Add the following to LB 3.1.10:

The pipes shall be as for “HDPE solid wall drainage pipes” with the 12mm diameter holes drilled on three sides of the pipe (not the invert) at each interval, every <500mm of pipe length. See drawing for perforation construction detail.

PSLD 4 Plant

PSLD 4.2 Setting Out

Add the following:

The equipment used for setting out and the setting out process itself shall not in any way damage the underlying geosynthetic sheets. To prevent accidental damage to the geosynthetic liners, no steel pegs shall be allowed near to the working area and the lines and levels of the pipework is to be set out with alternative non-damaging methods.

PSLD 5 Construction

PSLD 5.2.3 Method

Add the following to LD 5.2.3:

No excavation of trenches for the pipework shall be allowed above the geosynthetic lining system except by hand under strict supervision. Preferably, sandbags are to be placed on the geosynthetic liner in the positions of the pipework prior to the commencement of the placement of the sand layers. The sand layers shall be placed around the sandbags.

The sandbags are then to be carefully removed by hand and a 50mm clean selected sand bedding layer placed by hand into the trench and lightly compacted with a light vibrating plate compactor. Special care shall be taken to prevent any damage of the underlying geosynthetic liner and no “hand tamping” compaction methods shall be permitted. The sand is to be selected clean sand from a location on site approved by the Employer’s Agent. Sieving of the sand may also be required and shall be done only upon written instruction by the Employer’s Agent.

The pipe shall then be carefully placed by hand onto the bedding layer and the selected clean fill material placed by hand and compacted around the pipe. At this stage “hand tamping” shall be permitted.

PSLD 5.3 Sewers to be kept clean

Add the following to LD 5.3:

The interior surfaces of all pipes, specials, valves and fittings shall at all times be kept free from dust, silt, foreign matter and access by rodents, animals and birds shall be prevented. Pipes and specials shall not be used as shelters by staff or for the storage of garments, tools, materials, food containers or similar goods. Particular care shall be exercised at all times to prevent faecal contamination of pipe interiors by staff, casual visitors or passers-by.

Night-caps approved by the Employer’s Agent shall be used to close off all ends of each laid section of pipeline when work is stopped at the end of the day or for longer periods and shall be left on the ends of sections of completed pipework until such sections are tied-in with the remainder of the completed pipeline.

Notwithstanding the use of night-caps, the Contractor shall at his own expense make good all damage to pipe linings and fittings caused by the ingress of dirty water, silt, sand, debris, vermin, insects and other foreign matter. The Contractor shall at his own expense and to the satisfaction of the Employer’s Agent clean the interior of the pipeline of such contaminants, failing which the Employer’s Agent may order the Contractor to remove the pipes from the trench and replace them with clean pipes.

PSLD 5.4 Connecting into existing manholes and mains

Add the following sub-clause to LD 5.4.1:

The Contractor is reminded that under no circumstances shall the connections into "live" manholes or live drainage systems (pipes or the like) be made without prior written consent of the Employer’s Agent.

The Contractor shall allow in the sum tendered for the appropriate item in the Schedule for all costs connected with the making of this connection.

PSLD 5.6 Manholes

Add the following sub-clause to LD 5.6:

Notwithstanding the requirements of Sub-Clause 5.6 manholes constructed of precast concrete rings shall have watertight joints.

PSLD 5.11 Pipe laying with high water table

Add the following sub-clause to LD 5.11:

Where a high-water table is encountered, and a probability exists of water entering the trench after the pipeline has been laid, the Contractor will be permitted to bed and lay the pipes and backfill sufficiently to prevent floatation, prior to testing.

"High water table" shall also means perched systems and liquid-waste encountered.

PSLD 5.12 Thrust blocks

Add the following sub-clause to LD 5.12:

All thrust blocks shall be cast against undisturbed material or otherwise agreed with the Employer's Agent. In the event of the Contractor over-excavating, Contractor shall carry the cost of any additional concrete required to comply with this provision.

Prior to casting any thrust blocks, the Contractor shall notify the Employer's Agent who shall inspect the nature of the ground against which the thrust block is to be cast and either confirm that the specific conditions do not differ from those on the basis of which the thrust blocks shown on the drawings were designed or instruct the Contractor to alter the dimensions of the thrust block to suit the actual ground conditions.

Any pipe laid on a gradient exceeding 15% shall be anchored as directed by the Employer's Agent.

PSLD 7 Testing

PSLD 7.1 General

Add the following sub-clause to LD 7.1.6:

The Employer's Agent shall use the water test for testing the solid-wall pipes.

The hydraulic tests shall not be carried out within 24 hrs after the last concrete anchor block in the section to be tested has been cast.

All completed pipework sections shall be satisfactorily tested hydrostatically and no payment in respect of pipefitting or the supply of pipes and fittings on any section of pipeline shall be made until such tests have been completed.

Hydrostatic tests shall be carried out on approved suitably sized completed sections of the works as pipefitting proceeds.

The Contractor shall be responsible to arrange all aspects of the hydrostatic testing and for the supply of all equipment, material, water for testing and labour required.

Joints shall, except where otherwise approved, be exposed during testing. Care shall be taken to strut and support the pipework wherever necessary during testing.

The pressure shall be applied by a manually operated force pump or by a power driven pump which shall not be left unattended during testing. The Contractor shall ensure that pressure gauges are accurately calibrated before testing commences and precautions shall be taken to ensure that the quantity of make-up water pumped into the pipework during testing is measured.

The test pressure applied to the section of mains being tested shall be such that the pressure in any pipe or fitting in the section does not exceed its specified pressure rating.

If any hydrostatic test result is unsatisfactory in any regard, the Contractor shall carry out all necessary remedial measures to approval and the test shall be repeated, all at his expenses.

Water used for hydrostatic testing shall be disposed of in an approved manner without causing damage, nuisance or injury.

The Contractor shall allow for the cost of all labour, equipment, water for testing and material for hydrostatic testing in the Scheduled Rates for supply and laying of pipes and supply and laying of fittings and no separate payment will be made in respect of hydrostatic testing.

PSLD 7.2 Tests and acceptance/rejection criteria

PSLD 7.2.6 Watertightness of manholes

Add the following sub-clause to LD 7.2.6:

“Manhole” also means leachate collection system manholes and any leak detection system manholes.

A watertightness test will be called for by the Employer’s Agent at the Contractor's expense on every manhole as follows:

The manhole shall be tested by filling internally to cover level with water. After allowing sufficient time for absorption, the loss of water over a one-hour period shall be equivalent to the volume of water which has to be added to return the water level to its original position. The manhole will have passed the test provided the volume measured is less than the equivalent of 0,40 litres per millimetre of nominal diameter of manhole per metre depth from cover level to invert per one hour period. Rectification, if necessary, is to be carried out by the Contractor at his own expense.

All of the manholes so tested shall pass the test. If they do not pass then all the manholes shall be tested at the Contractor's expense.

The test pressures on pipelines and manholes which have been backfilled shall be increased by the equivalent of the exterior hydrostatic pressure caused by surrounding ground conditions.

The Contractor shall provide all the necessary testing apparatus and materials and shall carry out the tests. The Contractor shall request the Employer’s Agent to observe only when he himself is satisfied that the manhole will pass the test.

PB: SUPPLY AND INSTALLATION OF GEOSYNTHETICS

Construction of the specified geosynthetics must be in accordance with the approved Project Drawings and Project Specifications. This Quality Assurance program consists of reviewing Geosynthetics Manufacturer's and Installer's Quality Control submittals, material conformance testing, and construction monitoring and testing.

The types of geosynthetics used in the barrier system construction include geotextile, geogrid, geomembrane and HDPE pipes and fittings. These geosynthetics are defined in the Project Specifications. Prior to and during construction, these geosynthetics shall be sampled and tested to determine if they conform to the Project Specifications. All geosynthetic conformance testing shall be the responsibility of the Geosynthetic Installer and CQAO or independent CQAO Auditor.

PB: 1. QUALITY CONTROL PROCESS

Quality Control from the Geosynthetic Manufacturer is critical to the success of the barrier system installation. The QA process extends beyond construction in this regard and must be applied as early as possible. For this reason, QA is in an inherent part of the tender conditions, in order to ensure that a Geosynthetic Manufacturer and Installer that are selected for the project have the necessary expertise to execute the work to the required standard.

PB: 2. AT TENDER STAGE (STAGE 4, PROCUREMENT PROCESS)

Certain Functionality Criteria form part of the Tender Document issued by Ray Nkonyeni Municipality (complying with their own internal policy, as well as the MFMA and PFMA) with the tender to comply with the following conditions, to be considered for award of the contract:

PB : 2.1. Specialist Works – Geosynthetic Membrane (supply / manufacture, installation and surveying).

The tendering entity or the tenderer's proposed sub-contractors, must show compliance to the requirements listed as follows:

<u>Geosynthetic Membrane (GSM) Manufacture</u>

- Details of the Manufacturer(s) (i.e., name, company registration, location etc.)
- Information on plant size, equipment, number of shifts per day, and capacity per shift,
- List of material properties, including certified test results (to be supplied if requested by the Employer).
- Completed Projects; provide details of completed projects for material manufactured where the geomembrane materials are equal to that described below:
    - **For HDPE smooth-smooth geomembrane:** Completed projects totalling a minimum area of 500,000 m^2 for which the Manufacturer has manufactured geomembrane materials equal to that proposed to be used for this Contract.
- It is required that the Manufacturers of the geosynthetic membranes have ISO 9001:2015 or valid preceding ISO certification.

<u>Geosynthetic Membrane (GSM) Installation</u>

The Installer must be trained and qualified to install the GSM's specified in this Contract. If the Contractor is not an installer with the necessary experience and qualification, then a suitably qualified firm of installers must be sub-contracted.

The following information regarding the GSM Installer(s), as a minimum, must be completed/submitted with the Tender

- Corporate background and information and declare ISO 9001:2015 or valid preceding ISO certification.
- Information on equipment, personnel and anticipated daily production (to be completed).
- Written confirmation that all design features, Specifications, and requirements of the CQA Plan can be

complied with.

- Completed Projects: Provide details of completed projects for which the Installer has installed similar geomembranes with a minimum total area of 100,000 m^2 being installed.
- The Installation Supervisor must be qualified by experience. The Installation Supervisor must have supervised the installation of a minimum of 100,000 m^2 of geosynthetic membrane.

PB: 3. AT ADJUDUCATION STAGE (STAGE 4, PROCUREMENT PRROCESS)

At adjudication stage, the Employer's Agent reviews the information submitted by each tenderer and confirms whether the information submitted is compliant with the requirements. This "pre-screening" eliminates unqualified manufacturers or installers from being awarded the work. In particular for the Class A Barrier System specified in this Contract, an experienced installer and manufacturer is essential due to the associated risks of non-containment of the leachate.

PB: 4. AT CONSTRUCTION STAGE (STAGE 5, Administration and Inspection)

Prior to geosynthetic installation, the Employer's Agent (or CQAO) and independent CQAO Auditor review the Geosynthetic Installer's Quality Control Program to confirm that testing regime and QC process aligns with the National Standards and Specification. The CQAO or Employer's Agent shall review the following for each geosynthetic material specified for the Project:

- Geosynthetic material samples, and minimum material specifications which shall include the Manufacturer's minimum physical properties of the material, test methods (ASTM Standards) used, and factory seaming methods
- The origin (supplier's name and production plant), identification (brand name and number) and material properties of the resin used to manufacture the product,
- Geosynthetics Installer's Quality Control Manual, for the installation and testing of the geosynthetic,
- A copy of each of the Quality Control Certificates on each lot of resin issued by the resin Supplier for the specific material for this project. Geomembrane submittals shall include certification of the resin for extrusion welding rod,
- The result of quality control testing conducted on the resin used in manufacturing the specific material for this project,
- A list which correlates the resin to the individual geosynthetic rolls and extruded materials
- A copy of the geosynthetic roll Quality Control Certificates which shall be supplied at a minimum frequency of one 1 per every 5, 000 square meters of geosynthetic material continuously produced and supplied to the project unless otherwise presented in the Construction Specifications,
- A panel layout drawing for geomembrane showing the proposed installation layout identifying field seams as well as any variance or additional details which deviate from the Construction Drawings
- A detailed installation schedule for the project,
- Certification that the extrusion welding rod to be used is comprised of the same resin type as the geomembrane to be used (geomembrane only)

PB: 5. CONFORMANCE TESTING

Conformance Testing will be performed and approved prior to shipment and also on arrival of material on site. Durability tests are to be conducted as soon as the material is manufactured.

Conformance Testing may, at the discretion of the Employer's Agent, be carried out by an independent laboratory (QCA laboratory). Conformance testing is not an opportunity to reproduce the QC testing program. It is a check to provide confirmation that satisfactory material is delivered to the site. The name and address of the laboratory shall be approved by the Employer's Agent. The Employer's Agent has the right to reject any roll or production batch if the samples do not pass the conformance testing.

The Employer's Agent shall mark the machine direction and roll number on the sample, and date the sample was obtained and forward the sample to the geosynthetic laboratory. All conformance tests shall be performed in accordance with the Construction Specifications.

The CQAO (or Employer's Agent) along with the CQAO Auditor shall review the test results and shall report any non-conformance to the Project Manager and the Installer.

PB: 6. GEOSYNTHETIC CONSTRUCTION MONITORING AND TESTING

The GSM manufacturer shall issue Quality Control submissions to the Employer's Agent and CQA officer for each delivery of material. The submissions shall include the following information:

Prior to the shipment of any geomembrane, the Manufacturer will provide the CQAO (or Employer's Agent) with the following:

- A certified properties sheet including, at a minimum, all specified properties (parameters), and test methods indicated in the specifications,
- A list of quantities and descriptions of materials other than the base polymer which comprise the geomembrane, and
- The internal MQC sampling procedures, frequencies of testing, and results of testing of material supplied to the project.

The CQAO (or CQAO Auditor) will verify that:

- The property values certified by the Manufacturer meet all of the Project specifications; and
- The measurements of properties by the Manufacturer are properly documented, the test methods used are acceptable, and the geomembrane meets the Project Specifications.
- GSM Manufacturer Tracking List - Cross-referencing list delineating the corresponding lots for the materials used in the production of the rolls delivered.
- Manufacturing Quality Control Data - The manufacturing quality control test data indicating the actual test values.
- Physical Properties Sheet - The material specification for the geomembrane supplied in accordance with this specification.
- Letter of Certification - The letter indicating that the material is in conformance with the physical properties specified.

PB: 7. ALL GEOSYNTHETIC INSTALLATIONS

The CQAO (or Employer's Agent) along with the CQAO Auditor, will ensure that the Main Contractor is, at **MINIMUM,** undertaking the following checks for all geosynthetic installations. More emphasis or detail may be added to these checks in subsequent sections:

- Delivery and unloading of geosynthetic materials to the site to verify that the materials are not damaged and are properly labelled,
- Obtaining geosynthetic packaging identification slips for verification and generation of an on-site materials inventory
- Subgrade conditions prior to liner installation and verify that any deficiencies (e.g. surface irregularities, protrusions, excessively soft areas, stones, desiccation cracks) noted are corrected,
- Verification that the Employers Agent has reviewed completed surveys,
- Handling of geosynthetic materials from storage to the work area,
- Temporary and permanent anchoring of geosynthetics to verify that Project Specifications are met,
- Verification that required overlap distances are met,
- A record of all incidents such as storms and fires which may have an influence on materials properties.

PB: 8. TRIAL PADS

Trial Pads are a useful tool in order to practice and refine installation conditions for site specific materials and conditions. For the purposes of this project, a trial pad is not required due to the high level of expertise called for as part of the tender process for the Geosynthetic Installer.

Should the Employer, Design Employers Agent and CQAO feel that the conditions are significantly difficult to manage on site and therefore justify the need for a trial pad to be constructed, an annexure to the CQA Plan will be provided at Construction Stage detailing the requirements for the installation of the Trial Pad.

PB: 9. GEOMEMBRANE

PB: 10. MANUFACTURER REQUIREMENTS

PB : 10.1. Scope

The Employer's Agent may perform an audit of the manufacturing and quality control procedures used by the Manufacturer, specifically for the production of the geomembranes to be used for installation at the Employer's facility. The Manufacturer shall give the Employer's Agent at least one month's notice of the start of production of geomembrane for this project. Quality Control tests shall be performed as the geosynthetic membrane is manufactured.

PB : 10.2. Quality Control

The Manufacturer shall make available to the Employer and Employer's Agent , Manufacturing Quality Control manuals, which outline all quality procedures, to be implemented for the manufacture of the geosynthetic membranes.

The Manufacturer shall provide valid calibration certificates for laboratory testing equipment. The Employer's Agent shall verify that, during select runs of material, all MQC procedures are performed.

PB : 10.3. Manufacturing Process

In general, the Manufacturer shall provide access for the Employer's Agent to all equipment used to manufacture the geosynthetic membrane. This does not include divulging trade secrets, formulations, and procedures, which are not commonly known as basic manufacturing processes, used for geosynthetic membranes. However, if the process is critical to the integrity of the manufactured geosynthetic membrane, the equipment shall be made accessible to the Employer's Agent.

The Employer's Agent shall monitor production and testing of GSM material allocated for this project. If material for this project has already been manufactured, the Employer's Agent shall monitor production of the same type of GSM on the same production line to verify that manufacturing controls are in place. Additional tests by one independent laboratory are also required before the material will be approved. The Employer's Agent shall review the QC certificates and notify the Manufacturer in writing which geomembrane rolls are approved for shipping. The Employer's Agent shall be allowed to monitor the loading of the geomembrane for shipping.

The Main Contractor shall obtain written approval from the Employer's Agent before the GSM material is loaded for shipping.

PB : 10.4. Manufacturing of Geomembrane

The following types of geomembranes are to be manufactured and installed, namely:

- Minimum 1.5mm thick smooth-smooth High Density Polyethylene ("HDPE");
- Minimum 1.5mm thick smooth-textured High Density Polyethylene ("HDPE")

PB : 10.5. Raw Materials

Only one type of resin (one manufacturer, one resin classification per HDPE) shall be used to manufacture geomembrane for this project.

Resin used in manufacturing geomembrane sheets shall be made of virgin uncontaminated ingredients. No more than 5 percent regrind, reworked, or trim material in the form of chips or edge strips shall be used to manufacture the geomembrane sheets. All regrind, reworked, or trim materials shall be from the same manufacturer and exactly the same formulation as the geomembrane sheet being produced. No post-consumer materials shall be used to produce the geomembrane. For geomembranes with plasticizers, only primary plasticizers that are resistant to migration shall be used.

The Contractor/Manufacturer shall submit a copy of the Resin Manufacturers test reports and QC/QA certificates for the raw materials used in the manufacturing of the geomembrane shipped to the site.

The resin used must adhere to the GRI–GM13 for HDPE, latest edition based on date of tender.

Internal Quality Assurance testing will be carried out by the geomembrane Manufacturer to demonstrate that the incoming resin meets this specification. At the Client's discretion, additional conformance testing, paid for by the Owner, may be carried out at the CQA Laboratory. If the results of the Manufacturer's Quality Control (QC) Laboratory and the CQA Laboratory testing differ, the testing will be repeated by the CQA Laboratory, and the Manufacturer will be allowed to monitor this testing. The results of this latter series of tests will prevail, provided that the applicable test methods have been followed.

Prior to the installation of any geomembrane material, the Manufacturer will provide the CQAO with the following information:

- The origin (resin Supplier's name), identification (type, lot number), and production date of the resin,
- A copy of the Quality Control certificates issued by the Resin Supplier.
- Reports on the tests conducted by the Manufacturer to verify the quality of the resin used to manufacture the geomembrane rolls assigned to the project. At a minimum, these tests should include specific gravity (ASTM D792 Method A or ASTM D1505), and Melt Index (ASTM D1238 (190/2.16))
- A statement that no post-consumer recycled polymer has been added to the raw resin. However, the use of clean post-industrial polymer recycled during the manufacturing process may be permitted if done with appropriate cleanliness and if recycled polymer does not exceed 5% by weight).

The Manufacturers QC documents indicating the process followed by the manufacturer to ensure that the resin supplied for the manufacture of the geomembrane delivered to the site complies with the required specifications.

The CQAO will review these documents and report any discrepancies to the Employer's Agent.

PB: 11. HDPE RESIN PROPERTIES

Table 3: HDPE Resin Properties

Property	Units	Test Method	HDPE
Density	g/cm^3	ASTM D 1505 or D 792	0.932-0.940
Melt Index	g/10 min	ASTM D1238 Condition E	<0.8

PB : 11.1. Properties of the HDPE geomembranes

The HDPE geomembranes delivered to, and installed, on site shall be manufactured to meet the specifications ("GRI" specifications obtainable from https://geosynthetic-institute.org/specs.htm):

PB: 12. HDPE SHEETING MATERIAL PERFORMACE REQUIREMENTS

MATERIAL SPECIFICATION FOR SMOOTH-TEXTURED HDPE GEOMEMBRANE

The material shall be in compliance with GRI–GM13 Specifications for smooth-textured HDPE Geomembranes. The material shall comply with the following properties as set out and described in Table 1(b) for Smooth HDPE geomembranes:

Table 4: HDPE Sheeting Material Performance Requirements

Property	Test Method	QC/QA TEST FREQUENCY
Thickness	As listed in GRI-GM13	As listed in GRI-GM13
Formulated density	As listed in GRI-GM13	As listed in GRI-GM13
Tensile Properties	As listed in GRI-GM13	As listed in GRI-GM13
Puncture Resistance	As listed in GRI-GM13	As listed in GRI-GM13
Stress Crack Resistance	As listed in GRI-GM13	As listed in GRI-GM13
Carbon Black Content	As listed in GRI-GM13	As listed in GRI-GM13
Carbon Black Dispersion	As listed in GRI-GM13	As listed in GRI-GM13
OIT	As listed in GRI-GM13	As listed in GRI-GM13

A width of approximately ≥150mm on the lengthwise edges of each sheet shall be left untextured for ease of seaming. The widths of the panels are to be minimum 7.0m wide.

In addition, a minimum Interface Friction Angle between GM (TXT SIDE) & Underlying CCL of ≥18° using ASTM D5321 will be required and a minimum Interface Friction Angle between GM (SMTH SIDE) & Overlying Protection Layer of ≥17.5° using ASTM D5321 will be required.

The minimum interface friction angles for the various components making up the Class B liner system have yet to be determined. These figures shall be determined during the course of the detail design and once established will be communicated to the successful bidder as part of the geosynthetics specification requirements.

PB : 12.1. Submittals

The GSM manufacturer shall issue Quality Control submissions to the Employer's Agent and CQA officer for each delivery of material. The submissions shall include the following information:

Prior to the shipment of any geomembrane, the Manufacturer will provide the CQAO with the following:

- A certified properties sheet including, at a minimum, all specified properties (parameters), and test methods indicated in the specifications.
- A list of quantities and descriptions of materials other than the base polymer which comprise the geomembrane; and
- The internal MQC sampling procedures, frequencies of testing, and results of testing of material supplied to the project.

The CQAO will verify that:

- The property values certified by the Manufacturer meet all of the Project specifications; and
- The measurements of properties by the Manufacturer are properly documented, the test methods used are acceptable, and the geomembrane meets the Project Specifications.
- GSM Manufacturer Tracking List - Cross-referencing list delineating the corresponding lots for the materials used in the production of the rolls delivered.
- Manufacturing Quality Control Data - The manufacturing quality control test data indicating the actual test values.
- Physical Properties Sheet - The material specification for the geomembrane supplied in accordance with this specification.
- Letter of Certification - The letter indicating that the material is in conformance with the physical properties specified.

PB : 12.2. Testing

Conformance Testing will be performed and approved prior to shipment and also on arrival of material on site. Durability tests are to be conducted as soon as the material is manufactured.

The geomembrane material shall be tested by the manufacturer for compliance with the specifications. The costs of these tests are to be included for in the tendered price for Quality Control/Quality Assurance.

Conformance Testing may, at the discretion of the Employer's Agent, be carried out by an independent laboratory (QCA laboratory). Conformance testing is not an opportunity to reproduce the QC testing program. It is a check to provide confirmation that satisfactory material is delivered to the site. The name and address of the laboratory shall be approved by the Employer's Agent . The Employer's Agent has the right to reject any roll or production batch if the samples do not pass the conformance testing.

PB : 12.2.1. In Plant Conformance Testing

The purpose of In-plant Material Conformance Test Sampling is to verify that geomembrane material which is designated for the Owner's project is confirmed as meeting the project specifications prior to shipment to the site. Thus, barring a transportation accident, the geomembrane can be installed immediately when it arrives on site.

The Manufacturer will make available all necessary personnel and equipment to assist the CQAO in retrieving conformance samples of the geomembrane material.

The CQAO shall send to the CQAO Laboratory conformance samples for testing. The frequency of sampling

shall be at the discretion of the CQAO but shall typically be between each 10,000 and 25,000 m^2 of geomembrane manufactured. No material shall be shipped to the site until conformance test results are obtained.

PB : 12.2.2. On-site conformance testing

If In-Plant conformance testing is not performed, upon delivery of the rolls of geomembrane to the site, the CQAO will ensure that samples are removed at the frequency specified in the Project Specifications and forwarded to the CQA Laboratory for testing to ensure conformance to both the Project Specifications and the Manufacturer's list of guaranteed properties.

PB : 12.2.3. Sampling

Samples will be taken across the entire width of the roll and will not include the outer wrap of the roll. Unless otherwise specified, samples will be 500 mm long by the roll width. Specimens for testing will be taken across the full width of the sample.

If roll numbers are very different and non-sequential, consideration should be given to testing each block of roll numbers at the same frequency.

PB : 12.2.4. Test results

The CQAO will examine all results from laboratory conformance testing and will report any non-conformance to Employer's Agent .

The following procedure will apply whenever a sample fails a conformance test that is conducted by the CQA Laboratory:

The Manufacturer will replace the roll of geomembrane that is in non-conformance with the specifications with a roll that meets specifications.

The CQAO will remove conformance samples for testing by the CQA Laboratory from the next higher and lower numbered rolls. These two samples must both conform to specifications. If either of these samples fail, testing shall continue until the defective rolls are isolated. These rolls will be replaced by the Manufacturer, at no expense to the Owner. This additional conformance testing will be at the expense of the Manufacturer.

The CQAO will document actions taken in conjunction with conformance test failures.

PB : 12.3. Packaging and Identification

All geomembrane roll cores shall be sufficiently strong to resist collapse during transit and handling. The Employer's Agent has the right to reject any roll if, upon delivery onto site, the core has collapsed or if the roll is damaged in any other way.

Before shipment, the manufacturer shall label each roll, both on the geomembrane roll and on the surface of the geomembrane or any 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:

- Product Name and Grade
- Length and width of roll
- Total weight of roll,
- Production Lot number and Individual roll number

PB : 12.4. Transportation, Handling And Storage Of Geomembrane Liners

PB : 12.4.1. Transportation And Handling Of Materials

The Installer shall contact the supplier before shipment to determine if the unloading methods and equipment differs from that specified below. Significant deviations from these procedures shall be pre-approved by the Employer's Agent in writing.

Geomembranes must be supported during handling to ensure worker safety and to prevent damage to the product. Under no circumstances may 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.

The CQA officer 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:

Spreader Bar Assembly - A spreader bar assembly shall include 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 geomembrane core while the spreader bar beam will prevent chains or straps from chafing the roll edges.

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 must be at least 3,0 m long and inserted to its full length into the roll core to prevent excessive bending of the roll when lifted.

Roller Cradles - Roller cradles consist of two large diameter rollers spaced approximately 75 mm apart, which both support the geomembrane roll and allow it to unroll freely. The use of roller cradles will be permitted if the rollers support the entire width of the geomembrane roll.

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 geomembrane 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.

PB : 12.4.2. Inspection upon delivery

The CQAO shall be notified in a timely manner when delivery and unloading is to take place.

Each roll shall be visually inspected when unloaded to determine if any packaging or material has been damaged during transit. Possible product conditions and actions are listed below.

Rolls, including the roll cores, exhibiting damage shall be marked and set aside for closer examination during deployment. Minor rips or tears in the plastic packaging shall be repaired with moisture resistant tape before being placed in storage to prevent moisture damage.

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.

Geomembrane rolls delivered to the project site shall be only those indicated on the geomembrane manufacturing quality control certificates.

The Employer's Agent reserves the right to reject any roll at any stage prior to installation should it exhibit any of the above damages or non-conformance.

PB : 12.4.3. Storage

Storage of the geomembrane rolls shall be done by the contractor under the guidance of the Installer. All geomembrane 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.

Rolls shall not be stacked on uneven or discontinuous surfaces, in order to prevent bending, deformation, and damage to the geomembrane or cause difficulty inserting the carpet spike or core pipe. The rolls shall be protected from puncture, abrasion, excessive heat or cold, material degradation or other damaging circumstances.

Geomembranes shall not be stored more than four rolls high or limited to the height at which installation personnel may safely manoeuvre the handling apparatus, whichever is lowest. Stacks or tiers of rolls must be situated in a manner that prevents sliding or rolling by chocking the bottom layer of the rolls. Storage shall not result in crashing of the cores or flattening of the rolls.

An additional tarpaulin or plastic sheet shall be used over the stacked rolls to provide extra protection for geomembrane material stored outdoors.

PB : 12.5. Overview of Quality Assurance Submissions

PB : 12.5.1. Manufacturing Quality Assurance Documentation

Geomembrane Manufacturing Quality Assurance (MQA) sampling and testing for compliance with this specification shall be co-ordinated by the Construction Quality Assurance (CQA) officer as necessary to support the manufacturer's Manufacturing Quality Control (MQC) data.

PB : 12.5.2. Submissions Required Before Shipment

Prior to shipment, the Manufacturer will furnish the CQAO with Quality Control certificates covering each roll of geomembrane and welding rod provided. (NOTE: Tests do not have to be done on each roll, they simply need to be done according to the frequency. The Quality Control certificate will be signed by a responsible party employed by the Manufacturer, preferably the QC Laboratory Manager.

PB : 12.5.3. The Quality Control certificates will include:

Resin Manufacturer, resin type, resin lot number, and geomembrane roll numbers; and

results of Quality Control tests. At a minimum, results will be given for thickness, specific gravity/density, uniaxial tensile strength and elongation at yield and break, single point stress rupture time, and carbon black content and dispersion, evaluated in accordance with the methods indicated in the specifications or equivalent methods previously approved by the Employer's Agent and CQAO. No material will be installed until complete QC test data have been provided.

The CQAO will:

Verify that the Quality Control certificates have been provided at the specified frequency for all rolls, and that each certificate identifies the rolls and resin related to it; and review the Quality Control certificates and verify that the certified roll properties meet the Manufacturer's and Project Specifications.

PB : 12.5.4. Submissions Required Upon Delivery To Site

Prior to geosynthetic installation, the Employer's Agent shall review the Geosynthetic Installer's Quality Control submittals to confirm that materials meet the Construction Specifications. The CQAO or Employer's Agent shall review the following submittals for each geosynthetic material specified for the Project:

- Geosynthetic material samples, name of Manufacturer, and minimum material specifications which shall include the Manufacturer's minimum physical properties of the material, test methods (ASTM Standards) used, and factory and site seaming methods
- Manufacturer's Quality Control Manual followed during the manufacturing process
- The origin (supplier's name and production plant), identification (brand name and number) and material properties of the resin used to manufacture the product
- Geosynthetics Installer's Quality Control Manual, for the installation and testing of the geosynthetic
- A copy of each of the Quality Control Certificates on each lot of resin issued by the resin Supplier for the specific material for this project. Geomembrane submittals shall include certification of the resin for extrusion welding rod
- The result of quality control testing conducted on the resin used in manufacturing the specific material for this project
- A listing which correlates the resin to the individual geosynthetic rolls and extruded materials
- A copy of the geosynthetic roll Quality Control Certificates which shall be supplied at a minimum frequency of one (1) per every fifty thousand (50,000) square metres of geosynthetic material continuously produced and supplied to the project unless otherwise presented in the Construction Specifications
- A panel layout drawing for geomembrane showing the proposed installation layout identifying field seams as well as any variance or additional details which deviate from the Construction Drawings
- A detailed installation schedule for the project
- Certification that the extrusion welding rod to be used is comprised of the same resin type as the geomembrane to be used (geomembrane only)

PB : 12.6. Geomembrane Installation

PB : 12.6.1. Subsurface preparation

Earth subgrade

The Civil Contractor will be responsible for preparing the supporting soil according to the project specifications. The subgrade is to be prepared such that:

- the lines and levels of the surface are according to the drawings and specifications.
- the supporting soil meets the density specification.
- the surface to be lined has been finished so as to be free of irregularities, protrusions, loose soil, desiccation cracks and abrupt changes in grade.
- the gravel surface layer (as applicable) of the supporting soil does not contain stones or other objects larger than 6mm (or that which may have been specified as maximum particle size for that adjoining layer – see earthworks specifications) which may be damaging to the geomembrane; and
- there are no areas excessively softened by high water content.
- there are no equipment tracks or footprints present on the subgrade.

The Civil Contractor is to request the CQAO's approval of the subgrade in writing. The CQAO is to inspect the subgrade to verify that it meets the specification and confirm this in writing. The Installer will certify in writing that the surface on which the geomembrane will be installed within the next 24 hours is acceptable. The certificate of acceptance will be given by the Installer to the CQAO prior to commencement of geomembrane installation in the area under consideration.

The CQAO will also acknowledge the approval of the subgrade in writing. After the supporting soil has been accepted by the Installer, it will be the Installer's responsibility to indicate to the CQAO any change in the supporting soil condition that may require repair work. If the CQAO concurs with the Installer, then the Installer will ensure that the supporting soil is repaired.

The Installer is responsible for maintaining the condition of the subgrade after approval up until the placement of the geomembrane.

Geosynthetic layer

Prior to the deployment of any geotextile, as well as other underlying geosynthetic materials upon which the geomembrane material may be installed, the subgrade shall be inspected and approved in writing by the CQAO and Installer.
It shall remain the responsibility of the Main Contractor to install the geotextiles in a manner such that the subgrade or other surfaces do not become disturbed and such that the composite lining system is not adversely affected either during construction or during the life of the facility. Where such disturbance does occur, the Main Contractor shall reinstate the area to conform with the requirements of this Specification.
The geotextile shall always be ballasted and anchored within anchor trenches or by using sand filled ballast bags and similar, to ensure that the geotextile is not displaced or uplifted by wind or other cause.

PB : 12.6.2. Anchorage Trenches and Edge Tie-in

ANCHOR TRENCHES

Anchor trenches will be excavated by the Civil Contractor (unless otherwise specified) to the lines and dimensions shown on the design drawings, prior to geomembrane placement.
The edge of the trench, over which the geomembrane enters the trench, will be rounded to avoid sharp bends in the geomembrane. There shall be no sharp protrusions on the inside wall of the trench. No loose soil will be allowed to underlie the geomembrane in the trenches.
Water shall not be allowed to stand, or soften the soil, in the anchor trench. Responsibility for dewatering of the anchor trench shall reside with the Main Contractor.
The anchor trench shall be inspected as well as approved by the Employer's Agent and CQAO officer before geomembrane placement, backfilling and compaction of the anchor key material.

EDGE TIE-IN

Where indicated on the drawings, the installer shall tie-in to the existing geomembranes installed in existing cells on the site. The Civil Contractor (unless otherwise specified) shall excavate to expose the edges of the existing linings along the tie-in length and shall take all precautions necessary to avoid undue damage of the existing linings. The contractor shall excavate trial holes to determine the depth of excavation necessary to expose the existing linings. Upon written instruction by the Employer's Agent, excavation within 200mm (unless otherwise specified) of the linings shall be undertaken by hand.
The existing geomembrane shall be exposed and lifted along its length to allow the Civil Contractor to tie-in.

The lining installer shall clean, trim and repair the existing lining edge as necessary and weld the new geomembranes to the existing geomembranes and ensure continuity of the membranes. The edge tie-in construction shall meet all the requirements.

PB : 12.7. GEOMEMBRANE PLACEMENT

Before any geomembrane is deployed the relevant documents must be received from the Main Contractor and be reviewed and approved by the CQAO. The smooth-textured HDPE geomembrane shall be placed with the textured surface face down (if applicable).

PB : 12.7.1. Conformance Testing

Prior to geosynthetic installation, the Employer's Agent shall obtain samples of the geosynthetics for conformance testing to evaluate or confirm that these materials meet the Construction Specifications. The Employer's Agent shall mark the machine direction and roll number on the sample, and date the sample was obtained and forward the sample to the geosynthetic laboratory. All conformance tests shall be performed in accordance with the Construction Specifications. The CQAO shall review the test results and shall report any non-conformance to the Project Manager and the Installer.

PB : 12.7.2. Field Panel Identification

A field panel is a single piece of geomembrane (other than a patch or cap strip) which is seamed in the field: i.e. a roll or a portion of roll cut in the field.

It will be the responsibility of the CQAO to ensure that each field panel is given an "identification code" (number or letter-number) consistent with the layout plan, which is supplied by the Installer. This identification code will be agreed upon by the Installer and the CQAO. This field panel identification code should be as simple and logical as possible. It will be the responsibility of the Installer to ensure that each field panel placed is marked with the original roll number as well as the panel identification code. The identification code and roll number will be marked at a location agreed upon by the Installer and CQAO.

Typically, panels will be numbered in the order in which they are placed. The Installer shall keep accurate records of the positions, dimensions and numbering of panels for submittal to the CQAO at weekly intervals. The CQAO will establish a table or chart showing correspondence between roll numbers and field panel identification codes. The field panel identification code will be used for all CQA records.

PB : 12.7.3. Field Panel Placement

No geosynthetics shall be deployed, joined, or tested unless a representative of the Employer's Agent is present to monitor such activities. Field panel placement shall not be undertaken in the presence of excessive moisture, in an area of standing water, or during high winds. The Civil Contractor shall ensure that run-off water is diverted from the area surrounding the lining installation.

The Installer will record the identification code, roll number, location, weather conditions, and date of installation of each field panel. The information shall be submitted to the CQAO on a weekly basis.

If a portion of a roll is set aside to be used at another time, the roll number shall be written on the remainder of the roll in several places.

PB : 12.8. LOCATION

The CQAO will verify that field panels and seam orientations are approximately as indicated in the Installer's approved layout plan, or as modified.

PB : 12.9. COMPENSATION FOR MATERIAL EXPANSION AND CONTRACTION

The Installer will be responsible for determining the required amount of compensation that must be installed in the geomembrane to ensure that it will not be unduly tensioned due to temperature variations in service. Such calculations shall be shown to the CQAO and Employer's Agent . The Installer will be responsible for ensuring that sufficient geomembrane is installed to compensate for contraction of the material during anticipated lower temperatures and to prevent expansion and excessive wrinkling at possible higher covering temperatures.

The methods of installing compensation will be discussed with, and approved by, the Employer's Agent and the CQAO.

The geomembrane must not be tensioned and must be fully supported by the subgrade when it is covered by

soil or liquid ballast.

PB : 12.10. INTIMATE SUBGRADE CONTACT

Only that amount of geomembrane will be deployed in one day that can be covered by the required thickness of cover soil in the following day. The cover soil will initially be placed as ballast around the periphery of that section of geomembrane.

The CQAO will monitor the placement of geomembrane and soil to confirm that the geomembrane is essentially in complete contact with the subgrade at the end of the working day, and is restrained in this position, without excessive tension, by the peripheral soil.

The CQAO will monitor the spreading of cover soil at the start of the first shift of the next day to confirm that no standing or folded wrinkles in the geomembrane are covered by soil. The geomembrane must be in intimate contact with the subgrade.

At all times the exposed edges of geosynthetics will be kept clean and protected from damage.

A minimum of five thickness measurements shall be taken along the edge of each panel width and at least two thickness measurements shall be taken along each panel length. For the smooth geomembrane side, thickness shall be measured in accordance with ASTM D 5199. For the textured geomembrane side, thickness shall be measured in accordance with ASTM D 5994. If thickness readings fall below the values specified in GRI GM 13 the entire panel shall be rejected and replaced. The Installer shall provide the appropriate apparatus for thickness measurements.

PB : 12.11. INSTALLATION SCHEDULE

Field panels will be placed one at a time, and each field panel will be seamed immediately after its placement (in order to minimize the number of unseamed field panels exposed to wind).

It is beneficial to "shingle" overlaps in the downslope direction to facilitate drainage in the event of precipitation, shingling should also be done in the downstream direction to minimize resistance to flow. It is also beneficial to proceed downslope and in the direction of (with) prevailing winds. Scheduling decisions must be made during installation, in accordance with varying environmental conditions. In any event, the Installer will be fully responsible for the decisions made regarding placement procedures.

The CQAO will evaluate every change in the schedule proposed by the Installer and advise the Employer's Agent on the acceptability of that change. The CQAO will verify that the condition of the supporting soil is still satisfactory for installation of geomembrane.

PB : 12.12. WEATHER CONDITIONS

Geomembrane placement will not proceed at geomembrane temperatures below 0°C or above 75°C unless approved by the Employer's Agent .

Geomembrane placement will not be done during any precipitation, conditions with excess moisture (e.g. fog, dew), in an area of ponded water, or during excessive winds except as approved in an Action Decision Meeting.

NOTE: The only temperature of significance is the actual geomembrane temperature, not the ambient temperature. When exposed to sunlight the geomembrane temperature will be significantly higher than ambient.

The CQAO will verify that the above conditions are observed. Additionally, the CQAO will verify that the supporting soil has not been damaged by weather conditions.

The CQAO will inform the Employer's Agent if the above requirements are not observed.

PB : 12.13. GEOMEMBRANE PLACEMENT

The Installer shall be responsible to ensure that:

- Equipment used does not damage the geomembrane as a result of handling, trafficking, excessive heat, leakage of hydrocarbons, or by other means.
- Any All-Terrain Vehicles (ATVs) used to deploy geosynthetics exert ground pressures less than 55 kPa (8 psi).
- ATVs are not operated: 1) at excessive speeds, 2) in tight turning circles, 3) under extreme breaking and accelerating conditions, 4) with dirty tires, and 5) over wrinkles, that might damage the

geomembrane.

- The prepared surface underlying the geomembrane has not deteriorated since previous acceptance, and is still acceptable immediately prior to geomembrane placement;
- Any geosynthetic elements immediately underlying the geomembrane are clean and free of debris;
- Personnel working on the geomembrane do not smoke, do not wear hard-soled shoes, and do not engage in activities which could damage the geomembrane;
- Frequently used pathways up and down geomembrane on slopes are protected by a roll of geotextile;
- The methods used to unroll the panels do not cause excessive scratches or crimps in the geomembrane and do not damage the supporting soil;
- The method used to place the panels minimizes wrinkles (especially differential wrinkles between adjacent panels);
- Geomembrane is not allowed to unroll freely down a slope;
- Geomembrane is not placed under tension, unless approved by the Employer's Agent in writing;
- Adequate temporary loading and/or anchoring (e.g., sandbags, tires), that does not damage the geomembrane, has been placed to prevent uplift by wind;
- Direct contact of equipment with the geomembrane shall not be allowed, except as previously described for ATVs used to deploy geosynthetics. The geomembrane shall be protected by geotextiles, extra geomembrane, soil layers, or suitable materials, in areas where equipment may be used, or traffic may be expected;
- Only hook bladed utility knives are used to cut through the geomembrane.
- Appropriate care is to be taken to prevent shock and explosions caused by static electricity discharges.
- All handholds cut for moving panels and damage caused by clamps are repaired;
- Panels are not moved such that subgrade soil can peel the underside seam flap.
- Motorized equipment contact and /or traffic shall not be allowed on the liner.
- Portable generators may be positioned on the lined area provided that the liner is protected by an adequate cushion of geotextile or an additional layer of liner material.
- The Installer shall not refuel generators or other equipment that uses petroleum products while the equipment is located on the liner.
- Equipment shall be maintained such that no petroleum products come into contact with the liner.
- No equipment or tools shall damage the liner by handling, traffic, or by other means.
- Use of metal tools shall be kept to a minimum.

The CQAO will inform the Employer's Agent if the above requirements are not observed.

PB : 12.14. TEMPORARY BALLASTING

Temporary ballasting around the edges of the installed liner shall be done with sandbags or equivalent non-damaging ballast material (e.g. tires without reinforcing wires exposed). Sandbags shall be of a size and weight so as to enable handling by one person and shall be spaced to provide adequate uplift protection against typical winds that might reasonably be expected to occur prior to the addition of adjacent panels or prior to permanent ballasting.

PB : 12.15. DAMAGE

The CQAO will visually examine each panel, after placement and prior to seaming, for damage.

The CQAO will advise the Employer's Agent which panels, or portions of panels, should be rejected or repaired. Damaged panels or portions of damaged panels, which have been rejected will be marked, and their removal from the work area recorded by the CQAO.

At a minimum, the Installer will be responsible to ensure that:

- each panel is placed in such a manner that it has not been, or is unlikely to be, damaged; and

- any tears, punctures, holes, thin spots, and damaging inclusions, gouges, and protuberances etc., are marked for repair and brought to the attention of the CQAO.

PB : 12.16. Field Seaming

PB : 12.16.1. Seam Layout

The Installer will provide the Employer's Agent and the CQAO with a proposed panel layout drawing at least 15 working days prior to the commencement of installation activities. The CQAO will review the panel layout drawing and verify that it is consistent with the accepted state-of-practice and this CQA Plan. The layout shall be such as to keep the number and length of field seams to a minimum. No panels may be seamed in the field without the Employer's Agent s representative's written approval. In addition, panels that significantly change the layout drawing (e.g. that change the orientation of seams) shall not be installed without the Employer's Agent 's prior approval.

In general, seams should be oriented parallel to the line of maximum slope, i.e., oriented up and down, not across, the slope. In corners and other geometrically complex locations, the number of seams should be minimized. No base seam or tee seam will be less than 2 m from the toe of slopes, or areas of potential stress concentrations, unless otherwise authorized by the Employer's Agent in writing. Horizontal and T-shaped seams shall not be placed on slopes.

If roll end seams are unavoidable on slopes, the upslope panel shall overlap the downslope panel and adjacent panel cross-seams shall be staggered by at least 2 m.

A seam numbering system compatible with the panel numbering system will be agreed upon at the Resolution Meeting.

Seams are usually identified by the panel numbers on each side, e.g. seam 1 / 2, for the seam between panels 1 and 2.

Welding is to extend at least 500mm beyond the crest and into the anchor trench.

PB : 12.16.2. Seaming Equipment and Products

Approved methods for field seaming are thermal fusion (hot wedge, hot air, or combination) seaming and extrusion seaming. Proposed alternate methods will be documented and submitted with the tender. Only apparatus that has been specifically approved by make and model will be used. The Installer will use appropriate measuring equipment to ensure that required temperatures are being achieved.

PB : 12.17. FUSION SEAMING (Wedge-Welding)

Seaming equipment shall comply with the requirements of GRI Test Method GM 19 and all equipment used shall comply with national regulations and statutory requirements on accident prevention.

The fusion seaming machines will be equipped with gauges giving hot wedge temperatures. Temperature, speed, and nip roll pressure settings will be verified by the Installer prior to each seaming period. Nip roll and wedge geometries shall be such as to minimize residual stresses at the edge of the seam, i.e. to minimize reduction in stress cracking resistance of the geomembrane.

The Installer will log ambient conditions, geomembrane temperatures, seaming apparatus temperatures and speeds, equipment serial number, and operator initials.

The Installer is responsible to ensure that:

- The number of operable seaming machines decided at the Resolution Meeting are maintained on site at all times;
- equipment used for seaming does not damage the geomembrane;
- for tee seam intersections, all edge flaps are cut back to the edge of the outer-most peel-tested track of the seam prior to seaming;
- electric generators and fuel containers are placed on a smooth protective layer such that no damage occurs to the geomembrane;
- a smooth insulating plate or fabric is placed beneath the hot seaming apparatus after usage;
- the geomembrane is protected from damage in heavily-trafficked areas; and
- build-up of moisture or dirt between the sheets is prevented. To accomplish this a movable protective

layer may be used directly below each overlap of geomembrane that is to be seamed.

PB : 12.18. EXTRUSION SEAMING

Extrusion welding shall be used only at areas which cannot be welded by using fusion seaming.

Extrusion-seaming apparatus will be equipped with gauges giving the relevant temperatures of the apparatus such as the temperatures of the extrudate, nozzle, and preheated air.

The Installer will provide documentation (including QC certificates) regarding the welding rod or resin pellets to the CQAO, that show that the resin is the same HDPE resin as the geomembrane itself. Other seaming resins must be approved by the CQAO.

The Installer will log apparatus temperatures, extrudate temperatures, ambient conditions, and geomembrane temperatures at appropriate intervals.

The CQAO will verify that:

- the Installer maintains on-site the number of operable seaming machines decided at the Resolution Meeting are maintained on site;
- equipment used for seaming will not damage the geomembrane;
- the extruder is purged prior to seaming until all heat-degraded extrudate has been removed from the barrel;
- feed resin is maintained clean and dry;
- the electric generator and fuel containers are placed on a smooth intermediate layer such that no damage occurs to the geomembrane;
- a smooth insulating plate or fabric is placed beneath the hot seaming apparatus after usage; and
- the geomembrane is protected from damage in heavily trafficked areas.

PB : 12.18.1. Seam Preparation

The Installer is responsible to ensure that:

- prior to seaming, the seam area is clean and free of moisture, dust, dirt, debris of any kind, foreign material, and any mechanical damage;
- if seam overlap grinding is required, the process is completed according to the Manufacturer's instructions but within 30 minutes of the seaming operation, and in a way that does not damage the geomembrane;
- the abrading does not remove more than 10 percent of the thickness of the geomembrane, and the resulting abrasion marks are covered by the finished extrusion bead;
- any visible abrasion marks, after seaming, are essentially perpendicular to the direction of the seam;
- the abrading does not introduce damaging gouges in the geomembrane; and
- seams/panels are aligned with a minimum of wrinkles and "fishmouths".

PB : 12.18.2. Weather Conditions for Seaming

The following protocols will be observed during seaming:

- Unless authorized in writing by the Employer’s Agent , no seaming will be attempted at geomembrane temperatures below -0°C or above 75°C.
- Below a geomembrane temperature of 5°C, the need for pre-heating and additional testing should be discussed with the Employer’s Agent and CQAO.
- In all cases, the geomembrane in the seaming area will be dry and protected from wind and airborne particulates.
- Geomembrane temperatures will be measured with a surface temperature thermocouple or a calibrated infrared pyrometer.
- Care shall be taken that wind chill does not reduce the geomembrane temperature such that fusion is

inadequate or that excess heat is being used to overcome the wind chill.

If the Installer wishes to use methods which may allow seaming at geomembrane temperatures below 0°C or above 75°C, the Installer will demonstrate (by testing trial seams) that such methods produce seams which are entirely equivalent to seams produced at geomembrane temperatures above 0°C and below 75°C, and that the overall quality of the seam and durability of the geomembrane are not adversely affected. In addition, the Installer will prepare written certification that states that the seaming procedure does not cause any physical or mechanical modification to the geomembrane that will generate any short or long-term damage to the geomembrane liner.

The CQAO will verify that these requirements are observed and will advise the Employer's Agent if potential problems are perceived. The Employer's Agent will then decide if the seaming will be stopped or postponed. Such decisions may be the subject of an Action Decision Meeting.

Seaming shall not take place during precipitation, conditions of excess moisture (e.g. fog, dew), or excessive wind.

PB : 12.18.3. Overlapping and Temporary Bonding

The Installer is responsible to ensure that:

- the panels of geomembrane have an overlap of approximately 100 mm, sufficient to allow peel tests to be performed on the inner track of the seam;
- there is a free flap at the edge of the top geomembrane a minimum of approximately 10 mm wide, to allow a peel test to be performed on the outer track of the seam;
- no solvent or adhesive is used unless the product is approved in writing by the Employer's Agent (samples must be submitted to the Employer's Agent for testing and evaluation);
- any procedure used to temporarily bond adjacent panels together does not damage the geomembrane. In particular, the temperature of hot air at the nozzle of any spot seaming apparatus will be controlled such that the geomembrane is not damaged. "Damage" includes a loss in durability; and
- temporary bonds do not interfere with the ability to perform shear and peel tests on the actual production seam.

The CQAO will log all relevant temperatures and conditions and will log and report any non-compliance to the Employer's Agent .

If protective layers of geomembrane are placed on the barrier layer geomembrane for any purpose (e.g. puncture protection in drainage trenches), they shall not be tack or spot welded to the barrier layer. They shall be fully welded, except a small pressure relief segment, along the complete periphery of the protective layer or they shall not be welded at all.

PB : 12.18.4. Trial Seams

Trial seams will be made by each machine/operator combination on strips of HDPE geomembrane to verify that seaming can be successfully performed. Trail seams shall be made under the same surface and environmental conditions as the production seams. Such trial seams will be made at the beginning of each seaming period (i.e., at the beginning and middle of each working shift), but at least once every five hours or as requested by the Employer's Agent or CQAO, for each seaming apparatus/operator combination used in the seaming period. In addition, a new trial seam will be conducted when a welding apparatus has been restarted after being switched off. A trial seam will also be made in the event that the geomembrane temperature changes more than 25°C since the last passing trial seam. When geomembrane temperatures are below 5°C or higher than 75°C more frequent trial seams may be required. In general, trial seams will be conducted as follows:

The trial seam sample will be at least 1.5 m long by 0.3 m wide with the seam centred lengthwise. The CQAO will observe all trial seam procedures.

All trial seams shall be conducted under the same conditions as will be encountered during actual seaming.

Four specimens, each 25 mm wide and a minimum of 150 mm long, will be cut from the centre section of the trial seam sample by the Installer. Two specimens will be tested in shear and two in peel using a calibrated field tensiometer (supplied by the Installer). They should meet project specifications. If any specimen fails, the entire operation will be repeated. If the second trial seam fails, the seaming apparatus and seamer will not be approved for production seaming until the deficiencies are corrected and two consecutive successful trial

seams are achieved. If no subsequent machines can successfully seam the material, then the material roll shall be rejected.

The remainder of the successful trial seam samples will be assigned a number and marked accordingly by the Installer, who will also log the date, time, geomembrane temperature, number of seaming unit, settings, name of seamer, and pass or fail description. The CQAO shall inspect trial seams for uniformity and general appearance.

A trial seam shall also be prepared by each seaming machine/operator at the completion of seaming each day to determine whether changes in seam quality might have occurred during the last part of the seaming period.

No seaming equipment will be allowed to perform production welds until equipment and operators have successfully completed trial seams. Once the seaming process has been qualified by successfully passing a trial weld, seaming technicians shall not change parameters without performing another trial seam.

PB : 12.18.5. General Seaming Procedure

Unless otherwise specified, the general seaming procedure used by the Installer will be as follows:

- For fusion seaming, a movable protective layer of plastic may be placed directly below each overlap of geomembrane that is to be seamed. This is to help prevent any moisture build-up between the sheets to be seamed.
- If required, a firm substrate may be provided by using a flat board, or other similar hard surface placed directly under the seam overlap.
- Fish mouths or wrinkles at the seam overlaps will be cut along the peak of the wrinkle in order to achieve a flat overlap. The cut fish mouths, or wrinkles will be seamed and any portion where the overlap is inadequate will then be patched with an oval or round patch of the same geomembrane material extending a minimum of 150 mm beyond the cut in all directions. The end of the cut should be rounded.
- If seaming operations are carried out at night, adequate illumination will be provided.
- Seaming will extend at least 0.5m into the material in the anchor trench.
- Each seam will be labelled with the seaming machine number, the operator's initials, machine temperature and speed settings, date, time, and direction seamed.

The CQAO will monitor the above seaming procedures and will inform the Employer’s Agent of any unsatisfactory deviations from standard practice.

T-joints

T-joints are formed where a longitudinal seam is intersected by another seam. T-joints shall be staggered between panels to avoid the formation of cross joints.

T-joints shall be constructed so as to ensure the watertightness of the point where the two seams intersect. The procedure for forming a hot-wedge seamed T-joint shall be as per SANS 10409:2005, Clause 10.4.4.4, with the inclusion of 10.4.4.4(g).

Non-destructive Seam Continuity Testing

PB: 13. CONCEPT

The Installer will non-destructively test all field seams over their full length using a vacuum test unit, air pressure test (for double fusion seams only), spark test, or other approved method. The purpose of non-destructive testing is to check the continuity of seams. It does not provide any information on seam strength. Continuity testing will be carried out as the seaming work progresses, not at the completion of all field seaming. Non-destructive testing will not be permitted unless there is, in the opinion of the CQAO, adequate illumination.

The CQAO will:

- observe all non-destructive testing,
- record location, date, test unit number, operator, and outcome of all testing
- mark the seams (on the geomembrane) that have been tested; and

- log and inform the Installer and Employer's Agent of any required repairs.

The Installer will complete any required repairs.

The CQAO will:

- observe the repair and re-testing of the repair;
- mark on the geomembrane that the repair has been successfully made and tested; and
- document the results.

The following procedures will apply to segments of seams that cannot be non-destructively tested:

- All such seam segments will be cap-stripped with the same type of geomembrane material, or
- All such seam segments will be very carefully prepared and welded by the master seamer under the observation of the consultant.
- If the seam is accessible to testing equipment prior to final installation (e.g. after prefabrication), the seam will be non-destructively tested prior to final installation.
- The seaming and cap-stripping operations must be observed for proper procedures by the CQAO and Installer's QC representative.

The Installer will write the details of each seam non-destructive test on the geomembrane with a permanent marker. For air pressure tests this will include the initials of the tester, the date, start time and pressure, end time and pressure, and pass or fail result. For vacuum testing this will include the initials of the tester, the date, and pass or fail result. For spark testing this will include the initials of the tester, the date, voltage setting, and pass or fail result. When a test fails, the number of the appropriate repair will also be recorded on the geomembrane.

PB: 14. SUBMITTALS

Prior to any non-destructive testing, the Installer shall submit to the CQAO calibration certificates for all pressure gauges to be used during vacuum and air pressure testing or shall otherwise demonstrate that all gauges are in satisfactory working condition.

PB : 14.1. Vacuum Box Testing

The equipment will be comprised of the following:

- a vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole, valve assembly, and a vacuum gauge;
- a vacuum tank and pump assembly equipped with a pressure controller and pipe connections;
- a pressure/vacuum hose with fittings and connections;
- a soapy solution that does not cause environmental stress cracking in the geomembrane, and
- a soap solution applicator.

The following procedure will be followed:

- for fusion seams (not normally tested with a vacuum box), cut off the free flap with an approved cutter (so that the lower geomembrane is not damaged) prior to testing the seam;
- energize the vacuum pump and reduce the tank pressure to approximately 5 kPa gauge;
- with a soapy solution, wet a strip of geomembrane which is wider and longer than the vacuum box;
- place the box over the wetted area;
- close the pressure relief valve and open the vacuum valve;
- ensure that a leak-tight seal is created;
- examine the geomembrane seam through the viewing window for the presence of soap bubbles (large bubbles, or fine froth) for a period of not less than 5 seconds;
- if no bubbles or foam appear after 5 seconds, close the vacuum valve and open the pressure relief

valve. Move the box over to the adjoining section of seam, with some overlap, and repeat the process;

- all areas where soap bubbles appear will be marked and repaired; and
- excess soap solution shall be cleaned or rinsed off the geomembrane and seam.

PB : 14.2. Air Pressure Testing

The following procedures are applicable to those seaming processes which produce a double track seam with a central channel.

The equipment will be comprised of the following:

- an air pump equipped with a pressure gauge capable of generating and sustaining a pressure between 160 and 280 kPa mounted on a cushion to protect the geomembrane;
- a pressure hose with fittings and connections;
- a sharp hollow needle, or other approved pressure-feed device attached to a pressure gage; and
- clamps or other devices to seal the ends of the seam to be tested.

The following procedures will be followed:

- seal both ends of the seam to be tested;
- insert the pressure-feed device into the channel of the seam;
- energize the air pump to a pressure between 185 and 275 kPa (depending on geomembrane thickness), close the valve, and allow the temperature of the air in the channel, and thus the pressure, to stabilize for about 2 minutes;

Table 5: Air Channel Test Pressures for HDPE Geomembranes

Geomembrane Thickness	Minimum Pressure	Maximum Pressure
(mm)	(kPa)	(kPa)
1.0	165	240
1.5	185	275
>2.0	205	275

- Verify that the stabilized pressure is within the required range and note the pressure loss after a further 5 minutes. If loss of pressure exceeds the amount indicated in Table 10, or if the pressure does not stabilize, locate the faulty area and repair it.
-

Table 6: Allowable Pressure Loss In Air Channel Test

Geomembrane Thickness	Maximum Allowable Pressure Drop
(mm)	(kPa)
1	28
1.5	21
>2.0	14

- Verify that the full length of the seam section has been tested by observing the air pressure gauge for a decrease in pressure when the seal at the end of the channel away from the air pump is removed, or by visual inspection of the pressurised channel. If there is a blockage in the channel, the entire seam must be capped, with cap seams being non-destructively tested, or the location of the blockage must be found and the untested part of the seam must be properly tested; and
- Remove the needle or other approved pressure-feed device and seal the hole.

NOTE: A decrease in the geomembrane temperature (e.g. due to clouds) will also cause a reduction in air channel pressure.

PB : 14.3. Spark Testing

Spark Testing shall be performed according to ASTM D6365 for short, detail (e.g. sump, penetration) extrusion welds that cannot be tested by vacuum box testing. It may also be used on long extrusion seams as the primary non-destructive test method.

It is recognized that this test requires no signal be generated for a passing result. There are many conditions in addition to adequate seaming under which no signal will be generated: proper connections may not be made, the voltage may be set too low, the search electrode may be held too far away. Thus, this test method may only be used where no other non-destructive test method can be applied. Written approval must be obtained from the Employer's Agent to perform this test and the CQAO must be informed and present during testing.

PB : 14.4. Visual Examination

Air pressure, vacuum box, and spark testing methods apply only to seams. Installer and CQA personnel shall continuously visually examine the geomembrane panels for the presence of other penetrating and non-penetrating defects and shall continuously feel for protuberances when walking on the geomembrane.

The Installer shall inform the CQAO in writing and verbally of any penetrating or non-penetrating defects that he, his staff or anyone else may observe. Failure to do so will be seen in a very negative light by the Employer's Agent .

Visual examination should take advantage of low angles of sunlight and early morning condensation on the geomembrane.

Immediately prior to covering, the geomembrane, seams, and non-seam areas shall be visually inspected by the QCAO and Installer for defects, holes, or damage due to weather conditions or construction activities. At the QCAO's discretion, the surface of the geomembrane shall be brushed, blown, or washed by the Installer if the amount of dust, mud, or foreign material inhibits inspection or functioning of the over lying material. Each suspect location shall be non-destructively tested. Each location that fails non-destructive testing shall be repaired accordingly.

Destructive Testing

PB: 15. CONCEPT

Destructive seam tests will be performed at selected locations. The purpose of these tests is to evaluate seam bond strength and the effects of seaming on the adjacent geomembrane. Seam strength testing will be done as the seaming work progresses, not at the completion of seaming.

PB: 16. LOCATION AND FREQUENCY

The CQAO will select locations where seam samples will be cut out for laboratory testing. Those locations will be established as follows:

A minimum frequency of one sample for every 150 m of seam made by each extrusion machine/operator combination - unless a different frequency is requested by the Employer's Agent or CQAO.

Conditions under which testing frequency may be increased or decreased as the project progresses will be agreed upon by the Installer and CQAO at the Resolution Meeting.

Test locations will be determined during seaming at the CQAO's discretion. Selection of such locations may be prompted by suspicion of overheating, contamination, offset seams, or any other evidence of imperfect seaming.

If trial seams are not made at the end of the day, one sample for destructive testing shall be removed from the last seam made by each seaming machine at the end of each working day.

The Installer will not be informed in advance of the locations where the seam samples will be taken.

Test frequencies may be increased or decreased at the CQAO's discretion depending on the consistency of the test results.

PB : 16.1. SAMPLING PROCEDURE

Samples will be cut by the Installer as the seaming progresses in order to have laboratory test results before the geomembrane is covered by another material. The CQAO will:

- observe sample cutting;
- assign a number to each sample, and mark it accordingly; and
- record the sample location on the layout drawing.

All holes in the geomembrane resulting from destructive sample removal will be immediately repaired.

PB: 17. SIZE OF SAMPLES

At a given sampling location, two types of samples will be taken by the Installer.

First, two pairs of specimens for field peel and shear testing will be taken. Each of these specimens will be 25 mm wide by at least 150 mm long, with the seam centred across the width. The distance between these two pairs of specimens will be 1.1 m. If both pairs of specimens pass the field tests, a sample for laboratory testing will be taken.

The sample for laboratory testing will be located between the two pairs of specimens taken for field testing. Unless determined otherwise at the Resolution Meeting, the destructive sample will be 0.3 m wide by 1.1 m long with the seam centred lengthwise. The sample will be cut into three parts and distributed as follows:

- one portion, measuring 0.3 m x 0.5 m, to the Installer for QC laboratory testing;
- one portion, measuring 0.3 m x 0.6 m, to the CQAO for CQA Laboratory testing.

PB: 18. FIELD TESTING

The 25 mm wide specimens will be tested in the field, by calibrated gauged tensiometer, one of each pair in peel and one in shear. If any field test specimen fails to pass the criteria and the project specifications, then the procedures outlined in Non-destructive Seam Continuity Testing will be followed.

The CQAO will witness all field tests and mark all samples and portions with their unique sample number. The CQAO will also log the date and time of sampling, and test pass or fail description.

If the two pairs of specimens meet the project specifications, the sample qualifies for testing in the laboratory; if they fail, the seam should be repaired.

PB: 19. CONSTRUCTION QUALITY ASSURANCE LABORATORY TESTING

Destructive test samples will be packaged and shipped to the CQAO laboratory by the CQAO, in a manner which will not damage the test sample. The Employer's Agent will verify that packaging and shipping conditions are acceptable. The Employer's Agent will be responsible for storing the archive samples. This procedure will be fully outlined at the Resolution Meeting. Test samples will be tested by the CQAO Laboratory.

Testing will follow ASTM D4437 as modified in NSF 54 Appendix A (1993), but with no requirement for sample conditioning time. The minimum acceptable values to be obtained in these tests are those indicated in the Table 11. Five specimens will be tested in peel and five in shear. Specimens will be selected alternately by test from the samples (e.g., peel, shear, peel, shear, etc.). The CQAO will review laboratory test results as soon as they become available and make appropriate recommendations to the Employer's Agent.

PB: 20. INSTALLER'S LABORATORY TESTING

The Installer's laboratory test results will be available to the Employer's Agent and the CQAO for review.

PB: 21. DESTRUCTIVE SAMPLE PASS/FAIL CRITERIA

The criteria shown in Table 11, must be met for the acceptance of peel and shear test specimens:

Table 7: Seam Specimen Test (ASTM D4437) Specifications

PEEL TEST	CRITERIA
Peel Strength	>70% (fusion seam), >65% (extrusion seam) minimum specified geomembrane yield strength*
Seam Separation	<10% of originally bonded area
SHEAR TEST	CRITERIA
Shear Strength	>95% minimum specified geomembrane yield strength*

Elongation	>100% of distance between edge of seam and nearer grip
Location of Failure	Outside the weld

* The yield strength specified by the Manufacturer, which is usually the population average value less 2 standard deviations.

The peel criteria apply to both tracks of double track seams. Nine out of the ten specimens in a seam destructive sample must meet the criteria above for acceptance of the complete destructive sample.

The CQAO will ensure that the CQA Laboratory retains all sample and specimen remnants, clearly labelled, for at least 30 days after the last specimen for the project has been tested.

PB: 22. PROCEDURES IF DESTRUCTIVE SAMPLE FAILS

The following procedures will apply whenever a sample fails a destructive test, whether that test is conducted by the CQA Laboratory, the Installer's laboratory, or on the field tensiometer. The Installer has two options:

Reconstruct the seam between the nearest passing destructive test locations on each side of the failed sample; or

Trace the seaming path to an intermediate location (3 m minimum from the failed test location in each direction) and take a small sample for an additional field test at each location. If these additional samples pass tensiometer testing, then full destructive test samples should be taken. If these laboratory destructive test samples pass the tests, then the seam should be reconstructed between these locations by capping. If either sample fails, then the process is repeated to establish the zone in which the seam should be reconstructed.

If a fusion-type seam fails destructive testing and the Installer chooses to repair the seam, the described method should be followed. Applying topping (bead of extrudate) is not an approved method of capping any seam unless it can be shown that this procedure will not reduce the stress rupture resistance of the seam below 75% of that of the parent geomembrane.

Only seams bounded by two locations from which samples passing laboratory destructive tests have been taken will be considered acceptable. An additional destructive test sample will be taken from repair seams when the length of a reconstructed seam exceeds 50 m. This sample must pass destructive testing, or the procedure outlined in this section must be repeated.

The CQAO will document all actions taken in conjunction with destructive test failures.

PB : 22.1. Electrical Leak Location Survey

The Contractor will sub-contract a specialist independent Electrical Leak Location Contractor (ELLC) to undertake an Electrical Leak Location Survey (ELLS) of the primary liner using the Dipole Test method. The proposed sub-contractor must have sufficient experience or competency to perform the ELLS.

The ELLS uses electrical methods for post-geomembrane installation performance testing once the liner is covered in a protection layer (earth material). This is to detect anomalies or leaks resulting from both geomembrane installation damage as well as construction damage caused during the placement of the protective layer.

The method shall entail placing electrical probes on the outside/underside of the liner to be tested. A second probe is to be run along the entire surface of the liner on the outside. A change in the potential difference between the probes is to be used to locate anomalies or possible damage to the liner. The location is to be marked and the cover soils carefully removed to expose the anomalies. The survey is to be done in accordance with ASTM D 6747 and ASTM D7007 (or more recent standard) and shall occur after the installation of the silty sand above each the primary.

Any damaged geomembrane is then to be repaired. The cost for the exposing of the anomalies and repairing is to be covered in the Contractor’s rates for installation of the geomembrane.

PB: 23. QUALIFICATIONS OF THE PARTIES

All parties must be qualified to perform the responsibilities and have extensive experience in surveying . Specific qualifications will be defined in the Contract Specifications.

Details of the Electrical Leak Location Contractor (ELLC) who will perform Electrical Leak Location Survey (ELLS) shall be provided to the CQAO or Employer’s Agent for approval prior to the planned surveying. The ELLC shall be an independent third party unrelated by ownership or relation to the Main Contractor or GSM installer.

The ELLC is responsible for performing the independent CQA on the liner installed by the GSM Installer. This includes the testing, identification of anomalies, evaluation of repairs, reporting and field quality control of the installed geomembrane by means of the Dipole Method.

The surveyor proposed by the ELLC must be sufficiently experienced in performing the ELLS using the Dipole Method.

The following information regarding the ELLC as a minimum, was to be completed/submitted as part of the tender submission:

- Corporate background and information of ELLC,
- Completed Projects:

Provide details of the completed projects for which the proposed surveyor has performed the ELLS using the Dipole Test method with a minimum total area of 250,000 m^2 being tested. (This requirement is for testing of any/all GSM)

Provide 2 reference letters from successfully completed projects where the Dipole Test method was used to the conduct the ELLS.

PB: 24. Defects and Repairs

PB : 24.1. Identification

All seams and non-seam areas of the geomembrane will be examined by the Installer and the CQAO for identification of defects, protruding and penetrating objects, lack of subgrade support, overheating, overgrinding, holes, blisters, undispersed raw materials, scratches and gouges, and any sign of contamination by foreign matter. To facilitate the examination the geomembrane surface will be kept clean by the Installer (or as agreed at the Resolution Meeting).

PB : 24.2. Evaluation

Each suspect location, both in seam and non-seam areas, will be non-destructively tested using an appropriate method, such as vacuum box testing. Additional methods, such as electrical methods and infrared thermography, may also be used. Each location which fails the non-destructive testing will be marked by the CQAO and repaired by the Installer. Work will not proceed with any materials which will cover locations that have been repaired until passing destructive and non-destructive test results have been obtained on the repairs.

PB : 24.3. Repair Procedures

Any portion of the geomembrane exhibiting a flaw, or failing a destructive or non-destructive test, will be repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure will be agreed upon between the Employer's Agent , Installer, and CQAO at the Resolution Meeting or at an Action Decision Meeting. The procedures available include:

- patching, used to repair all penetrating holes, tears, undispersed raw materials, and contamination by foreign matter;
- spot beading, used to repair small surface scratches, or other minor, localized non-penetrating flaws;
- capping with a strip of geomembrane, used to repair long lengths of failed seams;
- lip extrusion, an extrusion weld applied along the lip of the overlap of wedge welded seams;
- removal and replacement of a defective seam with new material that is wedge welded into place.

In addition, the following provisions will be satisfied:

- surfaces of the geomembrane which are to be repaired will be abraded no more than 30 minutes prior to the repair;
- all surfaces must be clean, free of all particulate matter, and dry at the time of the repair;
- all seaming equipment used in repairing procedures must be approved;
- the repair procedures, materials, and techniques will be approved in advance of the specific repair by the CQAO in writing;

- patches and caps will extend at least 150 mm beyond the edge of the defect, and all corners of patches will be rounded with a radius exceeding 75 mm;
- the geomembrane below large caps should be appropriately cut to avoid fluid entrapment between the two sheets and resultant pressure increases (that stress the seams) as the liner is covered;
- sharp ends of slits and cuts in the geomembrane should be rounded before patches are placed over them; and
- no more than one extrusion bead at any location will be used to make a repair - multiple beading (more than two beads at any one location) is not permitted and must be replaced with a patch.

PB : 24.4. Verification of Repairs

Each repair will be numbered and logged. Each repair will be non-destructively tested using one of the methods described or another method approved in writing by the Employer's Agent. Repairs that pass the non-destructive test will be considered acceptable. Large caps may be of sufficient extent to require destructive testing, at the discretion of the CQAO. Failed tests will require the repair to be redone and retested until a passing test results. The CQAO should observe all non-destructive testing of repairs and will record the date of the repair and test result.

No repair shall be undertaken without the CQAO being informed of the repair both in writing and verbally at least 1 day prior to the repair taking place.

PB : 24.5. Large Wrinkles

When seaming of the geomembrane is completed (or when seaming of a large area of the geomembrane is completed) and prior to placing overlying materials, the CQAO will observe the sizes and distribution of geomembrane wrinkles. The CQAO will discuss with the Employer's Agent which wrinkles should be cut and re-seamed by the Installer at his cost. The seam thus produced will be tested like any other seam.

The wrinkle height to width ratio for the installed geomembrane shall not exceed 0.5. In addition, geomembrane wrinkles shall not exceed 150mm in height. Wrinkles that do not meet the above criteria shall be cut out and repaired in accordance with the Installer's approved QC manual.

PB : 24.6. Bridging of Geomembrane

Bridging or trampolining of the geomembrane shall be considered unacceptable. Compensating material will be installed at these locations. The geomembrane must be fully supported by the subgrade at the time of covering with soil or liquid.

PB : 24.7. Geomembrane Anchoring

The periphery of the geomembrane is to be anchored in an anchor trench.

The geomembrane will not be placed on loose soil in the anchor trench. The geomembrane must be permanently anchored in the anchor trench, as soon as possible after installation, particularly in windy and/or wet environments. However, the geomembrane must be allowed to go through one cold cycle (overnight) to evaluate the potential for contraction and trampolining. The geomembrane must lie flat against the anchor trench front wall and floor. It must not be folded.

PB : 24.8. Non-geosynthetic layer Placement

Construction observation and monitoring required during the placement of the non-geosynthetic layer include:

Verification that all pre-construction testing has been performed and that laboratory test results indicate compliance with the Construction Specifications. The CQAO shall assure that the Employer's Agent and the Contractor receive prompt notification of material conformance.

Verify that the material upon which the non-geosynthetic layer will be placed has been installed in accordance with the Construction Drawings and Specifications, and that all required testing, and as-built documentation have been completed.

Observe and document that end tipping is the only method used to when backfilling material for gravel materials, and appropriate light ground pressure equipment is used for handling the gravel material. No heavy machinery is to be used when handling gravel material.

No mechanical plant is to operate directly over geosynthetic layers.

Visually observe the gravel and sand materials to inspect for any variability in the material including variation in gradation, excess fines, or any deleterious material present (where applicable).

Verify that the CQA Survey has been completed and that the Record Drawings furnished by the surveyor indicates compliance with the lines, grades, elevations, and tolerances as indicated by the Construction Drawings and Specifications.

If the equipment or gravel/ non-geosynthetic layer placement procedures do not comply with the Construction Specifications, the geomembrane shall be exposed and inspected for potential damage, at a cost to the Contractor.

PB : 24.9. Backfilling of Anchor Trench

Anchor trenches will be adequately drained to prevent ponding or softening of the soils while the trench is open. Anchor trenches will be backfilled and compacted by the Civil Contractor using selected materials. Care will be taken when backfilling the trenches to prevent any damage to the geosynthetics. Sharp rocks and stones shall be removed from soils before filling in the anchor trench. There shall be no holes in the geomembrane placed in the anchor trench. The CQAO will observe the backfilling operation and advise the Employer's Agent of any problems.

CQAO observation and/or testing is required during construction to verify that the materials and construction are in accordance with the Construction Specifications. The tests to be performed, including testing frequency, are shown below. The testing frequencies specified in the table below may be increased when construction conditions warrant additional tests. Additional tests may be recommended by the CQAO and approved by the Employer's Agent

Table 8: Backfill For Anchor Trench QA/QC Testing Regime

Test Designation	ASTM Designation	Frequency
Visual-Method Soil Classification	D2488	Continual during excavation and placement of soils
Moisture-Density	D1557	1 per 3800 m^3 or each material type
Sieve Analysis	D422	Compliant to material (see PSD specifications).
Atterberg Limits	D4318	Not required for this Project.
Nuclear Moisture/Density[1]	D6938	see PSD specifications or relevant drawing.
Moisture Content	D2216	see PSD specifications or relevant drawing.
Sand Cone Test, or Drive Cylinder Test	D1556 D2937	Not required for this Project.

NOTE: 1. Tests shall be performed on an even grid to provide adequate testing coverage. For large fills in small areas, the testing frequency shall be increased as necessary to insure testing for each lift of soil placed.

PB : 24.10. Appurtenances

The installation of the geomembrane in appurtenance areas and connections of geomembrane to appurtenances shall be done according to the drawings.

These cannot normally be tested by destructive or non-destructive methods, yet they can be a critical weak link in the effectiveness of the geomembrane liner. They are therefore technique and workmanship dependent and the following procedures are to be followed:

- the precise technique shall be discussed at a site meeting and drawn on paper before commencement.
- the work shall be observed by the CQAO who shall probe test the welds if appropriate prior to approval.
- Consideration in critical work should be given to the incorporation of earthing mechanisms to facilitate high voltage spark testing. This shall be discussed at a site meeting.

<u>The Installer is responsible to ensure that:</u>

- seaming of any gas vent or monitoring well boot to a cover geomembrane is only done after cover soil has been placed to within about 3 m of each vent or well, and initial settlement and movement of the cover has occurred.
- extreme care is taken while seaming around appurtenances, since neither non-destructive nor destructive testing may be feasible in these areas; and

- the geomembrane is supported as well as can be expected at appurtenances.

The CQAO will inform the Employer's Agent if the above conditions are not fulfilled.

PB : 24.11. Cover material

The cover materials shall be compatible as well as suitable for use over the geomembrane and be in compliance to the specification of the subgrade material (where applicable) and placed in a manner appropriate to the particular subgrade. Regardless of the cover material, the uncovered edge of geomembrane panels shall be protected at the end of the working day with a waterproof sheet, which is adequately secured with ballasts.

PB : 24.11.1. Sacrificial Geosynthetic for Protection

Precaution shall be taken to prevent damage to the geomembrane by restricting the use of heavy equipment over the liner system. Installation of any overlying geosynthetic component (protection, geotextile or geogrid) shall be done using either manual labour or lightweight, rubber-tired equipment such as a 4 –wheel all-terrain vehicle (ATV). This vehicle can be driven directly on the geomembrane, provided the ATV makes no sudden stops, starts, or turns. If such occurrences do occur, the CQAO shall be notified immediately. The CQAO shall then inspect the possible damage and may instruct a repair. No other mechanical plant shall ride on the geomembrane.

HDPE may be unrolled with the use of low ground pressure equipment. Textured HDPE shall not be dragged across the subgrade/CCL surface.

PB : 24.11.2. Earth Cover

A clean, selected silty sand (approved by CQAO) shall be placed over the geomembrane as specified in Section PSD.

Soil cover shall be placed with low ground pressure equipment. Care shall be taken to avoid damaging the geomembrane or geotextile by making sharp turns or pivots with equipment as well as sudden starts or stops.

Soils may be placed on the geomembrane by pushing with a track-dozer or by carefully placing it with a loader or a backhoe. The use of construction machinery directly over the geomembrane is strictly prohibited. A minimum thickness of 250 mm of cover shall be kept between heavy equipment and the geomembrane at all times, except when final-grading. No heavy vehicles may be driven directly over the geomembrane until the proper thickness of cover had been placed. Verify that the thickness of operations layer required by the Construction Drawings is achieved.

Wrinkles in the geomembrane shall be prevented from folding over during placement of the cover material.

To prevent damage to the geomembrane, the initial lift(s) of soil cover shall not be compacted more than 85% of modified AASHTO density or as specified by the Employer's Agent . Cover soil should not be dropped from a height greater than 1m.

When covering geomembrane on sloped areas, cover shall be pushed up-slope to minimise tension on the geomembrane.

PB: 25. GEOSYNTHETIC CLAY LINER (GCL)

PB : 25.1. SCOPE AND INTRODUCTION

This specification covers the requirements for furnishing materials, equipment, and services necessary and incidentals to supply and install reinforced geosynthetic clay liners (GCLs). GCLs are also termed Clay Geosynthetic Barriers (CGBs). In this contract document the term "GCL" shall be used in abbreviation of the word Geosynthetic Clay Liner.

In this project the GCLs may be placed in both the embankment lining layer works and the basal lining layer works construction.

PB : 25.2. INTERPRETATIONS

PB : 25.2.1. SUPPORTING SPECIFICATIONS

The publication "GRI-GCL3: Test Methods, Required Properties, and Testing Frequencies of Geosynthetic Clay Liners (GCLs)" shall form part of this specification. This publication shall, unless otherwise stated, be the

edition in effect 30 (thirty) days prior to the date of issue of this Contract for tender purposes. Any contradictions between publication/s and this Contract shall be submitted to the Construction Manager for decision.

The sections pertaining to a **needle punched GCL in the GRI-GCL3 specification** are adopted and accepted by this standard as the manufacturing quality control specification.

GRI Standards are constantly being updated by the Geosynthetic Research Institute (GRI) and many of the documents are freely available online at website address: **www.geosynthetic-institute.org/specs.htm**.

EN-ISO or any other standard which can be shown to be equivalent to the standards specified may be acceptable.

PB : 25.2.2. UNITS

The values stated in SI (metric) units are to be regarded as the standard.

PB : 25.2.3. SAFETY

This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

PB : 25.2.4. DEFINITIONS RELATING TO GEOSYNTHETIC CLAY LINERS

For the purposes of this specification, the following definitions shall apply:

Bentonite: a distinct type of fine-grained clay soil typically containing not less than 80% Montmorillonite clay, usually characterized by high swelling upon wetting. For this project the type of Montmorillonite mineral is a Sodium (Na) Montmorillonite mineral. The type of Montmorillonite is a naturally occurring Sodium (Na) Montmorillonite mineral. No activated Sodium (Na) Montmorillonite minerals will be acceptable. The Bentonite must be similar to “Wyoming”-type Bentonite or equivalent. The Bentonite must be rich in Smectites and dominated by Smectites and Montmorillonite.

Carrier Layer: The material that forms the base layer of a needle punched GCL. This consists of a nonwoven or woven geotextile, or a combination of these.

Contractor: The main contractor who is responsible for the construction of the works.

Cover Layer: The material that forms the top layer of a needle punched GCL. This consists of a non-woven geotextile.

Geofilm: a thin polymeric film which is essentially impermeable.

Geosynthetic: A planar, polymeric (synthetic or natural) material used in conjunction with soil/rock and/or any other geotechnical material in civil Employers Agenting applications.

Geosynthetic Clay Liner (also known as Clay Geosynthetic Barriers): An assembled structure of geosynthetic materials and low hydraulic conductivity earth materials (clay or bentonite), in the form of a manufactured sheet, used in contact with soil/rock and/or any other geotechnical material in civil Employers Agenting applications.

Geotextile, non-woven: A geotextile in the form of a manufactured sheet or web of directionally or randomly orientated fibres, filaments or other elements, mechanically and/or thermally and/or chemically bonded.

Geotextile, woven: A geotextile produced by interlacing, usually at right angles, two or more sets of yarns, fibres, filaments, tapes or other elements.

GRI-GCL3: The listed “GRI” specification for GCLs on the 3 website or any website replacing this address (managed by GRI).

Lining Contractor: A specialist sub-contractor to the main contractor who is responsible for the installation of a geomembrane liner on behalf of the main contractor.

Normal temperature: A temperature between 15°C and 32°C.

Reinforced GCL: A GCL in which the carrier and cover layers are mechanically linked through the bentonite component to provide internal shear strength to the GCL.

Wrinkle, wave or fold: Undulation in the liner that is caused by installation methods, temperature fluctuations or activities like cover placement taking place on the liner.

PB : 25.2.5. DEFINITIONS RELATING TO QUALITY PROGRAMMES

This CQA Plan is devoted to Construction Quality Assurance. Both quality assurance and quality control in a construction project are aimed at ensuring quality of the final product - the infrastructure. However, Quality Assurance and Quality Control are distinctly different activities. Refer to the GRI-GCL3 specification for definitions relating to quality programmes. The definitions listed below provide a brief overview of the applicable quality programmes for reference:

Manufacturing Quality Control (MQC): The GCL shall conform to the requirements as stated in GRI-GCL3 for GT-Related reinforced GCL.

Construction Quality Control (CQC): Monitors work as it happens and is a planned system of inspections that is used to directly monitor and control the quality of a construction project. Construction Quality Control shall be performed by the Lining Contractor or for natural soil materials by the Earthworks Contractor and is necessary to achieve quality in the constructed or installed system. Construction Quality Control 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 Project Specifications.

Construction Quality Assurance (CQA): A planned system of activities that provides the Employer, Construction Manager and Permitting Authorities assurance that the facility was constructed as specified in the design. Construction Quality Assurance includes inspections, verifications, audits and evaluations of materials and workmanship necessary to determine and document the quality of the constructed facility. Construction Quality Assurance refers to measures taken by the Construction Manager to assess if the Lining Contractor is in compliance with the Drawings and Project Specifications. An independent third party CQA inspector may be appointed by the Employer to oversee the lining installation.

PB : 25.3. MATERIALS AND MANUFACTURING OF GCLs

PB : 25.3.1. QUALIFICATION OF GCL MANUFACTURER

The GCL material to be supplied and installed for this Contract shall be GRI-GCL3 (Reinforced GCL GT related) GCL. The carrier layer shall be a woven geotextile only.

Details of the Manufacturer(s) shall be provided in the Schedules forming part of this Tender.

The Manufacturer(s) shall be able to provide sufficient production capacity and qualified personnel to meet the demands of the project.

For this purpose, the following information regarding the Manufacturer(s), as a minimum, must be completed/ submitted in Returnable Schedule with the Tender):

- Corporate background and information (to be completed on the returnable Schedule) and declare ISO 9002: 1994 or ISO 9001:2000 certification (to be attached to the returnable Schedule)
- Manufacturing capabilities:
- Information on plant size, equipment, number of shifts per day, and production per shift(to be completed on the returnable Schedule);
- List of materials used, material properties, including certified test results and further details of completed projects (to be supplied if requested by the Employer).
- Completed Projects: provide details of completed projects for which the Manufacturer has produced the same geosynthetic clay liners with **a minimum total area of 1,000,000 m^2 being manufactured.** (This requirement is for GCL similar to that specified above)
- It is required that the manufacturers of the geosynthetic membranes have ISO 9002: 1994 or ISO 9001:2000 certification (even though more recent certifications are available). The Tenderer is to state in the returnable Schedule whether the manufacturer is ISO 9002:1994 or ISO 9001:2000 certified.

PB : 25.3.2. GCL Plant Audit

SCOPE

The Construction Manager or a representative of the Construction Manager may perform an audit of the manufacturing and quality control procedures used by the Manufacturer, specifically for the production of the GCLs to be used for installation at the Employer's facility.

QUALITY CONTROL

The manufacturer shall make available to the Employer and Construction Manager, Manufacturing Quality Control (MQC) manuals, which outline all quality procedures, to be implemented for the manufacture of the GCLs.

The Manufacturer shall provide certification for laboratory testing equipment. The Construction Manager may verify that, during select runs of material, all MQC procedures are performed.

MANUFACTURING PROCESS

In general, the Manufacturer shall provide access for the Construction Manager to all equipment used to manufacture the GCLs. This does not include divulging trade secrets, formulations and procedures that are not commonly known as basic manufacturing processes.

The Construction Manager shall be furnished with the relevant test results, in accordance with this specification, and the QC certificates

PB : 25.3.3. Manufacturing of Geosynthetic Clay Liner (GCL)

PB: 26. MANUFACTURING AND MATERIALS

Refer to the GRI-GCL3 specification for the manufacturing quality control requirements of GRI-GCL3 (Reinforced GCL GT related) GCLs.

The Construction Manager shall be informed and give approval if the source of bentonite is changed from the originally offered GCL product.

PB: 27. QUALITY CONTROL SUBMISSIONS

Manufacturing Quality Control documentation from the manufacturer of each type of GCL to be supplied must be submitted for approval to the Construction Manage. Submittals must be made before the materials are purchased and delivered to site. Submittals to include:

- Dates of manufacture
- Bentonite and geotextile supplier,
- Batch numbers and roll numbers, length and width
- Documentation of the manufacturer's specific quality control program, which shall provide test data indicating the actual test values per roll or per batch, as may be applicable as called for in GRI–GCL3.

PB: 28. MATERIAL SPECIFICATIONS

The quantities set out in the schedule of quantities have been determined from data available at the time. However, the liability shall rest entirely and solely with the Lining 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 Lining Contractor for construction purposes

Any reliance placed by the Lining Contractor on the estimated quantities stated in the Schedule of Quantities, or measurements made by the Lining Contractor from the drawings shall be entirely at the Lining Contractors risk and the Employer accepts no liability whatever in respect of materials ordered by the Lining Contractor on this basis.

All geosynthetic areas stated in the bill of quantities are net.

GEOSYNTHETIC CLAY LINER (GCL)

The GCL material to be supplied and installed for this Contract shall conform to the requirements as stated in GRI-GCL3 (Reinforced GCL GT related) GCL. The carrier layer shall be a woven geotextile only.

Replace the corresponding parameter in Table 1(a) of GRI-GCL3 with:

Parameter	ASTM Test Method	Value	MQ Test Frequency
Bentonite	D 5993	4000 g/m^2	2 000 m^2

Add the corresponding parameter in Table 1(a) of GRI-GCL3 with:

Parameter	ASTM Test Method	Value	MQ Test Frequency
Hydrated Internal Shear Strength (min) at a normal load of 30 KPa	D6243	24 kPa	2 000 m^2

Bentonite Type: All GCLs shall contain natural sodium bentonite unless otherwise specified on the drawings or in the Project Specifications.

The GCL Product being offered must be suitable for the application as indicated on the drawings.

In addition, a minimum Interface Friction Angle between GCL & Underlying Material Layer of ≥15° using ASTM D5321 will be required.

PB: 29. TESTING

All MQC and CQC testing and reporting thereon are described in the supporting specifications.

In addition to the above, the following independent 3rd party test will be carried out. For each type of GCL one set of tests will be carried out. A set of tests will consist of conformance to the properties listed in Table 14 below:

Table 9: GCL Manufacturer QA/QC Requirements

Property	Test Method
Clay mass per unit area	ASTM D 5993
Swell Index	ASTM D 5890
Fluid Loss	ASTM D 5891
Hydraulic Conductivity	ASTM D 5887
Strip Tensile Strength	ASTM D 6768
Shear strength	ASTM D 6243

The testing procedure is as follows:

- One set of six 400mm x 400mm samples are to be cut evenly spaced across the width of the roll in the presence of the Construction Manager or his Representative.
- The samples must be cleaned and packaged and sent to a laboratory as specified by the Construction Manager. Alternative testing facilities will be considered, if the supplier can provide proof of such a testing facility's independence and competence.
- Information on the specific roll numbers from which the samples are cut are to be provided to the Construction Manager, as well as confirmation of dates on which samples have been sent and arrival at the testing facility.
- The Construction Manager may require the testing to be repeated once the material is delivered to site.

PB : 29.1. PACKAGING, TRANSPORTATION, HANDLING AND STORAGE

The products shall be packaged, transported, unloaded and stored in accordance with the manufacturer's instructions, subject to the Construction Manager 's approval, and generally in accordance with ASTM Standard D 5888, "Standard Guide for Storage and Handling of Geosynthetic Clay Liners".

PB : 29.1.1. Packaging and Identification

All GCL rolls shall be packaged in opaque moisture and ultraviolet resistant plastic sleeves. The roll cores shall be sufficiently strong to resist collapse during transit and handling. The Construction Manager has the right to reject any roll if the core has collapsed or if the roll is damaged in any other way.

Before shipment, the manufacturer shall label each roll, both on the surface of the plastic protective sleeve and on the inside of the core. Labels shall be resistant to fading and moisture degradation to ensure legibility at the time of installation. As a minimum the roll labels shall identify the following:

- Product name, grade and manufacturer
- Length and width of roll
- Gross mass of roll

- Production lot/batch number and individual roll number
- Manufacturers quality approval label
- Label with handling guidelines

PB : 29.1.2. Auxiliary Products

Any accessory bentonite used for sealing seams, penetrations, or repairs, shall be high-quality powdered or granular sodium bentonite from a recognized producer and must comply with the same specifications as the GCL itself, as contained in GRI-GCL3.

PB : 29.1.3. Transportation

If slings are used to load or off load and transport GCL rolls, an appropriate core pipe must be used to support the weight of the roll. During transportation, a roll may not deflect by more than half its diameter.

PB : 29.1.4. Handling of Materials

The method of unloading and handling of GCL rolls shall be as specified below. Any deviation from these procedures shall be pre-approved by the Construction Manager in writing.

GCLs must be supported during handling to ensure worker safety and to prevent damage to the product. Stacking should always allow easy access to at least one end of each roll for handling equipment as well as for roll identification. The construction quality assurance officer 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.

Under no circumstances may the rolls be dragged, lifted from one end, lifted in the middle of the roll, lifted with only the forks of a forklift, or dropped to the ground from the delivery vehicle.

Spreader Bar Assembly: A spreader bar assembly shall include 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. Lifting the rolls should be done with a sufficiently strong pipe/bar that can easily fit in the roll core. This can be accomplished with a 63mm to 75mm outside diameter steel pipe/bar, with a wall thickness capable of providing sufficient beam strength to support the weight of the roll without bending, which, depending on the GCL type, can be up to 1200kg or more.

Carpet Spike (or "stinger"): 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 must be at least ¾ the width of the roll and inserted to its full length into the roll core to prevent excessive bending of the roll when lifted.

Roller Cradles: Roller cradles consist of two rollers, which both support the GCL roll and allow it to unroll freely without significant deflection.

A method statement shall be submitted to the Construction Manager by the Contractor before ANY GCL material is off-loaded on site.

PB : 29.1.5. Inspection upon Delivery

Each roll shall be visually inspected when unloaded to determine if any packaging or material has been damaged during transit. Possible product conditions and actions are listed below:

- Rolls, including the roll cores, exhibiting damage shall be marked and set aside for closer examination during installation. Minor rips or tears in the plastic packaging shall be repaired with moisture resistant tape before being placed in storage to prevent moisture damage.
- The presence of free-flowing water (more than small amount of condensate from bentonite itself) within any roll packaging shall require that the roll be set aside for further examination to ascertain the extent of any damage.
- GCL rolls delivered to the project site shall be those indicated on GCL manufacturing quality control certificates.
- Repairs to damaged GCL rolls shall be performed in accordance with the repair method detailed in this this specification, during installation, if approved by QCAO and/or Employers Agent.

All material deliveries shall be logged and a summary of this log presented to the Construction Manager no

more than three (3) days after delivery to site for any particular material type.

The Construction Manager or his representative should be present, whenever possible, to observe the material delivery and unloading on Site. The Construction Manager reserves the right to reject any roll at any stage prior to installation should it exhibit any of the above damages or non-conformance.

PB : 29.1.6. Storage

Storage of the GCL rolls shall be the guidance of the Installer party. All GCL rolls shall be stockpiled and maintained dry in a well-drained flat area away from high-traffic areas but sufficiently close to the active work area to minimize handling. Rolls should be stacked off the ground using wooden pallets. The top of the wooden pallets shall be at least 100mm above natural (surrounding) ground level.

The area where the material is to be stored shall be free of any protrusions, rocks and other sharp objects, which could damage the material. The Main Contractor will clear an area of sufficient size for the storage of materials within 1km of the construction site next to the Main Contractor's campsite.

Rolls shall not be stacked on uneven or discontinuous surfaces, in order to prevent bending, deformation, product thinning and damage to the GCL or cause difficulty during handling.

GCL roll stacks shall be limited to the height at which installation personnel can safely manoeuvre the handling apparatus, to a maximum height of three rolls. Stacks or tiers of rolls must be situated in a manner that prevents sliding or rolling by chocking the bottom layer of the rolls.

An additional tarpaulin or plastic sheet shall be used over the stacked rolls to provide extra protection for GCL material stored outdoors.

Bagged bentonite material shall be stored in a dry location free from the influences of weather conditions. Bags shall be stored on dry surfaces that will prevent pre-hydration.

PB: 30. CONSTRUCTION

PB : 30.1. Construction Quality Control

PB : 30.1.1. CONSTRUCTION QUALITY CONTROL (CQC) PLAN

The CQC Plan shall be submitted to the Construction Manager at least 5 days before construction commences. It shall include:

- A site staff organogram indicating authority and responsibilities
- Proposed panel layout drawing(s)
- A Method Statement detailing the Contractor's proposed construction procedure of the specific elements of the GCL installation including activities preceding and following the installation (i.e. surface preparation and cover placement). No work related to such elements shall commence before the method statement has been submitted and agreed upon.
- A delivery note checklist template
- Acceptance and non-conformance templates for subgrade, panel placement, seaming and repairs.
- All necessary Construction Quality Control forms for completing during the installation of the GCLs.

PB : 30.2. QUALIFICATION OF THE GCL CONTRACTOR

The GCL shall be installed by a competent Contractor. If the Contractor has no prior experience installing GCLs, adequate training should be provided by the GCL supplier to the satisfaction of the Construction Manager . The cost of the training shall be taken into account in the payment items.

PB : 30.3. NOTIFICATION OF CHANGES

After acceptance of the CQC Plan, the Contractor shall notify the Construction Manager in writing prior to any proposed change. Proposed changes are subject to acceptance by the Construction Manager.

PB : 30.4. CONSTRUCTION QUALITY ASSURANCE

Duties of Construction Manager 's Construction Quality Assurance Personnel

The personnel of the Construction Manager include:

- The CQA Officer, who may be the same person as the Construction Manager 's representative;
- The Construction Manager 's representative who is located at the site; and
- Any other staff or assistant who may be used on the site.

The general duties of a qualified and experienced CQA Officer are set out below. The CQA Officer shall review all site-specific documentation, proposed panel layouts, Contractor's GCL construction programme and methods, and the Contractor's CQC Plan and he shall attend the Site Meetings where necessary and may be required to produce a final report.

PB: 31. INSTALLATION

PB : 31.1. General

The GCL shall generally be installed as per ASTM D 6102, except where otherwise indicated in the following sections of this specification The CQAO shall verify that the subgrade is suitable for supporting the geosynthetics, any underlying layers are clean and free of deleterious materials prior to deployment, and that anchoring is achieved as specified. The CQAO shall observe and document that all geocomposite materials are covered with the approved material and that traffic or hauling equipment does not damage the material during installation, regardless of CQAO observing the Works, the onus rests with the Contractor to undertake the installation in such a way as to avoid damage to the materials.

PB : 31.2. Temporary Anchoring

The Contractor shall supply double lined sandbags or other method approved by the Construction Manager to keep all material in place during the installation process. The bags are to be filled with sand.

PB : 31.3. Panel Layout

Prior to commencing GCL installation the Contractor shall prepare and submit to the Construction Manager for approval a proposed panel layout drawing, drawn to scale, showing the proposed deployment pattern and sequence. The location of overlaps and details thereof must also be shown. No deployment of GCL shall commence until the Construction Manager has approved the panel layout. This deployment plan may be requested by the Construction Manager at the tender stage.

In preparing the panel layout, the Contractor shall take into account the construction schedule, access restrictions and the following limitations placed on seam locations:

- To the maximum extent possible, overlaps shall be parallel to the slope (down the slope).
- The number of transverse seams (perpendicular to slope) on slopes shall be minimized. Where such seams are unavoidable, the details of these seams must be approved by the Construction Manager.
- Seams at inside and outside corners, odd-shaped geometric configurations, seam convergences, and small panels shall be avoided if possible.

Each panel and penetration shall be given a simple and logical identification code consistent with the panel layout drawing. The panel identification should include the panel batch and roll number. The panel layout drawing shall be updated from time to time to reflect the actual deployment configuration.

On completion of the installation, the Contractor shall prepare and submit to the Construction Manager as-built drawings to scale showing the final panel layout.

PB : 31.4. Anchor Trench

In some cases, the GCL can be anchored in the same trench as any adjacent geosynthetic liner components (if used). Dimensions and location of the trench are provided on the project drawing/s. The front edge of the trench is to be rounded, so as to prevent stress concentrations on the GCL. Care should be taken to preserve the integrity of the sides of the trench during GCL installation.

The backfill of the anchor trenches must only commence after the Construction Manager has inspected and accepted the trench for backfill. The Construction Manager requires the trench only to be backfilled after the protection geotextile layer has been installed.

The backfilling of the trenched shall be done in accordance with SANS1200DB, with particular reference to

SANS1200 DB, Clause 5.7.1.

The GCL must be installed in the trench as detailed on the project drawings.

PB : 31.5. Deployment

Prior to deployment, the CQAO shall verify that the subgrade or synthetic liner is suitable for supporting the geosynthetics, any underlying layers are clean and free of deleterious materials prior to deployment, and that anchoring is achieved as specified.

The GCL shall be installed on the approved areas shown on the drawings, or as directed by the Construction Manager, using methods and procedures that ensure a minimum of handling. The orientation of the GCL, i.e. which side faces up, shall be in accordance with the drawings, or as instructed by the Construction Manager.

When possible, GCL deployment should begin at the higher elevations and proceed to the lower elevations. At no time shall GCL rolls be released and allowed to unroll freely under gravity. Damaged, faulty or suspect areas shall be marked for repair. The method used to unroll the GCL shall not damage any underlying geosynthetics or allow stones, mud, or debris to be trapped under the GCL. Care shall be taken to prevent damage to the either surface of the GCL when it is finally positioned across the subgrade or underlying geosynthetic.

The GCL shall be placed one panel at a time in a relaxed condition with the required overlap so that it is in intimate contact with the underlying surface at all locations and free of tension or stress upon completion of the installation. All necessary precautions, including installing extra material, shall be taken to avoid bridging of the material. Cutting and trimming of GCL placed over geomembranes shall be undertaken with hooked-blade knives or another approved cutter. Special care shall be taken to protect other geosynthetic materials from damage that could be caused when cutting.

It is important to ensure that the GCL is not left exposed to the elements and therefore the subsequent covering activities must be co-ordinated accordingly with the GCL installation.

The Contractor shall only deploy as much GCL that can be covered in a reasonably short time in the event of precipitation or as can be covered by the end of the working day with geomembrane, or temporary plastic sheeting.

The layout and sequence of panel placement is determined by the direction of water run-off. Panels are laid out according to previously approved panel layout drawings. Generally, the installation is started at the up-wind side and at the highest elevation so that any rainfall runs off the lower part of the impoundment, preventing pooled water from hydrating the GCL.

If unplanned premature hydration occurs the Construction Manager shall be notified. If the extent of the premature hydration is such that, when an average weight person walking over the GCL causes ”toothpasting” to occur, the hydrated GCL may need to be replaced at the discretion of the Construction Manager.

The extent of the damage of the prematurely hydrated GCL section can be assessed taking the following into account:

- Separation and damage of the geotextiles
- Depth of indentations (and corresponding bentonite thinning) where it has been walked or driven on.
- The integrity of the overlaps and other bentonite enhanced seams.

A sharp utility knife should be used for cutting the GCL if required, e.g. around penetrations. Frequent blade changes are recommended to avoid damage to the geosynthetic components of the GCL during the cutting process. Removed blades should not be discarded on or under the installed GCL. Cutting should be done on an adequately sized, preferably wooden, cutting board.

The GCL may not be unrolled elsewhere or re-handled after it is unrolled.

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. A slip-sheet may be used to facilitate positioning of the liner while ensuring the GCL is not damaged by underlying harsh surfaces.

The contractor shall only install as much GCL as can be covered at the end of each working day by the HDPE and/or sand cover layers. Only those GCL panels, which 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.

Bentonite paste of similar grade to the actual GCL should be placed between panels at a minimum rate of 900 grams per linear meter of seam.

The overlap zone shall be kept clean from any foreign material.

No overlaps shall be placed in low points or in drain cavities and shall be kept 1m away from the toe of all slopes.

Overlaps shall be to the Construction Manager 's requirements and shingled in the direction of anticipated water flow.

PB : 31.6. Seaming

PB : 31.6.1. General

GCL seams shall be used where called for on the Drawings, shown on the approved panel layout, or as directed by the Construction Manager. The seam shall be created by overlapping adjacent edges and enhancing the seam as recommended by the manufacturer, or as instructed by the Construction Manager.

The overlap zone shall be kept clean and shall not be contaminated with loose soil or other debris. There shall be no folds in the overlap zone and no traffic or walking shall occur on the completed seam. No end overlaps shall be positioned in sumps or inverts.

PB : 31.6.2. Overlap

Overlaps shall be 500mm minimum horizontally and vertically and shingled in the direction of anticipated water flow.

If the GCL does not incorporate a mechanism to ensure longitudinal overlap sealing overlap areas will require on site overlap bentonite sealing. Edges are pulled back and bentonite of the same source to that used in the product should be poured/smeared continuously along all seam edges. The amount of bentonite must be sufficient to create a thin-paste layer over the entire overlap area.

Horizontal seams on steep slopes (steeper than 1V:6H) should be avoided. However, these may be required for long slopes, in which case the horizontal seams shall be constructed as directed by the Construction Manager.

When the GCL is cut to fit into small areas, in corners or around structures adjacent panels should be overlapped a minimum 500mm or as directed by the Construction Manager, adding abundant bentonite in overlapped areas, if the overlapped area does not cover a bentonite enhanced longitudinal edge.

PB: 32. REPAIRS

PB : 32.1. General

Any portion of the GCL or seam showing a defect shall be repaired. Reasons for requiring repairs to the GCL installation include, but are not limited to:

- A hole, cut, or tear
- Insufficient overlap
- Bridging
- GCL material defects
- A hard object underneath the GCL
- Unconfined and unhydrated GCL material exposure to harmful liquids during installation. This could include hydrocarbon fuels, chemicals, pesticides, or non-compatible leachate, as determined by the Construction Manager.
- Premature hydration

PB : 32.2. Repair Methods

Agreement on the appropriate repair method shall be reached between the Contractor and the Construction Manager. Repairs shall be undertaken using one or a combination of the following methods:

PB : 32.2.1. Patching

Patching shall be used to repair holes, cuts or tears, insufficient overlap, bridging, GCL material defects, and to remove hard objects underneath the GCL. Patching shall comprise installing a new piece of GCL of the same material type and thickness extending at least 500 mm beyond the affected area in each direction. This 500 mm area must be augmented with bentonite powder/granules to the supplier's normal jointing requirements for patches and to the Construction Manager s approval. Patch seams shall be created as described in PGCL 5.3.5.

Patches on slopes steeper than 1V:6H shall be minimized, and in this case the Construction Manager shall approve the location and size of such a patch. In addition to bentonite augmentation around the edge of patches on slopes steeper than 1V:6H the patch shall be temporarily secured such that it is not displaced during cover placement. Patches may be tucked under the damaged area to limit patch movement.

No patches shall overlap. If this is required to make a repair, the entire area, including all previous patches in the near vicinity, shall be covered with a single large patch. The Construction Manager shall approve deviations from this requirement.

All patches on the GCL should be recorded by a GPS global positioning system as positions stored and given to the quality control officer/ Construction Manager and indicated on the As-Built Panel layout.

PB: 33. SEALING AROUND PENETRATIONS AND STRUCTURES

The GCL shall be sealed around penetrations and structures embedded in the sub-grade. Bentonite powder/granules shall be used liberally to seal the GCL to these structures in accordance with the drawings. An example detail is shown in Figure 1 below.

When the GCL is placed over an earthen subgrade, a "notch" should be excavated into the sub-grade around the penetration. The notch should then be filled with bentonite or bentonite paste. A secondary collar of GCL should be placed round the penetration with a minimum overlap of 500mm.

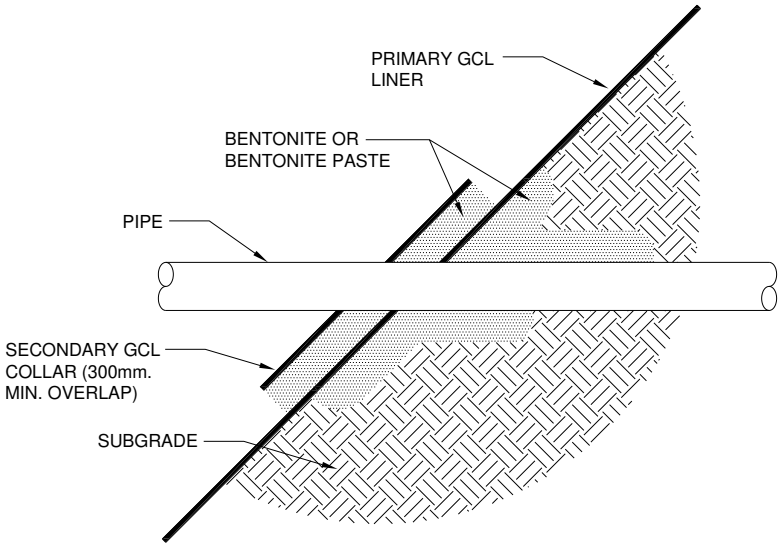


FIGURE 1: TYPICAL PIPE PENETRATION SECTION DETAIL (AFTER ASTM D 6102) (NOTE: CHANGE MIN OVERLAP TO 500MM)

PB: 34. HYDRATION

No prehydration of the GCL will be allowed unless specifically called for in the project specifications or on the drawings.

If the GCL is to be prehydrated as called for on the drawings or in the Project Specifications. If no specification is given the bentonite will be hydrated to contain 40% moisture measured by the dry mass of the bentonite.

PB: 35. COVER PLACEMENT

PB : 35.1. GEOMEMBRANE LINER

Once the GCL is hydrated, it will be immediately covered with the geomembrane liner as per the placement requirements dictated in this document. Only the amount of GCL that can be covered with HDPE Liner will be deployed on a certain working day. Under no circumstances is a hydrated GCL to be installed without covering it with HDPE Liner (including welding of joints) and left overnight.

Any exposed GCL edges shall be covered with temporary plastic sheeting that is anchored under the leading edge of the soil cover and folded at least 300 mm under the leading edge of the GCL. The protected end of the GCL shall be held in place with temporary ballast until installation resumes.

PB : 35.2. STONE CONFINING LAYER

It is a requirement of the design that the leachate collection stone be installed within a period of 14 day from the day on which the GCL is hydrated. This ensures that GCL is adequately confined to avoid GCL panel shrinkage and moisture losses.

No vehicles should be allowed to traffic the area directly above the GCL unless at least 300mm separation exists between the GCL and the vehicle to adequately distribute the vehicle load for a short period of time of pass-over.

PB: 36. TOLERANCES

Manufacturing tolerances to be in accordance with GRI-GCL3 and any associated standards.

The maximum permissible deviations for overlaps in joints, patches and seams shall be 10% of the specified overlap.

Verification of Permissible Deviations:

- Dimensions will be verified at normal temperature; measurements being made with a tape at normal temperature.
- For installation, at sunrise or at such time as when, in the opinion of the Construction Manager, the effect of the sun is of no consequence.
- All PDs will be rounded up to the next whole millimetre

Table 10: GCL Installation Tolerances

ITEM	PERMISSIBLE DEVIATION		
	DEGREE OF ACCURACY		
	III	II	I
Substrate			
Flatness of substrate		Note 1	
Flatness of GCL		Note 2	
Anchor trenches			
Anchor trench Position on plan	*	+-75mm	*
Anchor trench dimensions	*	-0mm	*
Anchor trench surface irregularities in contact with GCL	*	50mm	*
GCLs			
Refer GRI GCL3 for MQC			
Waves & Folds		None	

PB : 36.1. Note 1: Substrate flatness

The top layer of the subgrade layer shall be graded and compacted using a smooth drum roller where it needs to be prepared for the placing of the geomembrane and shall be finished such that no gap greater than 30mm can be measured beneath a 3m straight edge. The surface shall be clear of loose stones and may not have protrusions (of any sort) in excess of 5 mm of the final layer ready to accept the GCL. No abrupt changes in falls or alignments will be allowed.

PB : 36.2. Note 2: Liner flatness

The liner will be laid flat on the surface without any fold or wrinkles.

PB: 37. TESTING

PB : 37.1. General

The GCL material shall be tested for compliance with the specifications listed in Table 1 (a) in GRI-GCL3 (Reinforced GCL GT related) by the test methods and frequencies indicated. Sampling of GCL is to be in accordance with ASTM D6072.

Immediately upon manufacture, Conformance Testing may, at the discretion of the Construction Manager, be carried out by an independent accredited laboratory (MQA laboratory). Common important conformance tests are listed in Table 1. Further tests, such as GCL shear strength (ASTM D 6243), may be required by the Construction Manager for specific projects. The testing frequency shall be at the discretion of the Construction Manager, but the frequency shown in Table 1 (a) in GRI-GCL3 (Reinforced GCL GT related) can be used as a guideline. The Construction Manager shall approve the laboratory before any testing is done. The Construction Manager has the right to reject any roll or production batch if the samples do not pass conformance testing.

The Contractor shall supply with his tender, a Construction Quality Control Plan which clearly indicates documentation ensuring compliance with the necessary material specifications, and control points requiring quality control checking during construction/installation.

The Construction Manager/CQAO may request test results produced by a certified laboratory independent of the manufacturer to verify the claimed properties, prior to approval of the product(s) offered. All MQC and CQC testing and reporting thereon are described in the GRI-GCL3 specification.

PB: 38. DOCUMENTATION

PB : 38.1. General

An effective construction quality assurance plan depends largely on recognition of all construction activities that must be monitored, and on assigning responsibility for the monitoring of each activity. This is most effectively accomplished and verified by the documentation of quality assurance activities. The Construction Manager/CQAO will ensure that all quality assurance requirements have been addressed and satisfied.

PB : 38.2. Prior to installation

The Installer/Contractor is to provide the following to the Construction Manager/CQAO before installation on site:

- Manufacturers conformance certificates
- A drawing indicating the position and numbers of each individual panel that will be installed (Panel layout)
- A Method Statement describing the method of installation and quality control documentation to be completed
- A Project Quality Plan with organization chart and detailing inspection procedures

PB : 38.3. During installation

The Installer/Contractor is to complete the following:

- Material receipt with roll numbers

- Subgrade surface acceptance documentation
- Panel layout – Panels installed and repair positions
- Panel Placement Form showing the location of all panels and joints
- Project Quality Plan – Signatures
- Certificate of Acceptance

The Construction Manager s representative is to complete the following daily reports:

- Field notes, including memoranda of meetings and/or discussions with the Contractor and GCL Installer.
- Construction problems and solution data sheets
- Project Quality Plan – Signatures
- Data on weather conditions
- Safety Matters
- Soil cover details
- Signature of Completion Certificate

PB : 38.4. After installation

The Installer/Contractor is to provide the following within 14 days to the Construction Manager.

- A complete Data Pack containing all completed and signed documentation as described herein (Installer/Contractor documentation).
- The Installer/Contractor Data Pack
- An outline of the project
- A description of the lining system
- GCL Material Specification
- Batch and roll numbers of panels used
- A summary of onsite CQA activities, quantities, samples etc.
- A photographic record of construction
- Discussion of problems and solutions
- As built drawings

PB: 39. GEOTEXTILES

PB : 39.1. DEFINITIONS

Geotextile: A planar, permeable, polymeric (synthetic or natural) textile material, which may be non-woven, knitted or woven, used in contact with soil/rock and/or any other geotechnical material in civil Employers Agenting applications.

Geojute: a biodegradable netting/matting made from jute, sisal, coir or similar material. A 1m² sample shall be submitted for approval to the Employer's Agent /Landscape Architect prior to procurement.

Minimum Average Roll Value (MARV): For geosynthetics, a manufacturing quality control tool used to allow manufacturers to establish published values such that the user/purchaser will have a 97% confidence that the property in question will meet published values. For normally distributed data, "MARV" is calculated as the typical value minus two (2) standard deviations from documented quality control test results for a defined population from one specific test method associated with one specific property.

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.

PB : 39.2. REFERENCES

The PA specification includes references to specifications and test procedures of:

- the American Society for Testing and Materials (ASTM);
- Geosynthetic Research Institute (GRI) Test Methods and standards;
- All other specifications contained, or referred to, in this Document.

PB : 39.3. MANUFACTURING, TRANSPORT AND STORAGE

PB : 39.3.1. WORKMANSHIP AND APPEARANCE

The finished geotextile shall have good appearance qualities. It shall be free from such defects that would affect the specific properties of the geotextile, or its proper functioning.

General manufacturing procedures shall be performed in accordance with the manufacturer's internal quality control guide and/or documents.

PB : 39.3.2. MQC SAMPLING, TESTING, AND ACCEPTANCE

Geotextiles shall be subject to sampling and testing to verify conformance with this specification. Sampling shall be in accordance with the most current modification of ASTM Standard D 4354, using the section titled, "Procedure for Sampling for Purchaser's Specification Conformance Testing." In the absence of purchaser's testing, verification may be based on manufacturer's certifications as a result of testing by the manufacturer of quality assurance samples obtained using the procedure for Sampling for Manufacturer's Quality Assurance (MQA) Testing. A lot size shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.

Conformance testing to be done and approved during manufacturing and also on arrival on site.

PB : 39.3.3. MQC RETEST AND REJECTION

If the results of any test do not conform to the requirements of this specification, retesting to determine conformance or rejection should be done in accordance with the manufacturing protocol as set forth in the manufacturer's quality manual.

PB : 39.3.4. SHIPMENT AND STORAGE

Geotextile labelling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style, and roll number. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.

Each geotextile roll shall be wrapped with a material that will protect the geotextile, including the ends of the roll, from damage due to shipment, water, sunlight and contaminants. The protective wrapping shall be maintained during periods of shipment and storage.

During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, temperatures in excess of 70°C, and any other environmental condition that may damage the property values of the geotextile.

PB : 39.4. CERTIFICATION

The contractor shall provide to the Employer's Agent a certificate stating the name of the manufacturer, product name, style number, chemical composition of the filaments or yarns, and other pertinent information to fully describe the geotextile.

The manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request.

The manufacturer's certificate shall state that the finished geotextile meets MARV requirements of the

specification as evaluated under the manufacturer's quality control program. A person having legal authority to bind the manufacturer shall attest to the certificate.

Either mislabelling or misrepresentation of materials shall be reason to reject those geotextile products.

PB : 39.5. MATERIAL SPECIFICATION FOR GEOTEXTILES

Three types of geotextiles have been specified for use in the works, as described in **PA-5**, namely:

- Type A geotextiles (Separation), and
- Type B geotextiles (Protection - if needed),

These items have been listed as materials from "Local Content". It is also a requirement that "Type B" geotextiles are manufactured from >90% (by mass) recycled materials. If this requirement is in conflict with the remainder of these specifications, then this is to be reported at Tender stage.

Where products are tested under other test methods not specified, the methods and results should accompany the tender submission. The Employer's Agent retains the right to reject a test method and instruct the Contractor to have the product tested under the specified tests.

All geotextiles must be stable in the presence of the chemicals typically found at Oatlands Landfill and should be resistant to attack from these chemicals. This information is only representative of the leachate that would be in contact with the lining system. All geotextiles should be stable at a temperature of 100 °C.

All geosynthetics must be stable in the presence of the chemicals typically found in a landfill and should be resistant to attack from these chemicals.

PB : 39.5.1. TYPE A GEOTEXTILE: SEPARATION GEOTEXTILE

The **Type A** geotextiles shall be used for separation so the integrity and functioning of both materials can remain intact and/or be improved and remain functional for purpose (drainage/ through-flow) in the basal lining systems, leachate pond lining system and the terraced stormwater cascade. The geotextile will be non-woven needle punched polyethylene or polypropylene geotextile and shall comply with the material specifications tabulated below (in line with GRI-GT13a (Table 2b, page 7 of Rev 4) for geotextiles):

Table 11: Type A Geotextile Manufacturer QA/QC Requirements

PROPERTY	UNITS	ELONGATION < 50%	TEST METHOD
Permeability	m/s	$4.2x10^{-3}$	SANS 11058
Min. mass per m^2	g/cm^2	450	SANS 1525
Grab Tensile Strength (weakest direction)	N	1100	ASTM D 4632
Trapezoid Tear Strength	N	400	ASTM D 4533
CBR Puncture Strength	kN	2.25	ASTM D 6241
Permittivity	sec^{-1}	0.02	ASTM D 4491
Apparent Opening Size	mm	0.6	ASTM D 4751
Interface Friction with Stone Leachate Layer	°	25 (Residual) (TBC)	ASTM D5321
Interface Friction with Underlying Silty Sand Protection Layer	°	20 (Residual) (TBC)	ASTM D5321
All values are MARV Over and above the properties listed above, the product must be suitable for use in a solid waste landfill environment such as Oatlands Landfill. This site accepts a range of waste including general municipal waste and recirculates liquids.			

The Lab Test for Interface Friction Angle between the Separation GTX and the Stone Layer indicated shear properties of 29.2° and 26 kPa cohesion. The design has been undertaken assuming properties of 25° and c= 0 kPa to allow an envelope for material acceptance.

The minimum interface friction angles for the various components making up the Class B liner system have yet to be determined. These figures shall be determined during the course of the detail design and once established will be communicated to the successful bidder as part of the geosynthetics specification requirements.

PB : 39.5.2. TYPE B GEOTEXTILE: PROTECTION GEOTEXTILE

The **Type B** geotextile shall be a non-woven geotextile used for protection or cushioning layer, protecting the

geomembrane during the construction of the layers above. The geotextile must be a non-woven needle punched polyethylene or polypropylene geotextile manufactured from >90% (by mass) recycled materials. The geotextile must comply with the following material specifications tabulated below (in line with the GRI-GT12a (Table 1(b), page 6 of 7 of Rev 2):

Table 12: Type B Geotextile Manufacturer QA/QC Requirements

Property	Units	Type B1, 2	Test method
Protection Geotextile 1			
Grab Tensile Strength (weakest direction)	N	2250	ASTM D4632
Trapezoidal tear strength (weakest direction)	N	960	ASTM D4533
CBR Puncture strength	kN	7.56	SANS 12236
Tensile strength (weakest direction)	kN/m	36	SANS 1525
Protection Geotextile 2			
Grab Tensile Strength (weakest direction)	N	2000	ASTM D4632
Trapezoidal tear strength (weakest direction)	N	890	ASTM D4533
CBR Puncture strength	kN	4.90	SANS 12236
Tensile strength (weakest direction)	kN/m	34	SANS 1525
All values are MARV Over and above the properties listed above, the product must be suitable for use in a solid waste landfill environment such as Oatlands Landfill. This site accepts a range of waste including general municipal waste, hazardous waste and liquids.			

PB : 39.5.3. TYPE C GEOTEXTILE: EROSION CONTROL

The Tendered Rate shall be for the supply and installation of a biodegradable erosion control mat to be applied on top of a finished gravel surface. The mat is to be chemically stable and easily secured and pegged down. The purpose of this mat is to prevent erosion which may be caused by wind or water and to assist in the propagation of plants.

PB : 39.6. CONSTRUCTION

PB : 39.6.1. INSTALLATION OF THE GEOTEXTILE LAYER

No orders for any geotextile materials may be placed on a manufacturer or supplier without the Employer's Agent 's prior formal approval.

The geotextile shall be delivered to site in rolls with the unique roll number, unit mass and product name clearly labelled on the surface of the roll. The roll shall be covered with an opaque plastic sheet to prevent damaged from sunlight. If the geotextile roll is exposed to sunlight, at the discretion of the Employer's Agent, the outer layers of the roll shall be cut off and discarded. The rolls shall be stored on a secure dry, free draining surface and shall be stored on wooden beams to prevent water damage.

Where the geotextile is being placed on the subgrade layer, it may be deployed by machine. However, all wheel tracks shall be removed prior to the geotextile being deployed onto an area. The geotextile shall be held in place with sandbags to prevent wind uplift. Should the geotextile be displaced by wind or any other force, the Employer's Agent shall inspect the geotextile for damage and can instruct the Installer to remove the damaged geotextile and deploy a new roll at the Installer's own cost.

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. The overlaps shall be in such a direction that cover soil, when placed on the geotextile, is not pushed into the joint, under the top layer. The use of construction machinery directly over the geotextile is strictly prohibited. A minimum thickness of 250 mm of cover shall be kept between heavy equipment and the geotextile at all times when using machinery. No heavy vehicles may be driven directly over the geotextile until the proper thickness of cover had been placed.

Contractor to plan works to prevent any overlaps at start or end of rolls on embankment Type A. All costs associated to this requirement to be included in tendered rate.

PB : 39.6.2. CQA REQUIREMENTS

Over and above reviewing the installation as detailed above, the CQA Officer will review the following:

- Workmanship and appearance - The finished geotextile shall have good appearance qualities. It shall be free from such defects that would affect the specific properties of the geotextile, or its proper functioning.
- General manufacturing procedures shall be performed in accordance with the manufacturer's internal quality control guide and/or documents.
- Testing - Geotextiles shall be subject to sampling and testing to verify conformance with this specification. Sampling shall be in accordance with the most current modification of ASTM Standard D 4354, using the section titled, "Procedure for Sampling for Purchaser's Specification Conformance Testing." In the absence of purchaser's testing, verification may be based on manufacturer's certifications as a result of testing by the manufacturer of quality assurance samples obtained using the procedure for Sampling for Manufacturer's Quality Assurance (MQA) Testing. A lot size shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.
- Shipment and storage - Geotextile labelling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style, and roll number. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.
- Each geotextile roll shall be wrapped with a material that will protect the geotextile, including the ends of the roll, from damage due to shipment, water, sunlight and contaminants. The protective wrapping shall be maintained during periods of shipment and storage.
- During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, temperatures in excess of 70°C, and any other environmental condition that may damage the property values of the geotextile.

PB: 40. GEOGRID (IF REQUIRED)

PB : 40.1. DEFINITIONS

Tensile reinforcement "geogrid' fabric: A woven geotextile planar material comprising high strength yarn, bi-directional with high tensile strength at low elongation. **Geogrid is to be effective when installed within a fine-aggregate (sandy) layer works.**

Bi-directional : The tensile reinforcement fabric is to accommodate the specified tensile forces in two directions normal to each other.

PB : 40.2. MATERIAL SPECIFICATION FOR TENSILE REINFORCEMENT GEOGRID

Table 13: Geogrid Manufacturing QA/QC Requirements

Property	Min. Strength	Test Method
Short Term Tensile strength, machine direction and cross-machine direction at a maximum elongation of 10%	≥200 kN/m	ISO 10319
Tensile strength, machine direction and cross-machine direction at an elongation of 5%	≥80 kN/m	ISO 10319
Tensile strength (long term/ ultimate) after 100 years (technical assessment to be supplied to prove result, if requested)	≥110 kN/m	EN ISO 13431

Min. Interface Friction Angle between Geogrid & Underlying (Silty Sand) or Overlying (CCL) Material Layer	≥25°	ASTM D5321

The Lab Test for Interface Friction Angle between the Geogrid and the overlying CCL indicated shear properties of 31.7° and 33 kPa cohesion, and with the Silty Sand indicated shear properties of 31° and 28 kPa cohesion. The design has been undertaken assuming properties of 25° and c= 0 kPa to allow an envelope for material acceptance for both interfaces.

PB : 40.3. CONSTRUCTION

Supply and Installation of the Tensile Reinforcement Geogrid

PB : 40.3.1. GENERAL

The tensile grid is installed in the underside of a piggyback basal liner system, to take up strain in differential settlement. Due to high planned loading, each panel is to be anchored at the start and end of each roll, plus along the length of the roll, both sides (see Section below).

No orders for any tensile reinforcement “geogrid’ fabric materials may be placed on a manufacturer or supplier without the Employer’s Agent 's prior formal written approval.

The tensile reinforcement “geogrid’ fabric materials shall be delivered to site in rolls with the unique roll number, type and product name clearly labelled on the surface of the roll. The roll shall be covered with an opaque plastic sheet to prevent damaged from sunlight. If the material roll is exposed to sunlight, at the discretion of the Employer’s Agent , the outer layers of the roll shall be cut off and discarded. The rolls shall be stored on a secure dry, free draining surface and shall be stored on wooden beams to prevent water damage.

The tensile reinforcement “geogrid’ fabric shall be held in place with sandbags (until such time as the geogrid is anchored and completely installed) to prevent wind uplift. Should the sheets be displaced by wind or any other force, the Employer’s Agent shall inspect the sheets for damage and can instruct the Installer to remove the damaged sheets and deploy a new roll at the Installers own cost.

The tensile grid shall:

- be installed at the slopes as indicated on the drawings.
- be made from high strength PET yarns (the yarns are to be bi-directional.)
- Function (adhere to properties outlined in the table below) in fine to granular sand,
- Be stable and function under operating landfill temperatures of 00° to 60° C, even though temperatures over the landfills lifetime are not expected to exceed 35°C.

PB : 40.3.2. SUPPLY

The Contractor shall, prior to the commencement of the installation, supply a drawing or drawings showing the proposed position of all rolls, panels and seams of the geogrid to be placed in the Works.

The monitoring system established by the Employer’s Agent will include the following:

- Inspection of all geogrid manufacture Quality Control certificates provided by the Contractor;
- Selection of geogrid samples for conformance testing prior to installation;
- Inspection of all geogrid conformance test certificates provided by an Independent Testing Institute;
- Inspection of all geogrid laid and seamed to ensure that they have been placed in compliance with the Specification; and
- Inspection of any repairs required to the geogrid.

The Contractor shall afford any necessary assistance to the CQAO and take into account any disruptions that may be involved.

All the geogrid that the Contractor proposes to use in the Works shall be approved in writing by the CQAO, and sources of supply shall not be changed without their written approval. The manufacturer or supplier of each geogrid shall provide the following Information for each separate consignment of each material delivered to the site:

- Product name and grade/no;
- Name and address of producer/supplier;
- Batch or code number;
- Manufacturing characteristics and constituents including: Composition and type of constituent filaments, fibres, threads etc and any additives used in the manufacturing process and method of manufacture; and
- Consignment number and delivery date. Each consignment shall be numbered, and the delivery date recorded. A consignment is considered to be the number of rolls delivered at one time.

PB : 40.3.3. INSTALLATION

The Contractor shall provide adequate and acceptable measures for protecting the material at all stages of the work from all source of potential damage, including weather conditions until completion of the Work.

The Contractor shall submit a detailed Method Statement for the approval of the CQAO at least 7 days prior to installing any material. This shall detail the procedures for the installation and covering the geogrid, including the method of holding it in place.

Care shall be taken to avoid damaging the geogrid on removal of any wrappings and during the installation process or at any other time when the Contractor is responsible for the Works. Damaged lengths of geogrid shall be replaced with new materials unless the CQAO authorises repair by an approved method.

The geogrid shall be laid in a direction such that the work generally progresses down slope. When a geogrid is laid out on site care shall be taken to prevent damage or disturbance by wind or water. Where necessary, the geogrid shall be weighted or otherwise held in place by means which will not damage it.

The geogrid shall be securely anchored as detailed and deployed down the slope in such a manner to keep the geogrid in tension.

The layer of material on which the geogrid is placed shall not have protrusions or sharp projections which are likely to damage the geogrid during installation or in service. The method of installation shall ensure that the geogrid is in continuous contact with the surface on which it is to be placed and the geogrid shall not be stretched or bridged over hollow or hump. Operation of construction plant directly on the geogrid shall not be allowed.

The geogrid shall be anchored on ends of the roll/panel. The geogrid edging shall be placed into an anchor trench 100mm deep and 200mm wide, or as otherwise indicated on the drawings, thus the anchor “length” of geogrid will be 300mm on all sides and as such will be 100mm deep and 200mm wide on all sides. The overlap between panels will be the 200mm-wide-portion of geogrid laid at the bottom of the anchor trench**.**

The Contractor shall keep a daily record of formation preparation and geogrid installation. Copies of these records shall be submitted to the CQAO the following day. The daily record shall include:

- date
- area and location of formation prepared
- area and location of geotextile/geogrid installation
- consignment reference
- details and location of damage to geotextile/geogrid
- detail and location of any repairs

The form of the daily record shall be agreed with the CQAO.

If a tear or hole occurs in the geogrid which is less than 50% of the roll width it may be repaired. A patch shall be placed, with a minimum 500mm overlap on all sides of the tear and shall be tied at a maximum spacing of 300mm. If a tear or hole exceeds 50% of the width of the roll, then that role shall be removed from the slope and replaced.

PB: 41. MEASUREMENT AND PAYMENT

PB : 41.1. Geomembrane Supply ……Unit: m^2

Items will be provided for each membrane thickness, resin type and surface texture requirement. The area

measured will be the net (i.e. exclusive of all wastage, joints and overlaps) area shown on the drawings. The rate shall include all costs involved in purchasing the geomembrane local or international, MQC testing, transport to site, off-loading and storage as per specification.

PB : 41.2. Geomembrane Installation……Unit: m^2

Items will be provided for each membrane thickness, resin type and surface texture requirement. The area measured will be the net (i.e. exclusive of all joints and overlaps) shown on the drawings. The rate shall include the cost of preparing panel layout drawings, cutting, placing, overlapping, joining, repairing, terminating, fastening the membrane in position during construction, any temporary protection works against flooding, upliftment, traffic and any other adverse conditions that may exist. The rate shall also include for all CQC as specified. All work carried out after normal working hours is included in the installation rates. All lighting that may be required for carrying out work when dark should be included in the installation rates.

PB : 41.3. GCL Supply……Unit: m^2

Items will be provided for each membrane GCL type. The area measured will be the net (i.e. exclusive of all wastage, joints and overlaps) area shown on the drawings. The rate shall include all costs involved in purchasing the geomembrane local or international, MQC testing, transport to site, off-loading and storage as per specification. If overlaps are not specified side overlaps of 300mm and end overlaps of 500mm will be inferred.

PB : 41.4. GCL Installation……Unit: m^2

Items will be provided for each GCL type. The area measured will be the net (i.e. exclusive of all joints and overlaps) shown on the drawings. The rate shall include the cost of preparing panel layout drawings, cutting, placing, overlapping, joining, repairing, terminating, fastening the GCL in position during construction, any temporary protection works against flooding, traffic and any other adverse conditions that may exist. The rate shall also include for all CQC as specified. All work carried out after normal working hours is included in the installation rates. All lighting that may be required for carrying out work when dark should be included in the installation rates. If overlaps are not specified side overlaps of 300mm and end overlaps of 500mm will be inferred.

PB : 41.5. 3rd party testing……Unit: No.

Items will be provided for each membrane thickness, resin type and surface texture requirement. The costs shall include the material cost of the samples, marking, cutting, packaging, dispatching, testing the samples at the laboratory and reporting thereon.

PB : 41.6. Anchor trench …… Unit: m

Items will be provided for each anchor trench configuration. The rate shall include for excavation in all materials, shaping the trench to the lines shown on the drawings, temporarily stockpiling the material adjacent to the trench, backfilling in layers not exceeding 200mm and compacting the material as specified and spoiling the excess material. If no compaction is specified, the material will be compacted by two passes with a 1-ton smooth drum roller or equivalent approved.

PB : 41.7. Penetration……Unit: No.

Items will be provided for penetration detail configuration. The rate shall include for cleaning the surface area with a high-pressure water jet if required by the Employers Agent, supplying all steelwork, concrete work and geotextiles as shown on the drawings and installing the penetration as detailed including all, cutting, fixing, joining and wastage. The rate shall also include adequate GCL protection over the working areas and cleaning all metal shavings and other installation waste off the liner during installation or after completion as directed by the Employers Agent.

PB : 41.8. Geotextile Supply……Unit: m^2

Items will be provided for each type of geotextile used. The rate for the supply shall be calculated as per SABS 1200 DK Clause 8.2.4.

PB : 41.9. Geotextile Installation……Unit: m^2

Items will be provided for each type of geotextile used. The rate for the installation shall be calculated as per

SDABS 1200 DK Clause 8.2.4.

PB : 41.10. Supply and installation of geogrid……Unit: m^2

The unit of measurement shall be the net square metre area of the final placed geogrid as measured from the drawings, irrespective of any deformation of the base, extra material required for jointing or overlapping and the length of geogrid terminating into the anchor trench.

C3.5. ANNEXURES

C3.5.1. Particular Specification PC: OHSA 1993 HEALTH AND SAFETY SPECIFICATION

C3.5.2. Particular Specification PD: ENVIRONMENTAL MANAGEMENT SPECIFICATION

C3.5.1. Particular Specification PC : OHSA 1993 HEALTH AND SAFETY SPECIFICATION

AGREEMENT FOR THE REGULATIONS OF OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENTAL RESPONSIBILITIES

Entered into by and between

…….
(The CLIENT)

And

…….
(The CONTRACTOR)

1. PARTIES

2. ……. duly registered and incorporated according to the laws of the Republic of South Africa, and hereinafter referred to as the CLIENT.

3. ……. hereinafter referred to as the CONTRACTOR.

4. The COID Registration Number of the CONTRACTOR is: ……

2. DEFINITIONS AND INTERPATATION

2.1 An interpretation that is consistent with the intention of the PARTIES should be preferred over an interpretation that is inconsistent therewith.

2.2 In this AGREEMENT, unless inconsistent with, or otherwise indicated by the context, the following terms shall be interpreted under, and construed and implemented in accordance with, the laws of the Republic of South Africa.

2.3 In this AGREEMENT, unless inconsistent with, or otherwise indicated by the context, the following terms shall have the meanings assigned to them hereunder, namely:

2.3.1 The AGREEMENT: The contents of document and annexure(s), if any.

2.3.2 CONTRACT WORK: The work for which the CONTRACTOR was engaged by the CLIENT and all related activities.

2.3.3 The CONTRACT: As set out in paragraph 1.2 of this AGREEEMENT.

2.3.4 The PARTIES: The PARTIES as set out in paragraph 1 of this AGREEMENT.

2.3.5 The CLIENT: As set out in paragraph 1.1 of this AGREEMENT.

2.3.6 SHE: Occupational Safety, Health and Environment.

PREAMBLE

3.1 The purpose of the AGREEMENT is to regulate the legal responsibilities and liabilities arising from the CONTRACT WORK regarding occupational safety, health and environmental management. This AGREEMENT does not purport to regulate all the contractual relations between the PARTIES, and does not replace any existing agreement(s) between the PARTIES, and does not replace any existing agreement(s) between the PARTIES relating to any other aspect that does not relate to SHE risks, responsibilities and liabilities.

3.2 It is the intention of the PARTIES that, subject to the, subject to the express provisions of this AGREEMENT, the CONTRACTOR shall be the main risk carrier for SHE regarding the CONTRACT WORK.

3.3 This AGREEMENT shall be deemed to be for the full extent of site presence and these rules will remain in force until such time as the CLIENT revokes the document in full or in part.

3.4 The onus is the CONTRACTOR to advise any sub-contractor that this document is an agreement under section 37(2) of the Occupational Health and Safety Act and similarly binds such sub-contractors.

3.5 If the Construction Regulations apply to the CONTRACT WORK, this AGREEMENT will also serve as the health and safety specifications envisaged by those regulations that the client must provide to the principal contractor. Refer also to Annexure A in this regard.

4. LEGAL COMPLIANCE

4.1 The CONTRACTOR undertakes to comply with all legal requirements for SHE during the executive of the CONTRACT WORK, including both legislative and common law provisions.

4.2 The legal requirements mentioned in 4.1 include, without limitation, the provisions of:
4.2.1 The Occupational Health and Safety Act 85 of 1993 and its regulations
4.2.2 The Compensation for Occupational Injuries and Diseases Act 1993, (act no.130 of 1993 ;)
4.2.3 The National Environment Management Act, 107 of 1998
4.2.4 The Environment Conservation Act, 73 of 1989;
4.2.5 The National Water Act, 36 of 1998;
4.2.6 All relevant labour legislation;
4.2.7 Any other applicable National Acts of Parliament, provincial legislation and local by laws and regulations, as well as common law provisions.
4.3 It is the responsibility of the CONTRACTOR to identify and comply with all applicable legal requirements applicable to its activities.

5. MINIMUM SHE STANDARDS
Without derogating from any legal requirement or any other aspect of this AGREEMENT, the CONTRACTOR undertakes to ensure that he and/or his sub-contractors and/or their respective employees will at all times comply with the following conditions:

5.1 All work performed on the CLIENT'S premises must be performed under the close supervision of people who are trained to understand all the SHE hazards associated with any work that the CONTRACTOR performs on the stated premises.

5.2 The CONTRACTOR assumes the responsibility in terms of section 16(1) of the Occupation Health and Safety Act, 85 of 1993, and this agreement is also an agreement as envisage by section 37(2) of that Act.

5.3 The CONTRACTOR shall ensure that he familiarizes himself with the provisions of the Occupational Health and Safety Act, and that he, his employees and any sub-contractors comply with them. The CONTRACTOR shall further ensure that all work is carried out in compliance with CLIENT'S SHE Standards, where prescribed

5.4 The CONTRACTOR shall appoint competent employees who shall be trained on any SHE aspect pertinent to them or the work that is to be performed.

5.5 Discipline regarding SHE shall be strictly enforced by the CONTRACTOR.

5.6 The CONTRACTOR shall issue Personal Protective Equipment as required and ensure that is worn at all material times.

5.7 The CONTRACTOR shall safe work practices and make employees conversant with contents of these practices.

5.8 No unsafe equipment/machinery and/or shall be used on the CLIENT'S premises.

5.9 The CONTRACTOR shall as soon as reasonably possible report all relevant incidents as required by law, including but not limited to those referred to in the Occupational Health and Safety Act; section 30 of the National Environmental Management Act, 107 of 1998; section 20 of the National Water Act, 36 of 1998, to the relevant authorities as well to the CLIENT.

5.9.1 The CLIENT hereby obtains an interest in a legal proceedings of whatsoever nature arising from any incident involving the CONTRACTOR and/or his sub-contractors regarding SHE due to the execution of the CONTRACT WORK.

5.10 No use shall be made of any of the CLIENT'S machinery/equipment/articles/substances without prior written approval.

5.12 Work for which the issuing of a permit is required shall not be performed prior to the obtaining of a dully completed and approved permit.

5.13 No alcohol or other intoxicating substances shall be allowed on the CLIENT'S premises. Anyone suspected to be under the influence of alcohol or other intoxicating substances shall not be allowed on the premises of the CLIENT. For the purpose of this provision, the CLIENT hereby acquires the right to test the CONTRACTOR his employees by means of breath analyzer at any time, and the CONTRACTOR or employee shall submit to the testing.

5.14 Full participation shall be given if and when the CLIENT'S employees or agents inquire into SHE issues.

5.15 The CONTRACTOR shall report any hazardous conditions, which he cannot rectify due to them being under the control of the CLIENT, without delay to the CLIENT and ensure that his employees and sub-contractors do the same.

5.16 During the execution of the CONTRACT WORK, the CLIENT'S SHE personnel may offer advice and conduct inspections to ensure that standards are met. They may issue instructions should standards not be met in order to rectify such situations. This provision shall not detract from the CONTRACTOR'S other responsibilities in terms of law or this agreement.

5.17 The CONTRACTOR warrants that he shall not endanger the health and safety of the CLIENT'S employees in any way during the execution of the CONTRACT WORK.

5.18 The CONTRACTOR shall maintain a clean and tidy workplace,
5.19 The CONTRACTOR agrees to submit its vehicles to inspection by the PRINCIPAL or its agents or employees when entering and leaving the premises of the CLIENT.
5.20 Any additional rules, if applicable, will be added hereto as Annexure A.

6.1 The CONTRACTOR indemnifies and holds the CLIENT harmless against any loss in respect of claims, proceedings (of civil and criminal nature), damages, costs and expenses, regardless of negligence or not on behalf of the CLIENT, arising from:
6.1.1 Non-compliance by the CONTRACTOR with any provision of common law, Act of Parliament, regulation and by law of any local authority arising out of or due to the execution of the CONTRACT WORK or occupation of the site by the CONTRACTOR.

6.1.2 Claims from other parties, whether against the CLIENT or the CONTRACTOR,

consequent upon death, bodily injury or illness of any person or physical loss or damage to any property arising out of or due to the execution of the CONTRACT WORK or occupation of the site by the CONTRACTOR.

6.1.3 Physical loss or damage to any plant, equipment or other property belonging to the CONTRACTOR or his subordinates or agents.

6.1.4 Any loss of whatsoever nature by the CONTRACTOR or his employees during the execution of the CONTRACT WORK.

7. INSURANCE AND REGRESS

7.1 The CONTRACTOR warrants that all his and his sub-contractors' employees are covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 1993 and that the cover is in force during the duration of the CONTRACT WORK.

7.2 In order to verify the cover mentioned in 7.1 the CLIENT shall be entitled to request at any time of the CONTRACTOR to furnish the CLIENT with written proof of registration and good standing with the Compensation Fund, which proof shall be delivered within 14(fourteen) days of such request.

7.3 Notwithstanding 7.2, the CONTRACTOR shall deliver to the CLIENT a certificate of good standing with Compensation Fund, or similar proof acceptable by the CLIENT, by no later than the end of April every year for the duration of the CONTRACT WORK.

7.4 The CONTRACTOR warrants that he is in possession of the following insurance cover which shall remain in force during the duration of the CONTRACT WORK:

(Delete, and initials items that are not required)
7.4.1 Public liability insurance cover;
7.4.2 Insurance covering his liabilities to any of his and/or his sub-contractors' employees;
7.4.3 Insurance covering any liabilities in respect of environmental pollution, damage or other loss relating to inadequate environmental management;
7.4.4 Any other insurance cover that will adequately make provision for any possible losses and/ or claims arising from the indemnities provided for in this AGREEMENT.
7.5 In order to verify the cover mentioned in 7.4 the CLIENT shall be entitled to request of the CONTRACTOR to furnish the CLIENT with written proof of such cover, which proof shall be delivered within 14 (fourteen) days of such request.
7.6 Notwithstanding 7.5 the CONTRACTOR shall deliver to the CLIENT written proof of his public liability insurance, by no later than the end of April every year for the duration of the CONTRACT WORK.
7.7 Should any finding/order/penalty or similar conclusion be made by a court of law, arbitrator, national, provincial or local authority against the CLIENT due to something for which the CONTRACTOR is liable in terms of this AGREEMENT, then the CONTRACTOR shall, within 30 days after being so requested by the CLIENT, make good any and all loss suffered by the CLIENT as a result

8. BREACH

8.1 If any PARTY commits a breach of the terms of this AGREEMENT and fails to remedy such breach within 10(ten) days after receipt by him of a written notice from the PARTY aggrieved by such breach requiring him to remedy such breach, then and in that event the aggrieved PARTY may, without prejudice to any other rights or remedies he may have in terms of this AGREEMENT:

8.1.1 Cancel the CONTRACT WORK and claim and recover such damages as he have suffered as a result breach;

8.1.2 Claim specific performance of the terms of this AGREEMENT; or

8.2 The CLIENT reserves the right to summarily expel any CONTRACTOR OR CONTRACTOR'S employee failing to comply with the SHE requirements.

9. COVENANT TO RENDER EFFECTUAL

The PARTIES undertake that they will do all such things and sign all such documents as may be required of them from time to time in order to carry into effect the terms of this AGREEMENT.

10. GENERAL

10.1 This AGREEMENT constitutes the whole and exclusive memorial of the agreement between the PARTIES in respect of the subject matter hereof and no warranties, representations or other terms and conditions of whatsoever nature not expressly recorded herein, shall be of any force or effect.

10.2 No variation of the terms and conditions of this AGREEMENT shall be of any force or effect unless reduced to writing and signed by the PARTIES or their duly authorized agents.

10.3 If any clause or term of this AGREEMENT should be invalid, unenforceable or illegal, then the remaining terms and provisions of this AGREEMENT shall be deemed to be severable there from and shall continue in full force and effect unless such invalidity, unenforceability or illegality goes to the root of this AGREEMENT.

10.4 The Parties declare that they have disclosed to each other all material facts and circumstances effecting the contents and purpose of this AGREEMENT.

10.5 No indulgence, lenience or extension of time which either PARTY ("the grantor") may grant or show to another PARTY ("the grantee") shall in any way constitute a waiver of any of the rights of the grantor, who shall not thereby be precluded from exercising any rights against the grantee which may have arisen in the past, or which might arise in future.

11. ADDRESS AND NOTICES

11.1 Each PARTY hereby chooses as his *domicilium citandi ET executandi* for all purpose under his AGREEMENT, the address set forth below and any party shall be entitled by notice to the other to change his *domicilium* aforesaid provided that the change shall only become effective 14 days after service of the notice in question.

11.1.1 The CLIENT:

11.1.2 The CONTRACTOR:

11.2 Any notice to be sent to another PARTY may be sent by fax or delivered.
In the event of delivery by hand or transmission by fax it shall be deemed to have received by the addressee at noon on the second business day following the day of delivery or transmission.

EXECUTION
SIGNED at _____ on this _____2015

_____	_____
ON BEHALF OF THE CLIENT	NAME OF CAPACITY
_____	_____
ON BEHALF OF THE CONTRACTOR	NAME OF CAPACITY
_____	_____
WITNESS	

ANNEXURE A

PRE-CONSTRUCTION HEALTH AND SAFETY SPECIFICATION

PROJECT: UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

TABLE OF CONTENTS

2.3.7 Health and Safety Organogram

2.3.8 Preliminary Hazard Identification and Risk Assessment and Progress Hazard Identification and Risk Assessment

2.3.9 Health and Safety Representative(s)

2.3.10 Health and Safety Committee(s)

2.3.11 Health and Safety Training

2.3.11.1 Induction

2.3.11.2 Awareness

2.3.11.3 Competency

2.3.12 General Record Keeping

2.3.13 Health & Safety Audits, Monitoring and Reporting

2.3.14 Emergency Procedures

2.3.15 First Aid Box and First Aid Equipment

2.3.16 Accident / Incident Reporting and Investigation

2.3.17 Hazards and Potential Situations

2.3.18 Personal Protection Equipment and Clothing

2.3.19 Occupational Health and Safety Signage

2.3.20 Permits

2.3.21 Contractors and Sub-contractors

2.3.22 Incentives and Penalties

2.4 Physical Requirements

2.4.1 Excavations, Shoring, Dewatering or Drainage

2.4.2 Edge Protection and Penetrations

2.4.3 Piling

2.4.4 Stacking of Materials

2.4.5 Speed Restriction and Protection

2.4.6 Hazardous Chemical Substances (HCS)

2.5 Plant and Machinery

2.5.1 Construction Plant

2.5.2 Fire Extinguishers and Fire Fighting Equipment

2.5.3 Hired Plant and Machinery

2.5.4 Lifting Machine and Tackle

2.5.5 General Machinery

2.5.6 Portable Electrical Tools / Explosive Power Tools

2.5.7 Public Health and Safety

2.5.8 Night Work

2.5.9 Facilities for Safekeeping and Eating Areas (Mess Area) for workers

2.5.10 Transport of Workers

2.6 Occupational Health

2.6.1 Occupational Hygiene

2.6.2 Welfare Facilities

2.6.3 Alcohol and Other Drugs

3. Annexure A

Task Completion Form

4. Annexure B
Principal Contractor's Responsible Persons

5. Annexure C

Other Requirements

6. Annexure D

Initial Hazard Identification and Risk Assessment Format

7. Annexure E

Acknowledgement of Receipt of Document

1. INTRODUCTION AND BACKGROUND

1.1 Background to the Pre-construction Health and Safety Specification

The Construction Regulations (2014) place the onus on the Client to prepare a pre-construction health & safety specification, highlighting all risks not successfully eliminated during design.

1.2 Purpose of the Pre-construction Health and Safety Specification

To assist in achieving compliance with the Occupational Health & Safety Act 85/1993 and the now promulgated Construction Regulations (2014) in order to reduce incidents and injuries. This pre-construction specification shall act as the basis for the drafting of the construction phase health & safety plan.

The pre-construction specification sets out the requirements to be followed by the Principal Contractor and other Contractors so that the health & safety of all persons potentially at risk may receive the same priority as other facets of the project e.g. cost, programme, environment, etc.

1.3 Implementation of the Pre-construction Health and Safety Specification

This specification forms an integral part of the contract, and the Contractor is required to use it at pre-tender phase when drawing up its project-specific construction phase health & safety plan. The Principal Contractor shall forward a copy of this specification to all Contractors at their bidding stage so that they can in turn prepare health & safety plans relating to their operations.

2. PRE-CONSTRUCTION HEALTH AND SAFETY SPECIFICATION

2.1 Scope

This Specification covers the requirements for eliminating and mitigating incidents and injuries on the particular project

The scope also addresses legal compliance, hazard identification and risk assessment, risk control, and promoting a health and safety culture amongst those working on the project. The specification also makes provision for the protection of those persons other than employees.

This specification and the Contractor's own Health and Safety Plan as well as the Construction Regulations 2014, shall be displayed on site or made available for inspection by all workers, employees, inspectors and any other persons entering the site of works.

The following aspects of this project carry the risk of possible injuries, for example:

- Working down slope of bulk earthworks activities which my result in unstable boulders or rocks rolling downhill towards the construction work taking place at pedestrian bridge and box culvert structure below.
- Excavations below water level at some sections of the box culvert in soils possibly requiring shoring or flattening of slopes.
- Working below stream level to construction the box culvert foundations and floor slab.
- Operation and maintenance on the site of heavy civil engineering plant such as excavators, bulldozers, front end loaders, tippers, TLBs, compaction equipment, water pumps, concrete mixers, compressors, pneumatic tools, generators, etc.
- Use on the of power tools and hand tools
- Handling of materials such as scaffolding, cement bags, concrete materials and hand stone.

- Storage and handling of flammable materials such as fuels, oils, adhesive, and painting and cleaning products including bituminous paint.
- Storage and handling of herbicides and ant poisons
- Presence of open excavations for the foundations, manholes and storm water and pipe trenches.
- Lifting and lowering of materials and equipment.
- 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 necessarily covered in the above.

2.2 Interpretations

2.2.1 Application

This specification is a compliance document drawn up in terms of South African legislation and is therefore binding. It must be read in conjunction with relevant legislation as noted previously.

2.2.2 Definitions

The definitions as listed in the Occupational Health & Safety Act 85/1993 and Construction Regulations (2014) shall apply.

2.2.3 Tenders

This Health and Safety Specification forms an integral part of the Contract and Contractors are required to use it during the tender phase for pricing the preparation of a project specific Health and Safety Plan prior to commencing any work and for pricing the cost of ensuring compliance thereto during construction. Contractors must forward a copy of this Specification to all other persons or organisation that may be submitting prices to the Contractor during the tender stage to enable them to include the cost of preparing their own Health and Safety Plan, relevant to their particular operation, and for compliance with the Health and Safety requirements during construction. Payment for compliance with the 'Occupational Health and Safety Act 85 of 1993' and with this Specification needs to be included with the rates for the work items. No separate pay item has been allowed for. It is a condition of this contract that Contractors who submit tenders for this contract shall make provision in their tenders for the cost of all health and safety measures required during the construction process.

Contractors are required to complete Form J, 'Contractor's Health and Safety

2.3 Minimum Administrative Requirements

2.3.1 Notification of Intention to Commence Construction Work

The Contractor shall notify the Provincial Director of the Department of Labour in writing before construction work commences. A copy of this notification must be forwarded to the Client on appointment.

2.3.2 Health and Safety Plan

Before commencement of any construction work, the Contractor shall prepare a project specific Health and Safety Plan to comply with the requirements of Construction Regulation 4(1) (a) and in compliance with this Health and Safety Specification. This must include a risk assessment performed and recorded in writing by a competent person (refer to Regulation 7 of the Construction Regulation 2014).

The risk assessments shall identity 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 Health and Safety Plan 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.

The Contractor shall appoint in writing his employees and any subcontractors to be employed on the contract, 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.

2.3.3 Assignment of Contractor's Responsible Persons to Supervise Health and Safety on Site

The Contractor shall submit supervisory appointments as well as any relevant appointments in writing (as stipulated by the OHSA and Construction Regulations), prior to commencement of work. Proof of competency must be included. (See annexure B)

2.3.4 Competency for Contractor's Appointed Competent Persons

Contractors' competent persons for the various risk management portfolios shall fulfil the criteria as stipulated under the definition of Competent in accordance with the Construction Regulations (2014). Proof of competence for the various appointments must be included.

2.3.5 Compensation of Occupational Injuries and Diseases Act 130 of 1993 (COIDA)

The Principal Contractor shall submit a letter of good standing with its Compensation Insurer to the Client as proof of registration. Contractors shall submit proof of registration to the Principal Contractor before they commence work on site.

2.3.6 Occupational Health and Safety Policy

The Principal Contractor and all Contractors shall submit a Health and Safety Policy signed by their Chief Executive Officer. The Policy must outline objectives and how they will be achieved and implemented by the Company / Contractor.

2.3.7 Health and Safety Organogram

The Principal Contractor and all Contractors shall submit an organogram, outlining the Health and Safety Site Management Structure including the relevant appointments/competent persons. In cases where appointments have not been made, the organogram shall reflect the intended positions. The organogram shall be updated when there are any changes in the Site Management Structure.

2.3.8 Preliminary Hazard Identification and Risk Assessment and Progress Hazard Identification and Risk Assessment

The Contractor shall cause a hazard identification to be performed by a competent person before commencement of construction work, and the assessed risks shall form part of the construction phase health and safety plan submitted for approval by the Client. The risk assessment must include;

a) A list of hazards identified as well as potentially hazardous tasks;
b) A documented risk assessment based on the list of hazards and tasks;
c) A set of safe working procedures (method statements) to eliminate, reduce and/or control the risks assessed;
d) A monitoring and review procedure of the risks assessment as the risks change.

The Principal Contractor shall ensure that all Contractors are informed, instructed and trained by a competent person regarding any hazards, risks and related safe work procedures before any work commences and thereafter at regular intervals as the risks change and as new risks develop.

The Principal Contractor shall be responsible for ensuring that all persons who could be negatively affected by its operations are informed and trained according to the hazards and risks and are conversant with the safe work procedures, control measures and other related rules (tool box talk strategy to be implemented).

2.3.9 Health and Safety Representative(s)

The Principal Contractor and all Contractors shall ensure that Health and Safety Representative(s) are appointed under consultation and trained to carry out their functions. The appointment must be in writing. The Health and Safety Representative shall carry out regular inspections, keep records and report all findings to the Responsible Person forthwith and at health & safety meetings.

2.3.10 Health and Safety Committees

The Principal Contractor shall ensure that project health and safety meetings are held monthly and minutes are kept on record. Meetings must be organised and chaired by the Principal Contractor's Responsible Person. All Contractors' Responsible Persons and Health & Safety Representatives shall attend the monthly health & safety meetings. Contractors shall also have their own internal health & safety committees in accordance with the OHS Act 85/1993 and minutes of their meetings shall be forwarded to the Principal Contractor on a monthly basis.

2.3.11 Health and Safety Training

2.3.11.1 Induction

The Principal Contractor shall ensure that all site personnel undergo a risk-specific health & safety induction training session before starting work. A record of attendance shall be kept in the health & safety file. **A suitable venue must be supplied to house this training.**

2.3.11.2 Awareness

The Principal Contractor shall ensure that, on site, periodic toolbox talks take place at least once per week. These talks should deal with risks relevant to the construction work at hand. A record of attendance shall be kept in the health & safety file. All Contractors have to comply with this minimum requirement.

2.3.11.3 Competency

All competent persons shall have the knowledge, experience, training, and qualifications specific to the work they have been appointed to supervise, control, and carry out. This will have to be assessed on a regular basis e.g. periodic audit by the Client, progress meetings, etc. The Principal Contractor is responsible to ensure that competent Contractors are appointed to carry out construction work.

2.3.12 General Record Keeping

The Principal Contractor and all Contractors shall keep and maintain Health and Safety records to demonstrate compliance with this Specification, with the OHS Act 85/1993; and with the Construction Regulations (2014). The Principal Contractor shall ensure that all records of incidents/accidents, training, inspections, audits, etc. are kept in a health & safety file held in the site office. The Principal Contractor must ensure that every Contractor opens its own health & safety file, maintains the file and makes it available on request.

2.3.13 Health & Safety Audits, Monitoring and Reporting

The Client shall conduct monthly health & safety audits of the work operations including a full audit of physical site activities as well as an audit of the administration of health & safety. The Principal Contractor is obligated to conduct similar audits on all Contractors appointed by it. Detailed reports of the audit findings and results shall be reported on at all levels of project management meetings/forums. Copies of the Client audit reports shall be kept in the Primary Project Health & Safety File while the Principal Contractor audit reports shall be kept in their file, a copy being forwarded to the Client. Contractors have to audit their sub-contractors and keep records of these audits in their health & safety files, available on request.

2.3.14 Emergency Procedures

The Principal Contractor shall submit a detailed Emergency Procedure for approval by the Client prior to commencement on site. The procedure shall detail the response plan including the following key elements:

- List of key competent personnel;
- Details of emergency services;
- Actions or steps to be taken in the event of the specific types of emergencies;
- Information on hazardous material/situations.

Emergency procedure(s) shall include, but shall not be limited to, fire, spills, accidents to employees, use of hazardous substances, bomb threats, major incidents/accidents, etc. The Principal Contractor shall advise the Client in writing forthwith, of any emergencies, together with a record of action taken. A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital, etc.) must be maintained and available to site personnel.

2.3.15 First Aid Boxes and First Aid Equipment

The Principal Contractor and all Contractors shall appoint in writing First Aider(s). The appointed First Aider(s) are to be sent for accredited first aid training. Valid certificates are to be kept on site. The Principal Contractor shall provide an on-site First Aid Station with first aid facilities, including first aid boxes adequately stocked at all times. All Contractors with more than 5 employees shall supply their own first aid box. Contractors with more than 10 employees shall have a trained, certified first aider on site at all times.

2.3.16 Accident / Incident Reporting and Investigation

Injuries are to be categorised into first aid; medical; disabling; and fatal. The Principal Contractor must stipulate in its construction phase health & safety plan how it will handle each of these categories. When reporting injuries to the Client, these categories shall be used. All injuries shall be investigated by the Principal Contractor, with a report being forwarded to the Client forthwith. All Contractors have to report on the 4 categories of injuries to the Principal Contractor at least monthly. The Principal Contractor must report all injuries to the Client in the form of a detailed injury report at least monthly.

2.3.17 Hazards and Potential Situations

The Principal Contractor shall immediately notify other Contractors as well as the Client of any hazardous or potentially hazardous situations that may arise during performance of construction activities.

2.3.18 Personal Protective Equipment (PPE) and Clothing

The Principal Contractor shall ensure that all workers are issued and wear hard hats, safe footwear and overalls. The Principal Contractor and all Contractors shall make provision and keep adequate quantities of SABS approved PPE on site at all times. The Principal Contractor shall clearly outline procedures to be taken when PPE or Clothing is:

- Lost or stolen;
- Worn out or damaged.

The above procedure applies to Contractors and their Sub-contractors, as they are all Employers in their own right.

2.3.19 Occupational Health and Safety Signage

The Contractor shall provide adequate on-site OHS signage. Including but not limited to: **'no unauthorised entry', 'report to site office', 'site office', 'beware of overhead work', 'hard hat area'.** Signage shall be posted up at all entrances to site as well as on site in strategic locations e.g. access routes, stairways, entrances to structures and buildings, scaffolding, and other potential risk areas/operations.

2.3.20 Contractors and Sub-contractors

The Principal Contractor shall ensure that all Contractors under its control comply with this Specification, the OHS Act 85/1993, Construction Regulations (2014), and all other relevant legislation that may relate to the activities directly or indirectly. The Contractor, when appointing other Contractors as 'Sub-contractors', shall mutatis mutandis ensure compliance.

2.3.21 Incentives and Penalties

Certain incentives will be provided for ongoing compliance to the provisions of the construction phase health & safety plan submitted by the Principal Contractor.

Penalties will be implemented for ongoing non-compliance to the provisions of the construction-phase health & safety plan as submitted by the Principal Contractor**.**

2.4 Physical Requirements

2.4.2 Excavations, Shoring, Dewatering or Drainage

The project is for the stabilisation of a landslide of up to seven Metres high and the Principal Contractor must ensure that all work takes place in a safe environment. For this purpose all safety requirements applicable to an excavation as described in the Regulations will be applicable.
The Principal Contractor and any relevant Contractors shall make provision in their tender for shoring, dewatering or drainage of any excavation as per this specification.

The Contractor shall make sure that:

a) The excavations are inspected before every shift and a record is kept;
b) Safe work procedures have been communicated to the workers;
c) The safe work procedures are enforced and maintained by the Contractor's Responsible Persons

at all times;

d) The requirements as per section 11 of the Construction Regulations are adhered to.

2.4.3 Edge Protection and Penetrations

The Principal Contractor shall ensure that all exposed edges and openings are guarded and demarcated at all times until permanent protection has been erected. The Principal Contractor's risk assessment must include these items. E.g. protection of decking edges, finished floor slab edges, stairways, floor penetrations, lift shafts, and all other openings and areas where a person may fall.

2.4.4 Explosives and Blasting

The Principal Contractor shall ensure that the use of explosives and blasting (where required) be undertaken by a competent Contractor. A Safe Work Procedure (SWP) must be submitted to the Client for approval before commencement of blasting work. The Client will issue a permit to authorise the operation.

2.4.5 Piling

The Contractor shall ensure that piling is undertaken by a competent Contractor. A SWP shall be submitted to the Client for approval before commencement of this work.

2.4.6 Stacking of Materials

The Principal Contractor and other relevant Contractors shall ensure that there is an appointed staking supervisor and all materials, formwork and all equipment is stacked and stored safely.

2.4.7 Speed Restrictions and Protection

The Principal Contractor shall ensure that all persons in its employ, all Contractors, and all those that are visiting the site are aware and comply with the site speed restriction(s). Separate vehicle
And pedestrian access routes shall be provided, maintained, controlled, and enforced.

2.4.8 Hazardous Chemical Substances (HCS)

The Principal Contractor and other relevant Contractors shall provide the necessary training and information regarding the use, transport, and storage of HCS. The Principal Contractor shall ensure that the use, transport, and storage of HCS is carried out as prescribed by the HCS Regulations. The Contractor shall ensure that all hazardous chemicals on site have a Material Safety Data Sheet (MSDS) on site and the users are made aware of the hazards and precautions that need to be taken when using the chemicals. The First Aiders must be made aware of the MSDS and how to treat HCS incidents appropriates.

2.4.9 Asbestos

Not envisaged to be applicable on this project.

2.5 Plant and Machinery

2.5.2 Construction Plant

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

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

2.5.3 Vessels under Pressure (VuP) and Gas Bottles

The Principal Contractor and all relevant Contractors shall comply with Vessels under Pressure Regulations, including:

- Providing competency and awareness training to the operators;
- Providing PPE or clothing;
- Inspect equipment regularly and keep records of inspections;
- Providing appropriate fire fighting equipment (Fire Extinguishers) on hand.

2.5.4 Fire Extinguishers and Fire Fighting Equipment

The Principal Contractor and relevant Contractors shall provide adequate, regularly serviced firefighting equipment located at strategic points on site, specific to the classes of fire likely to occur. The appropriate notices and signs must be posted up as required.

2.5.5 Hired Plant and Machinery

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

2.5.6 Lifting Machines and Tackle

The Principal Contractor shall ensure that lifting machinery and tackle is inspected before use and thereafter in accordance with the Driven Machinery Regulations and the Construction Regulations (section 20). There must be competent lifting machinery and tackle inspector who must inspect the equipment daily or before use, taking into account that:

- All lifting machinery and tackle has a safe working load clearly indicated;
- Regular inspection and servicing is carried out;
- Records are kept of inspections and of service certificates.
- There is proper supervision in terms of guiding the loads that includes a trained banks man to direct lifting operations and check lifting tackle;
- The tower crane bases have been approved by an engineer;
- The operators are competent as well as physically and psychologically fit to work and in possession of a medical certificate of fitness to be available on site.

2.5.7 General Machinery

The Principal Contractor and relevant Contractors shall ensure compliance with the Driven Machinery Regulations, which include inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE or clothing, and training those who use machinery .

2.5.8 Portable Electrical Tools and Explosive Powered Tools

The Contractor shall ensure that use and storage of all explosive powered tools and portable electrical tools are in compliance with relevant legislation. The Contractor shall ensure that all electrical tools, electrical distribution boards, extension leads, and plugs are kept in safe working order. Regular inspections and toolbox talks must be conducted to make workers aware of the dangers and control measures to be implemented e.g. personal protection equipment, guards, etc.
The Contractor shall consider the following:

- A competent person undertakes routine inspections and records are kept;
- Only authorised trained persons use the tools;
- The safe working procedures apply;
- Awareness training is carried out and compliance is enforced at all times; and
- PPE and clothing is provided and maintained.
- A register indicating the issue and return of all explosive round;
- Signs to be posted up in the areas where explosive powered tools are being used.

2.5.9 Public and Site Visitor Health & Safety

The Principal Contractor shall ensure that every person working on or visiting the site, as well as the public in general, shall be made aware of the dangers likely to arise from site activities, including the precautions to be taken to avoid or minimise those dangers. Appropriate health and safety notices and signs shall be posted up,but shall not be the only measure taken.

Both the Client and the Principal Contractor have a duty in terms of the OHS Act 85/1993 to do all that is reasonably practicable to prevent members of the public and site visitors from being affected by the construction activities.

Site visitors must be briefed on the hazards and risks they may be exposed to and what measures are in place or should be taken to control these hazards and risks. A record of these 'inductions' must be kept on site in accordance with the Construction Regulations.

2.5.10 Night Work

The Principal Contractor must ensure that adequate lighting is provided to allow for work to be carried out safety.

2.5.11 Transport of Workers

The Principal Contractor and other Contractors shall not:

- Transport persons together with goods or tools unless there is an appropriate area or section to store them;
- Transport persons in a non-enclosed vehicle, e.g. truck; there must be a proper canopy

(properly covering the back and top) with suitable sitting area. Workers shall not be permitted to stand or sit at the edge of the transporting vehicle.

- Transport workers in bakkies unless they are closed/covered and have the correct number of seats for the passengers.

2.6 Occupational Health

2.6.1 Occupational Hygiene

Exposure of workers to occupational health hazards and risks is very common in any work environment, especially in construction. Occupational exposure is a major problem and all Contractors must ensure that proper health and hygiene measures are put in place to prevent exposure to these hazards. Prevent inhalation, ingestion, absorption, and noise induction. Site-specific health risks are tabled in Annexure C e.g. cement dust, wet cement, and wood-dust, noise etc.

2.6.2 Welfare Facilities

The Principal Contractor must supply Sufficient toilets (1 toilet per 15 workers), showers (1 for every 15 workers), changing facilities, hand washing facilities, soap, toilet paper, and hand drying material must be provided. Waste bins must be strategically placed and emptied regularly. Safe, clean storage areas must be provided for workers to store personal belongings and personal protective equipment. Workers should not be exposed to hazardous materials/substances while eating and must be provided with sheltered eating areas.

2.6.3 Alcohol and other Drugs

No alcohol and other drugs will be allowed on site. No person may be under the influence of alcohol or any other drugs while on the construction site. Any person on prescription drugs must inform his/her superior, who shall in turn report this to the Principal Contractor forthwith. Any person suffering from any illness/condition that may have a negative effect on his/her safety performance must report this to his/her superior, who shall in turn report this to the Principal Contractor forthwith. Any person suspected of being under the influence of alcohol or other drugs must be sent home immediately, to report back the next day for a preliminary inquiry. A full disciplinary procedure must be followed by the Contractor concerned and a copy of the disciplinary action must be forwarded to the Principal Contractor for his records.

PRE-CONSTRUCTION HEALTH AND SAFETY SPECIFICATION (HSS)

Project: UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

ANNEXURE A

The Principal Contractor and Contractors must submit proof of compliance with Annexure A with the construction phase H&S
plan where applicable.

HSS Item No.	Requirement	OHSA Requirement	Submission Date
2.3.1	Notification of Intention to Commence Construction / Building Work	Complete Schedule 1 (Construction Regulations)	Before commencement on site
2.3.2	Assignment of Responsible Person to Supervise Construction Work	All relevant appointments, as per OHS Act and Construction Regs	Before commencement on site
2.3.3	Competence of Responsible Persons	Client Requirement & OHS Act	Together with H&S plan
2.3.4	Compensation of Occupational Injuries and Diseases Act (COIDA) 130 of 1993	COIDA Requirement	Together with H&S plan
2.3.5	Occupational Health and Safety Policy	OHS Act	Together with H&S plan
2.3.6	Health and Safety Organogram	Client Requirement	Together with H&S plan
2.3.7	Initial Hazard Identification and Risk Assessment based on the Client's assessment	Construction Regs.	Together with H&S plan
2.3.8	Health and Safety Representative	OHS Act	Submit as soon as there are more than 20 employees on site
	Other		

ASSIGNMENT OF PRINCIPAL CONTRACTOR'S RESPONSIBLE PERSONS

Project: UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

ANNEXURE B

The Principal Contractor shall make the following appointments according to the initial risk assessment: (further appointments could
become necessary as project progresses)

APPOINTMENT	OHS-ACT / REGULATION REFERENCE
Section 16.2 appointment	Section 16.2
HSE Representative (if necessary)	Section 17(1)
Incident Investigator	GAR 9(2)
First Aiders	GSR 3(4)
Fire Fighters	ER 9 & CR 29
Risk Assessor	HCS Reg (Incl. Asbestos & Lead); CR 9

The following information must be provided in the H&SP:

- Indicate the estimated number of employees to be working on site.
- Indicate the expected number of sub-contractors to be appointed by the Principal Contractor.

The following competent persons, **where applicable**, shall be appointed in writing by the Principal Contractor, prior to any work being carried out, and shall adhere to the requirements of the specific sub-regulations.

The competency of each of these appointed competent persons must be provided and should include knowledge, training, experience & qualifications specific to the appointment.

The table below indicates the applicability of the appointments but contractors should by no means be limited to these indications.

APPOINTMENT	OHS-ACT / REGULATION REFERENCE
Construction Manager	CR 8 (1)
Assistant Construction Manager	CR 8 (2)
Construction H&S Officer where applicable	CR 8 (5)
Construction Supervisor	CR 8 (7)
Construction Assistant Supervisor	CR 8(8)
Risk assessor	CR 9(1)
Fall Protection Competent Person	CR 10 (1)
Temporary works competent person	CR12 (2)
Excavation Work Supervisor	CR 13 (1)(a)

Demolition Work Competent Person	CR 14 (1)
Competent Person (Use of Explosives for Demolition Work)	CR14(11)
Scaffolding Erector/ Team Leader/ Inspector	CR 16 (1)
Suspended platform Competent Person	CR 17(1)
Rope Access Work Competent Person	CR 18 (1) (a)
Material Hoist Competent Person	CR 19(8)(a)
Bulk Mixing Plant Competent Person	CR 20 (1)
Explosive Powered Tools Competent Person	CR 21(2)(b)
Construction Vehicle and Mobile Plant Competent Person	CR23 (1)(d)
Electrical Machinery Competent Person	CR 24 (c)
Stacking and Storage Supervisor	CR 28 (a)
Fire Equipment Inspector	CR 29(h)

OTHER REQUIREMENTS
Project: UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

ANNEXURE C

The Principal Contractor shall comply but not be limited to the following requirements: report on these to the Client at progress
meetings or at least monthly whichever is sooner.

What	When	Output	Accepted by Client & date
Induction training	Every worker before he/she starts work.	Attendance registers	
Awareness Training (Tool Box Talks)	At least weekly	Attendance registers	
Health & Safety Reports	Monthly	Report covering: • Incidents / accidents and investigations • Non-conformances by employees & contractors • Internal & External H&S audit reports	
Emergency procedures	Ongoing evaluation of procedure	Table procedure in writing as well as tel. numbers	
Risk assessment	Updated and signed off at least monthly	Documented risk assessment	
Safe work procedures	Drawn up before workers are exposed to new risks	Documented set of safe work procedures (method statements), updated and signed off.	
General Inspections	Weekly & daily	Report OHS Act compliance: • Scaffolding • Excavations • Formwork & support work • Explosive tools	
General Inspections	Monthly	• Fire fighting equipment • Portable electrical equipment • Ladders • Lifting equipment/slings	
List of contractors	List to be updated weekly	Table list, number of workers and Company tel. numbers	
Workman's Compensation	Ongoing	Table a list of Contractors' workman's compensation proof of good standing.	
Construction site rules & Section 37.2 Mandatory Agreement	Ongoing	Table a report of all signed up Mandatories.	

ANNEXURE D
.Risk Assessment
Project: UPGRADING OF OATLANDS LANDFILL – CELL 4C (Phase 1)

TASK ORIENTATED RISKS_____ DATE: _____

Rating	Task / situation	Personal protective equipment	Risk to safety	Preventative action	Risk to health	Risk to Environment

EQUIPMENT RISKS

Rating	Activity / Situation	Personal Protective Equipment	Risk to Safety	Preventative Action	Risk to Health	Risk to Environment

PHYSICAL RISKS

Rating	Situation	Personal Protective Equipment	Risk to Safety	Risk to Health	Preventative Action	Risk to Environment

ERGONOMICAL RISKS

Rating	Situation	Personal Protective Equipment	Risk to Safety	Risk to Health	Preventative Action	Risk to Environment

BEHAVIOURAL RISKS

Rating	Situation	Personal Protective Equipment	Risk to Safety	Risk to Health	Preventative Action	Risk to Environment

ANNEXURE E

Acknowledgement of receipt:

I, _____ representing

_____ Principal Contractor /

Contractor / Employer have satisfied myself with the content of the Pre-construction Health and Safety Specification and shall ensure that the Principal Contractor / Contractor and its personnel comply with all obligations / requirements in respect thereof.

_____ _____

Signature of Principal Contractor / Contractor Date

_____ _____

Signature of Client / Client's Agent Date

Comments:

PROJECT SPECIFIC OCCUPATIONAL HEALTH AND SAFETY SPECIFICATION

FOR

COVID-19 SITE CONDITIONS

MANAGED ON BEHALF OF

RAY NKONYENI MUNICIPALITY
(THE “EMPLOYER”)

KEY ROLE PLAYERS

EMPLOYER

Principal Agent: _____

Civil Engineer _____

Environmental Control Officer _____

Health and Safety Agent _____

PRINCIPAL CONTRACTOR

Contracts Manager _____

Site Agent _____

H&S Officer _____

Other: _____

SCHEDULE OF ABBREVIATIONS

BRA	Baseline Risk Assessments
BEPs	Built Environment Professionals
BoQ	Bill of Quantities
PSHSS	Project Specific Health and Safety Specifications
COIDA	Compensation of Injuries and Diseases Act
CR	Construction Regulations
DEL	Department of Employment and Labour
H&S	Health and Safety
OHSA	Occupational Health and Safety Act No. 85 of 1993 (as amended)
PPE	Personal Protective Equipment
PC	Principal Contractors
SSHSS	Site Specific H&S Specification

DEFINITIONS

The Employer: The Ray Nkonyeni Municipality

The Act: Means, unless the context indicates otherwise, the Occupational Health and Safety Act, No. 85 of 1993 and Regulations promulgated thereunder, as amended

COVID-19: Means, the Novel Coronavirus (2019-n Cov2) which is an infectious disease caused by a virus that has previously not been scientifically identified in humans which emerged in 2019 and was declared a global pandemic by WHO in 2020

WHO: Means, The World Health Organisation

KEY REFERENCES

The following key references apply to the specifications:

Occupational Health and Safety Act No. 85 of 1993 and Regulations (as amended)
Government Gazette No. 43257 dated 29 April 2020 titled COVID-19 Occupational Health and Safety Measures in Workplaces COVID-19 (C19 OHS), 2020
Regulation 10 (8) of the Regulations issued in Terms of Section 27 (2) of The Disaster Management Act, 2002 (ACT No. 57 of 2002).
The Disaster Management Act, 2002 (Act No. 57 of 2002), as amended

INTRODUCTION

The recent Regulations promulgated under the National Disaster Management Act, and the lockdown of 26 March 2020 have closed all construction projects except for those involved with essential infrastructure services and emergency facility preparedness. The Covid-19 pandemic has catapulted the role of health and safety (H&S) into the forefront of all activities. Going forward as the lockdown is slowly lifted, the construction industry will be required to focus as never before to protect the vulnerable who are often at the forefront of any project.

Construction projects range in size and complexity, occur in rural communities and cities, where the population is dense, or there is very little activity. Irrespective of the nature of the work, workers remain exposed to the typical risks and hazards that are typical of construction. Working at heights, confined spaces, breaking, cutting and grinding to name a few. High levels of hard physical labour and long hours of work are typical, over and above the risk of contracting Covid-19. As such the Occupational Health and Safety Act No 85 of 1993 and its Regulations require to be complied with. More specifically, the Construction Regulations of 2014 remain applicable and must be adhered to in order to protect the workers.

The Construction Regulations are very specific regarding the roles of stakeholders, namely the employer, designers and contractors. Each of these categories have very specific roles and responsibilities and cover both the built environment professionals (BEPs) and contractors. Each have roles in terms of H&S as per the existing arrangements over and above their contractual and monitoring duties on a project.

This H&S specification is based on Annexure 2 (Guideline for the Construction Sector Relating to Health and Safety and COVID-19) of the Construction Sector Reactivation Protocols prepared by the Construction COVID-19 Rapid Response Task Team and dated 26 April 2020.

PURPOSE

The purpose of this specifications is to specifically manage the operations of Construction work projects during the confirmed 2020 Covid1-19 Novel Corona Virus to ensure that employees are well informed and equipped to take all possible measures to prevent the spread and contain the virus as far as possible and reasonably practicable when performing their duties on site.

IMPLEMENTATION OF THE PROJECT SPECIFIC COVID-19 OCCUPATIONAL HEALTH AND SAFETY SPECIFICATIONS

These H&S specifications will form an integral part of the Contract and are in addition to Project Specific Health and Safety Specifications (PSHSS) already in place and included at tender stage. Where there is conflict of interpretation between the specifications, the Covid-19 specifications shall take precedence.

No work may commence without written approval of the revised H&S plan by the H&S Agent, or the responsible person in the MISA. Subsequent to approval, the contractor's activities on site will be monitored through regular H&S audits and Non-conformances will be issued and penalties or work stoppage will be issued where appropriate.

Roles And Responsibilities of Health and Safety Officers

The PC's Health and Safety Officer (HSO) will be required to undertaken the following amongst other activities:

HSO officers will ensure that they carry out the COVID 19 awareness and ensure that all employees receive the message and understand what to do and how to do it. The training awareness will include training of Security officers on what to do when receiving employees to the premises.
HSO officers must ensure that before letting any employees inside the premises/site camp, they issue them with face masks and sanitise their hands before passing through the gate.
Screening questionnaire will be completed before employees can be allowed to gain access to the premises.
The Employer specifications and requirements will be implemented accordingly.
Ensure hand sanitizer and hand soap is available at all times and issued to all including training on proper usage.
Undertake employee awareness campaigns on how the virus is spread from one person to another and also train them on how to prevent the spreading of the virus.
Conduct regular toolbox talks to ensure that employees are always reminded of correct behaviour and handling of PPE provided.
Ensure that employees who are suspected to have the symptoms are isolated immediately and the Department of Health immediately notified of such. While waiting the HSO officer must ensure that the isolated victim is entirely kept away from other employees, this will help to lessen to spread the virus.

BASELINE RISK ASSESSMENT

SUMMARY OF RISKS IDENTIFIED DURING DESIGN AND IMPLEMENTATION

The existing Baseline Risk Assessment (BRA) will require to be amended to take into account risks related to the potential spread of the Covid-19 virus. A typical risk assessment schedule is provided in ANNEXURE A for use by the Contractor.

Examples of risk factors include but are not limited to the following:

Lack of financial resources by Employer;
Employer not enforcing financial resources for projects;

Transportation, to, from and on sites;
Manual labour for physical tasks and tasks that will not allow for social distancing;
Workers arriving at work with a temperature or other symptoms of Covid-19;
Management of isolating potentially infected workers, and tracing of family/contacts;
The lack of clean ablution facilities;
The lack of clean welfare facilities where workers congregate for lunch break;
Lack of cleaning and hand washing facilities;
Confined working areas;
Too few emergency supplies, first aiders and first aid boxes;
Sanitization of frequently used environments throughout the working day;
The need to continually monitor site activities;
Underlying chronic diseases and age of workers (experienced workers);
Specialised contractors having older workers, or need to cross borders, and
Rural projects, or small/private projects ignoring the current legislation.

RE- INTRODUCTION TO THE WORK PLACE AFTER LOCKDOWN

Employees returning to the first day of work after the lockdown to answer a wellness questionnaire with the HSO at the entrance to the main building or site camp. Upon successful completion of the questionnaire (If satisfactory) the employee will be allowed to proceed to his/ her work area. All employees will attend a mandatory re-induction (Revised induction for COVID-19 awareness including new measures to be taken.
A COVID 19 Risk assessment will be communicated to all employees to highlight activities and areas considered “hot spots”

SITE SPECIFIC HEALTH AND SAFETY PROCEDURES

DEMOGRAPHICS

It will be incumbent upon the PC to establish a suitable and sufficient procedures for the identification of potentially infected employees and workers, the management of exposure to the corona virus on the project, including visitors and suppliers. Including a response plan for persons suspected of being infected with or exposed the virus. The procedure is to be applicable to all levels of management and supervision, employees and local labour.
As part of this procedure, the contractor is to maintain a register of all employees and workers on the project, including sub-contractor employees and workers, keeping records of the following information as a minimum (note the NIOH document that is currently available):

Age of Employee

The procedure is to take cognizance of the vulnerability of older workers and make provision for additional or more frequent screening of workers above a specified age. A certificate of fitness should be available to make the worker fit for duty, and should be available on site at all times.

Health status

A detailed record of all current and previous health conditions, specifically those identified as creating a higher risk for contracting Covid-19, to be kept for all workers. The procedure is to make provision for stringent testing procedures and management of exposure to the virus for workers with higher vulnerability due to underlying health conditions. Such records are confidential and will remain with the Occupational Health facility. A certificate of fitness must be available for each worker on site, including management and contractors.

Socio economic status / Unskilled labour

The procedure is to consider the socio-economic status and skill level of workers, taking cognizance of the fact that these may have an impact on the worker's level of exposure to the virus outside of the workplace and the risk of being asymptomatic carriers of the virus to the project/site.

Accommodation

Where accommodation is provided by the contractor/sub-contractor, factors to be considered in the procedure include, inter alia:
Density of occupants to allow for adequate social distancing (minimum 1.5m) in sleeping and dining quarters;
Restriction on the number of persons using the same sanitary/hygiene facilities;
Provision of dedicated crockery and cutlery for each occupant, together with a procedure for effective cleaning and safe storage of same and a prohibition on the sharing of utensils;
Dedicated facilities for safekeeping of personal belongings and abovementioned utensils for each person. Such facilities are to allow for total segregation of belongings and must be easy to sanitize. Provision of such facilities for safekeeping to be accompanied with a procedure for the use and sanitizing of the storage facility to reduce the risk of cross-contamination;
Facilities for accommodation provided by the contractor to have in place stringent procedures for personal hygiene, ongoing maintenance of sanitizing and social distancing, and
Additional rules to include a prohibition on the sharing of clothing, towels and other personal belongings, as well as the laundering of clothing for multiple persons at the same time.

ORIGIN OF LABOUR AND TRANSPORTATION

Where a return to work will necessitate travel between provinces and cities for employees and workers to return to the project, the PC is to have a procedure for, or provide transport for the return of workers to minimize the risk of exposure to the virus while in transit. While this is difficult to control by the PC, induction training needs to include such information so workers can protect themselves. Where on-site transportation is done, a policy needs to be available for how such transportation will be made safe and limit any opportunity for cross infection. If possible the PC could provide their own transportation for their workers.
Parking areas for public and private vehicles need to be considered. Hand cleaning facilities when entering gates, doors, and security entrances.

Public Transportation across borders/towns/cities

The contractor to source/recommend a transport service provider that complies with all travel restrictions and requirements as gazetted by the government, inter alia:
Maximum occupancy of vehicles to allow for social distancing;
Vehicle sanitized before passengers board;
Passengers provided with hand sanitizer and face masks prior to boarding;
Vehicle sanitized before boarding, and hand sanitizer provided to passengers prior to boarding, after each stop where passengers leave the vehicle for comfort breaks, and
Frequent hand sanitizing is recommended during transit.

Contractor provided transportation across borders/towns/cities

Where the contractor provides transportation across borders/towns/cities to assist workers to return to work, provision is to be made for an adequate number of vehicles to comply with the maximum occupancy as in (a) above, and all such vehicles provided will be subject to the same requirements as abovementioned.
Since it will not practicable to separate belongings and luggage in either instance mentioned above, the contractor's procedures must make provision for the sanitizing of personal belongings and luggage on arrival at the final destination.

SOCIAL DISTANCING

Social distancing has been shown to be an effective method to slow down the spread of the corona virus. It will be incumbent on the contractor to ensure that the construction site and facilities are set up in such a way that it will be possible as far as is practicable to maintain the required social distancing of a minimum of 1 metre between persons when at work.

Tasks that require more than 1 person to complete

Where it is not possible to maintain the required distance between workers due to the nature of the work activity, e.g. curb laying, confined working areas, rebar tying, preparing wire cages, the contractor will be required to implement, maintain and enforce a procedure to adequately protect such workers against potential infection with the corona virus. This includes but is not limited to:
Providing adequate supplies of suitable PPE such as face masks, task specific gloves, safety glasses, disposable/additional coveralls;
PPE used during multi-person activities to be exchanged immediately after the task is completed;
Sealed bins to be provided for disposable PPE such as masks, disposable coveralls, disposable gloves, etc.;
Sealable bags provided to each person for keeping PPE requiring laundering, such as gloves and overalls, and
Sanitising/washing facilities provided for immediate sanitizing of hard hats, safety glasses, shoes, safety harnesses etc. on completion of multi-person tasks.
All the above to be utilized when breaking for lunch or leaving the site, and before commencing with the next or new work activity.

Access/Egress of Site, Welfare Facilities, Meeting Areas

The PC is to ensure there is suitable and adequate provision to minimize the risk of persons who may be infected with Covid-19 entering the site, the spread of the virus between persons who work on or visit the site and the risk of potentially contaminated persons leaving the site and accessing public spaces or going home to their families. To achieve this, the contractor is required to implement, inter alia the following measures:
Persons accessing the site in groups to maintain social distancing of at least 1 metre while waiting to access the site;
Persons waiting to access the site to be segregated from the public where required by the provision of dedicated, prominently identified public pedestrian walkways situated in such a way that social distancing is maintained between site personnel and the public;
Screening of each person who enters the site with a no-touch infrared thermometer;
Means of (fully) sanitizing each person and their belongings, who access and leave the site;
Dedicated facilities for safekeeping of personal for each person. Such facilities are to allow for total segregation of belongings and must be easy to sanitize. Provision of such facilities for safekeeping to be accompanied with a procedure for the use and sanitizing of the storage facility to reduce the risk of cross-contamination;
Toolbox talks to be conducted outdoors when possible in order for persons to maintain social distancing. Where inclement weather does not allow for this, toolbox talks to be conducted with smaller groupings of workers in a sheltered area large enough to maintain social distancing, and
Eating areas to be set up in such a way that the maximum number of persons who will use the area at any one time are able to maintain the required social distancing of 1 metre. Should this not be practicable, meal times are to be staggered on a rotational basis to avoid contact between persons.
*This guideline is not an exhaustive list and the contractor is encouraged to develop rigorous control measures and procedures to safeguard all persons accessing or working on the site against the risk of Covid-19.
Where possible remote means of monitoring such as use of drones or security cameras to monitor site conditions and to do site inspections could be considered.

ALCOHOL AND DRUG TESTING

Alcohol testing may only be done using single use test units, and must be disposed of in the appropriate contaminated waste. Drug testing will only be done by an occupational health facility either using urine or blood sampling. A protocol will be drawn up by the PC to manage this with the occupational health service being used.

MEDICAL SURVEILLANCE

The normal requirements of pre-placement, periodic and exit medicals will remain, with the Occupational health service providing a methodology of how they will be including factors relating to Covid-19. No lung functions or peak flows will be done until deemed safe to do so by the South African Thoracic Society.
It is preferable that occupational health service providers use a cloud-based record keeping service to ensure easy tracking and tracing. Free apps such as Square 1 is such an example.
Any person who contracts the virus may need to be reported to the Compensation Commissioner as an occupational disease where their work is to monitor and in contact with others. Such details are provided in the Compensation for Injuries and Diseases Act (COIDA).
Isolation of workers who have a temperature or any symptoms, and removal to the closest facility for testing and treatment, through the numbers provided. The PC is to ensure their policy on this includes such information.
Workers will be required to complete COVID-19 questionnaires prior to returning to site. Any worker with any symptoms is not to return to work, or notify the PC of same.

ABLUTION FACILITIES

Ablution facilities are an essential facility that must be available for workers across a site.
Facilities are a high risk area and increased cleaning regimes are required to be introduced. A policy on how this will be done is required, that will cover both portable and permanent facilities.
The following are considerations, which include, inter alia:
Portable toilets to be provided at a 1:10 ratio
Cleaners to continually clean and have a formal cleaning regime
Hand washing facilities (soap and water, paper towel) to be available where possible, and if not, to provide hand sanitizer
Induction training to educate to ensure all users are hand washing correctly
Flush toilets preferably 1:15 unless increased cleaning regime present;
Restrict the number of people using toilet facilities at any one time e.g. use a welfare attendant;
Wash hands before and after using the facilities;
Enhance the cleaning regimes for toilet facilities particularly door handles, locks and the toilet flush;
Portable toilets should be avoided wherever possible, but where in use these should be cleaned and emptied more frequently;
Provide suitable and sufficient rubbish bins for hand towels with regular removal and disposal that need to be managed as hazardous waste;
Introduce staggered start and finish times to reduce congestion and contact at all times;
Consider increasing the number or size of facilities available on site if possible, and
Provide suitable and sufficient rubbish bins in these areas with regular removal and disposal.

SECURITY ACCESS

Public access to site is to be limited at all times, and non-essential visitors are not to be allowed entry. There is required to be staggered access at all times. The following aspects are to be included in a policy document as to how such issues will be managed, inter alia:

Staggered access to site;

The PC should consider the following:
Introduce staggered start and finish times to reduce congestion and contact at all times;
Monitor site access points to enable social distancing – consideration for the number of access points, either increase to reduce congestion or decrease to enable monitoring;
50-100mm deep trough to be placed at entrances to site. Disinfectant is to be placed in the trough and all shoes coming onto site or leaving site will be disinfected, without wetting shoes themselves;
Remove or disable entry systems that require skin contact e.g. fingerprint scanners or biometric system;
Require all workers to wash or clean their hands before entering or leaving the site;
Ensure social distancing between people waiting to enter site;
Regularly clean common contact surfaces in reception, office, access control and delivery areas e.g. scanners, turnstiles, screens, telephone handsets, desks, particularly during peak times;
Reduce the number of people in attendance at site inductions and consider holding them outdoors wherever possible, and
Drivers should remain in their vehicles if the load will allow it and must wash or clean their hands before unloading goods and materials.

PROCUREMENT AND STORAGE FOR COVID-19 PPE AND GENERAL SUPPLIES

The following is to be implemented by PC:
Availability of personal protective equipment PPE is an imperative and should be available at all times. Where this is not so, the work related to the activity will be stopped until adequate supplies are available.
Storage of PPE is to be tightly controlled, with records of issue. Damaged PPE is to be managed in the usual way, but all to be disposed of as if contaminated.

WASTE MANAGEMENT FOR COVID-19 WASTE

Waste management arrangements to be updated to include provision for the disposal of additional waste generated due to preventative measures implemented. All waste to be managed as hazardous waste.

Disposal of any gloves, masks

The contractor shall dispose of all used gloves and masks as hazardous waste and provide sealable bags and containers for the safe disposal of this waste.

Paper towels

The contractor shall provide adequate supplies of paper towels on site. At points where these towels are provided lined waste bins to be placed in order to collect all used towels and then to be disposed of in hazardous waste.

Disinfectant solution

The contractor to provide adequate supplies of disinfectant on site where the use of water and soap for cleaning is not practical. If disinfectant dispensers are not refilled it should be disposed with other hazardous waste.

Wastewater

Wastewater at washing points, toilets, and bathrooms to be contained in a drainage system that prevent surface spills. If wastewater is contained in waste buckets it must be sealed when removed and disinfected after it is cleaned.

SIGNAGE

The PC is to review all current signs and notices displayed on site. The PC is to avoid conflicting messages/notices that have been in place prior to lockdown and review according. Typical signage that can be displayed on site is shown in Figure 1
Figure 1: Typical Signage

Access rules

The contractor shall install additional signage with site rules specific to the prevention of spreading the COVID-19 virus at the access control points of the site.

Notices/Posters with protocols

Notices and posters shall be placed and installed to raise awareness and regarding protocols to be followed on site. These notices and posters shall be placed conspicuously at various points on the site including the following places:
Entrance
Site notice board
Site Office
Eating areas
Next to toilets and bathrooms
Hand washing stations
Storerooms

EMERGENCY PLANNING

An updated emergency plan is to be completed that is in line with the current Regulations of the National Disaster Management Act.

First aid

Extra gloves, and disinfectants are to be available, first aiders are to be issued with at least FFPT2 masks should they be required to respond
Evacuation plans

Evacuation plans should consider social distancing.

Isolation of potentially infected workers

The emergency plan is to consider how anyone who arrives on site and displays any of the symptoms, or has a raised temperature.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

The hierarchy of control applies with the use of PPE. Specific regard for the type and usage, training and control is to be outlined in the policies and procedures.

Masks

Masks are compulsory for all employees; personnel and professional team members, reducing the potential of inhaled COVID-19 droplets. For general administration purposes, for essential staff on site only, cloth masks may be worn. N95 masks are only to be worn by first aiders or high risk workers, due to the national shortage thereof.
All employees to have access to N95 or FFPT2 masks when required, only in instances of HIGH RISK OF EXPOSURE
All N95 and FFPT2 masks to be disposed with or after 1 day's use. Induction is to include training on the correct use of face masks.
Cloth face masks to be used on entering and leaving the site. It is advised that each worker is supplied with at least 3 cloth face masks. This would assist ensuring that the masks are hygienic (1 on the face; 1 in the wash and 1 as a backup).
The PC must ensure that sufficient stock is at all-time available on site. This will also have depended on the type of mask being issued.
All disposable masks are biological waste and must be properly disposed of. This must be disposed in container (locked) or in bags to be either removed as medical biological waste by registered service provider.
CLEARLY IDENTIFIABLE BINS INDICATING BIOLOGICAL WASTE TO BE PROVIDED

Face Shields

The principal contractor could also look at options such as full face shields for preventing spreading of virus through eyes. This would assist the employee who is doing hard physical work to breathe more easily but still protecting the mouth, eyes and nose.
Face shields should be cleaned daily before the shift and at the end of the shift. Proper cleaning agents/disinfectant must be used. Face shields should be issued to employees and no sharing is allowed.

Overalls

All employees must be issued with 3 overalls (1 overall wearing; 1 overall in the wash and one as the backup). This will ensure that the employee will be able to wear clean hygienic overalls. This must form part of the COVID-19 training for all employees.

Hand Gloves

It is preferable that surgical gloves are not worn unless indicated and workers trained in the proper use thereof. Gloves must only be used when the activity demand the wearing of specific type of hand gloves. This will be directed by the PC risk assessment.
Site office personnel need to be made aware of the risks in the office environment, this include to handling of documents and plans. These employees could be issued with the appropriate hand gloves or sufficient hand wash / sanitising facilities must be available in the site office.

CONSEQUENCE MANAGEMENT

Change Management

Each Principal contractor / contractors to ensure that regular information pertaining to COVID 19 and or any Health and Safety matters is distributed to ensure that required measures / controls is timeously addressed. There are various information platforms available to the Principal Contractor and or employee that can assist in keeping them informed. These include inter alia:
Local Authority / Legislation
World Health Organizations
Health Care Departments / Health Care Professional's / Centre's / Hospitals
Public Service Announcements – National News
Each contactractor is responsible and required to keep his or her employees informed by means but not limited by conducting the following;
Awareness campaigns -i.e. posters within work places
Daily site task Inspections (DSTIs)
Toolbox talks / Daily briefings
Meetings
Company policies / procedures / Employee Wellbeing interaction
Company newsletters
Telecommunications – Cell phones Apps / e-mail

Succession Planning

Employees who is performing specialize work/activities (including plant operators) must be identified. These positions must have alternative employees that could perform these activities. This could mean additional training for these employees.
Key personnel on site should also have competent alternative employees that could perform these functions when needed. Where possible administrative staff should be working from home to limit any opportunistic exposure.
It is very important to understand that the availability of certain essential products and material may not always be available and thus proper planning must be in place to ensure that the activities on site are not interrupted.
Proactive planning must be in place to ensure that the following are ordered and available:
PPE (cloth face masks, face shields, overalls)
Hand sanitizers with at least 60% alcohol content
Disinfectants and cleaning materials

Consequences

When non-compliance activities are noted, that activity will be stopped. Should the remedial actions not take place the site will be shut down till the corrective actions have been implemented.
Employees that do not work according to the SSHSS and SSHSP must be disciplined according to the company's disciplinary codes and practices.
Supervisory employees on site must ensure compliance, and when non-conformances are noted disciplinary actions should also be followed.
PCs should note that they could be fined and even according to the Disaster Management Act, arrested.

WELFARE FACILITIES

The PC shall adapt arrangements regarding the provision of welfare facilities to be in line with Government guidelines and requirements.

Clean, storage for food and personal belongings

The PC to provide lockable storage for all employees on site, which shall be disinfected daily. Training and awareness to address procedures and the importance of good hygiene practice.

No personal belongings to be kept on site

Apart from extra clean personal clothing no other personal belongings allowed on site accept if kept in locker provided by the PC.

No communal drinking facilities (shared cups etc.)

The PC to provide adequate supplies of bottled water to all employees on site. Empty bottles to be disposed of as normal waste. Training and awareness to address procedures and the importance of good hygiene practice.

Larger meeting areas/ preferably use technology (Skype, Zoom, Microsoft teams):

The PC is to limit the number of employees at all activities to the minimum required to do the work in a safe manner. Where possible meetings must be held in open areas limited to essential personnel. Technological alternatives to be exploited for meeting attendance if possible. Training and awareness to address procedures and the importance of social distancing.

Eating areas

The PC is to limit the number of employees at all activities to the minimum. Stagger lunchbreaks and resting periods for work teams. Training and awareness to address procedures and the importance of good hygiene practice and social distancing.
Workers are required to stay on site once they have entered it and not use local shops.
Dedicated eating areas should be identified on site to reduce food waste and contamination.
Break times should be staggered to reduce congestion and contact at all times.
Hand cleaning facilities or hand sanitiser should be available at the entrance of any room where people eat and should be used by workers when entering and leaving the area;
Workers should be asked to bring pre-prepared meals and refillable drinking bottles from home;
Social distancing to be applied whilst eating and avoid all contact;
Where catering is provided on site, it should provide pre-prepared and wrapped food only;
Payments should be taken by contactless card wherever possible;
Crockery, eating utensils, cups etc. should be disposable if supplied;
Drinking water should be provided with enhanced cleaning measures of the tap mechanism introduced;
Tables should be cleaned and disinfected between each use;
All rubbish should be put straight in the bin and not left for someone else to clear up;
All areas used for eating must be thoroughly cleaned at the end of each break and shift, including chairs, door handles, vending machines and payment devices.

ADEQUATE RESOURCING OF PROJECTS

The PC will be required to price for the additional H&S related items that have arisen as a result of the Covid-19 pandemic and the regulations promulgated under the Disaster Management Act 2002 (Act No. 57 of 2002), as amended. The Bill of Quantities (BoQ) provided to the PC needs to take into account the requirements that have been identified in the BRA and the SSHSS. Contractors need to be able to price for the requirements and the appropriate BEP to assess the suitability of the items and pricing thereof.

A typical example of a H&S BoQ that would be adapted is included as Annexure B. The BoQ is not exhaustive and is dependent much on the amended BRA as approved by the Employer or his Principal agent. Should risk factors change, amendments will need to be made to the BoQ.

CONTRACTUAL CONSIDERATIONS

GENERAL CONSIDERATIONS

Before considering the provisions of the common construction contracts in detail, the following general recommendations are made:

Should payment certificates not have been issued during the period of lockdown, they should be issued as soon as possible after recommencement of works, but no later than the end of May 2020.
The lockdown period will give rise to various typical force majeure claims and contractors will be entitled to submit extension of time claims for the period of the lockdown. These will be evaluated by the Principal Agent in accordance with the situation/conditions on site during the lockdown.

The Covid-19 epidemic and the continued lockdown regulations may have a further and continued impact to contractors after site re-opening. Those impacts will have to be assessed by the contractors and further claims for resulting delays to the project programmes may need to be considered.
Where time limits are applicable to claims and claim notifications, such time period should only be calculated from, at the earliest, the date on which the relevant construction site re-opens.
It is recommended that all claims arising from the lockdown be submitted and resolved as soon as possible after recommencement and well before any applicable time limits.
Any disputes emerging in regard to claims should be resolved expeditiously in accordance with the provisions in the contract.

APPLICABLE GENERAL CONDITIONS OF CONTRACT

The following clauses in the General condition of contract are noted which are considered applicable to the Covid-19 Lockdown:

GCC 2015

Clause 5.12.1 provides that the contractor is entitled to an extension of time for the completion of the works if “circumstances of any kind whatsoever” will delay the achievement of practical completion of the works.

Clause 5.12.2.4 specifically lists “any disruption which is entirely beyond the contractor’s control” as a circumstance entitling the contractor to an extension of time. A contractor will accordingly be entitled to an extension of time for delays caused by the lockdown and other circumstances resulting from Covid-19.

In terms of clause 5.12.3, if an extension of time is granted the contractor shall be paid such additional time-related general items as are appropriate.

Clause 5.12.4 provides that instead of granting an extension of time, if feasible, the contractor may be requested to accelerate the rate of progress to achieve practical completion and will be paid for the costs of such acceleration.

A contractor may also be entitled to a claim for extension of time with adjusted value in terms of clause 5.4.3 if an instruction to commence work was issued to the contractor but the employer was unable to fulfil its obligation to give the contractor access and possession of site due to the limitations imposed during lockdown.

However, once the contractor has been given possession of the site, a claim under clause 5.4.3 would not be applicable.

Covid-19 may also fall within the definition of “excepted risk” and in particular the reference to “epidemic plague” set out in clause 8.3.1.7.

In terms of clause 8.3.2, the contractor is entitled to an extension of time and can recover additional costs where the contractor suffers a delay or loss directly or indirectly caused by an “excepted risk”.

Clause 9.1.2 read with clause 9.1.4 provides that the contractor is entitled to claim additional costs, which are not covered by the additional time-related general items, caused by “a state of emergency, riot, commotion politically motivated sabotaged acts of terrorism or disorder” and “any such event beyond the control of the contractor” that materially affects the execution of the works.

Clause 9.1.4 requires the contractor to notify the engineer within 14 days of becoming aware of such increase in cost.

In terms of clause 6.8.4 the contractor is entitled to any additional costs, which are not covered by the additional time-related general items, if at any time within 28 days before the closing of tender or thereafter, any act, ordinance, regulation or by-law is amended and this results in additional cost to the contractor.

In terms of clause 10, the contractor is required to submit its claim for any extension of time or additional payment as follows:
the contractor must submit its claim to the engineer in accordance with the specified requirements, within 28 days after the circumstance or event giving rise to such claim; and
if the event giving rise to a claim is of an ongoing nature, the contractor is additionally required to deliver updated monthly claims to the engineer and submit its final claim within 28 days after the end of the event or circumstance.

The parties may deliver a written notice of dispute to each other and the engineer of any dispute provided that the dispute arises from a rejected claim and it is delivered within 28 days of the event giving rise to the dispute.

The dispute shall be referred to adjudication unless an amicable settlement is contemplated. The parties may agree to settle any claim or any dispute amicably with the help of an impartial third party. If the other party rejects amicable settlement in writing or does not respond to the invitation within 14 days or if the amicable settlement is unsuccessful the dispute shall be referred to adjudication.

Either party is entitled to disagree with any decision of the Adjudication Board and refer the matter to arbitration or court proceedings, whichever is applicable in terms of the contract provided that a party disputes the adjudicator’s decision not before 28 days or after 56 days from receipt of the decision.

GCC 2010

The contract provisions are the same in effect save for clause 8.3.1.7 relating to the excepted risk which is not part of GCC 2010.

The contractor may also be entitled to a claim for extension of time with adjusted value and additional costs in terms of clause 5.4.3, 5.10.1 and 5.11.2 as explained above in the GCC 2015 version. These clauses have the identical operation as in the 2015 version.

The clause numbering and content of the GCC 2010 dispute resolution process runs parallel to that of the GCC 2015, save that the 2010 version provides that the parties may deliver a written

notice of dispute to each other and the engineer of any dispute provided that the dispute arises from an unresolved claim (and not a rejected claim as recorded in the 2015 version).

NEC 3

Clause 60.1 defines a compensation event as:

“An event which stops the contractor completing the services or stops the contractor completing the services by the date shown on the accepted programme and:
which neither party could prevent;
an experienced consultant would have judged at the contract date to have such a small chance of occurring that it would have been unreasonable for him to have allowed for it; and
is not one of the other compensation events stated in this contract;

A contractor must notify the project manager of a compensation event in accordance with clause 61.3 which provides that if the contractor has not given notice of the compensation event within eight weeks of becoming aware of the event, it will not be entitled to a change in the prices, the completion date or a key date (unless the project manager should have notified the event to the contractor but did not).

If the project manager does not respond to the contractor’s notice timeously, it will be deemed to have accepted the existence of a compensation event.

If the employer does not respond to the contractor’s abovementioned notice, it will be deemed to have accepted the existence of a compensation event.

The employer will then instruct the contractor to submit quotations which could impact the contract price and/or completion date.

Where the employer decides that the effects of a compensation event are too uncertain to be forecast reasonably, it must state assumptions about the event in its instruction to the contractor to submit quotations. Assessment of the event will then be based on these assumptions. If any of them is later found to have been incorrect, the employer must give notice of a correction.

In terms of clause 63, a delay to the completion date is assessed as the length of time that, due to the compensation event, planned completion is later than the planned completion shown on the accepted programme.

The NEC3 makes provision for a risk register which is “a register of the risks which are listed in the contract Data and the risks which the project manager or the contractor has notified as an early warning matter. It includes a description of the risk and a description of the actions which are to be taken to avoid or reduce the risk.”

It is recommended that Covid-19 and the Disaster Management Regulations and their impact be included in the Risk Register.

In terms of clause 16.1 the contractor and the project manager will give an early warning by notifying the other as soon as either becomes aware of any matter which could:
increase the total of the prices;
delay completion;
delay meeting a key date; or
impair the performance of the works in use.

The contractor may give an early warning by notifying the project manager of any other matter which could increase its total cost.

The project manager then enters early warning matters in the risk register. Early warning of a matter for which a compensation event has previously been notified is not required.

In terms of clause 16.3, the parties will then hold a risk reduction meeting in order to:
make and consider proposals for how the effect of the registered risks can be avoided or reduced;
seek solutions that will bring an advantage to those affected;
decide on the action to be taken in accordance with the contract; and
decide which risks have been avoided or have passed and can be removed from the Risk Register.

The NEC3 series of contracts mandate adjudication as a dispute resolution procedure. An adjudicator is appointed by the parties in terms of an NEC Adjudicator's Contract.

The adjudication procedure is included either in section 9 of the core clauses or under Option W1 (Dispute Resolution).

The contracts provide that a party referring a matter to an adjudicator must do so on notice, and within the time periods specified in the adjudication table. The table refers to four categories of disputes and specifies which party may refer each category to adjudication and the timelines for doing so.

Where the adjudicator's decision includes assessment of additional cost or delay caused to the contractor, he makes his assessment in the same way as a compensation event is assessed.

The adjudicator's decision is binding unless and until revised by the tribunal (arbitration or litigation as selected by the parties in the contract data), alternatively it is binding if a party does not notify the other party of his intention to refer the matter to the tribunal within 4 weeks of the adjudicator's decision. The adjudicator's decision will be enforceable as a contractual obligation.

The dispute may not be referred to the tribunal if the matter has not first been referred to the adjudicator.

ANNEXURE A
BASIC RISK ASSESSMENT

BASELINE RISK ASSESSMENT			LOW	MED	HIGH
			1	4	12
			2	6	18
			3	8	27
Risk Rating multiplier: Low = 1; Medium = 2; High = 3	**PREPARED BY:**				

Note: This is a broad overview of the activities expected and available during the design stage of the project. Key issues will be addressed during the construction stage, and may be updated during this time. Consolidation of activities where overlap or applicable throughout the project (plant, material or other common activities). Compliance with all the applicable legislation is required. Penalties for non-compliances will be applied where issues not addressed as per the H&S Specification (as amended).

REFERENCES/ABBREVIATIONS: OHSA Occupational Health and Safety Act (applies overall); GAR = General Administration Regulations; GSR = General Safety Regulations; HBR = Hazardous Biological Regulations; CR = Construction Regulations; HCSR = Hazardous Chemical Substances Regulations; FR = Facilities Regulations; EIR = Electrical Installation Regulations; DMR = Driven Machinery Regulations; PER = Pressure Equipment Regulations; RTA = Road Traffic Safety Act; SANS = 1200 (unless stated) SANS 10085 = Access Scaffolding; SANS 10083 = Audiometry standards; SANS 1300, 10142,10400 & 2001 = Building & Electrical Standards; SARTSM = South African Roads and Traffic Signs Manual; PC = Principal Contractor;

			Baseline design: RAW RISK					Baseline Design: Residual risk			
LEGAL REF	**DESIGN ASPECTS PRESENT**	**DESCRIBE THE METHODS AND ACTIVITIES USUALLY PROVIDED BY THE PC AND CONTRACTOR**	**LIKELY CONSEQUENCES OF AN ACCIDENT**	**FREQUENCY OF EXPOSURE**	**PROBABILITY OF HARM**	**RISK RATING AND RISK CATEGORY**	**CATEGORYEXTRA CONTROL MEASURES NECESSARY TO REDUCE RISK/ REDESIGNLIKELY**	**LIKELY CONSEQUENCES OF AN ACCIDENT**	**FREQUENCY OF EXPOSURE**	**PROBABILITY OF HARM**	**RISK RATING AND RISK CATEGORY**

ANNEXURE C

PPE ISSUE REGISTER

LOCATION / SITE NAME: ..... COMPANY NAME: .....

ISSUED BY:.....

												ENTER NAME AND SURNAME & SIGN BELOW EACH ITEM RECEIVED
Gloves	Hard Hat	Overhaul	Safety Boots	Reflective Vest	Safety Glasses	Dust Mask	Earplugs	Safety Harness	Welding Gloves	Welding Helmet/ Glasses	Welding Apron	ENTER NAME AND SURNAME

ANNEXURE D

COVID-19 QUESTIONNARE & DECLARATION

Contractor Name: _____
Important : Please note that this is an individual Questionnaire.

Site/Work Area: _____

Employee Name and Surname: _____

Date: _____

Line Manager: _____

Symptomatic Screening Questionnaire	Yes	No
Have you experienced symptoms of flu or had flu in the past two weeks?		
Have you experienced any coughing or breathing abnormalities lately?		
Do you currently have a fever or have you been experiencing symptoms of a fever? (Red eyes, burning sensation)		
In the last 14 days, have you come into contact with any person that has displayed symptoms or tested positive for COVID 19?		
Have you travelled outside the borders of South- Africa lately?		
Have you been tested for COVID 19?		

Personal Commitment

I Will further to the above , declare any immediate changes in my health to my line manager
I will Adhere to all the guidelines set out by Thermaire & Ampair in the COVID 19 management plan
I will maintain good hygiene practices
I will maintain social distance from employees at all times
I will utilize ppe and sanitizer provided at all times.
I will ensure that shared equipment, as far as reasonably practicable , has been sanitized before handover to other employees.

I ,_____ Declare that the document is a true statement of my current health and hereby will adhere to all guidelines set out.

Employee Signature _____

Temperature reading If available (Refer to health practioner if above 38 degrees Celsius		
Employee Cleared for entrance (Circle)	Yes	No

Questionnaire reviewed by :	

C3.5.2. Particular Specification PD: ENVIRONMENTAL MANAGEMENT SPECIFICATION

HIBISCUS COAST MUNICIPALITY

OATLANDS LANDFILL SITE

ENVIRONMENTAL MANAGEMENT PROGRAMME

AUGUST 2014

Report prepared by:
Mary Chettle & Associates
P. O. Box 174, Nottingham Road, 3280
Tel: 033 266 6336
Cell: 082 334 4585
Fax: 086 546 2600
E-mail: mchettle@mweb.co.za

TABLE OF CONTENTS

ACRONYMS

BA	Basic Assessment
BAR	Basic Assessment Report
BID	Background Information Document
CSW	Contaminated stormwater
DAEA	Department of Agriculture, Environment Affairs (KZN Provincial Department)
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs (KZN Provincial Department)
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management programme
EPR	Extended Producer Responsibility
G:M:B+	General waste landfill site (medium size, leachate producing)
GN	Government Notice
HCM	Hibiscus Coast Municipality
LFG	Landfill Gas
MC	Monitoring Committee
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
PPP	Public participation Process

1. INTRODUCTION

The Oatlands Regional Sanitary Landfill Site has been operational since 1996. It was originally permitted in April 1996 in terms of the Environment Conservation Act, 1989 (Act no. 73 of 1989) (as amended). This permit authorised the operation of phases 1 and 2 of the landfill site. A new permit was issued in March 2009 in terms of the Environment Conservation Act, 1989 (Act no. 73 of 1989) (as amended) authorising the operation of phases 1, 2 and 3 of the site. Phase 4a, although not permitted, was constructed in 2009 and has been operational since. The proposed activity includes the expansion of the landfill site (phases 4, 5 and 6) as well as the construction and operation of a leachate treatment plant. A Waste Management Licence (WML) is required for the Oatlands Landfill Site in terms of section 45 of the NEM:WA, 2008 (Act No. 59 of 2008).

The proposed activity (expansion) requires an application subject to Basic Assessment Reporting as described in the Environmental Impact Assessment (EIA) Regulations 2010, sections 26 - 35 (Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998, as amended).

Hibiscus Coast Municipality (the Applicant) appointed Mary Chettle & Associates in 2013 to undertake the Basic Assessment (BA) process for the Licencing of the Oatlands Landfill Site (including the expansion of the site).

An application for a Waste Management Licence in terms of the NEM:WA, 2008 (Act 59 of 2008) and the EIA Regulations, 2010 (Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998, as amended) was lodged with the DAEA in January 2013. DAEA project reference number DC21/WML/0016/2013.

The potential environmental issues identified during the project, include the following:

- The potential to contaminate / pollute the iBilanhlolo River and the Ramsgate Lagoon
- Water management on site: stormwater, potentially contaminated water and leachate
- Leachate generation, containment, treatment and final disposal options
- Waste reduction, recovery and recycling

These issues have all been addressed in the BAR.

1.1 Site Description

The site:

- Remainder of portion 1 of the farm Wheatlands B Number 11019; remainder of portions 1,2,3 and 6 of the Farm Oatlands B Number 7199 and the farm Hoheluft number 14136, District of Margate, KwaZulu Natal.
- Local Authority: Hibiscus Coast Municipality
- District Municipality: Ugu District, DC 21
- 240,000m^2 in extent

- Geographical co-ordinates: 30° 50' 50" E and 31° 40' 33" S.

2. EMPR PROCESS AND CONTENTS

2.1 Contents of the EMPr

The contents of the EMPr is prescribed by the minimum requirements of section 24N(2) of NEMA. Section 24N(2) of NEMA states that the environmental management programme must contain-

(a) information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24 (1A), including environmental impacts or objectives in respect of-
(i) planning and design;
(ii) pre-construction and construction activities;
(iii) the operation or undertaking of the activity in question;
(iv) the rehabilitation of the environment; and
(v) closure, if applicable;

(b) details of-
(i) the person who prepared the environmental management programme; and
(ii) the expertise of that person to prepare an environmental management programme;

(c) a detailed description of the aspects of the activity that are covered by the environmental management programme;

(d) information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);

(e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;

(f) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and

g) a description of the manner in which it intends to-
(i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
(ii) remedy the cause of pollution or degradation and migration of pollutants; and
(iii) comply with any prescribed environmental management standards or practices.

The EMPr will require annual monitoring by an independent Environmental Control Officer (ECO) to ensure that the operator complies with all aspects of the EMPr.

2.2 Methodology

2.2.1 Authority Consultation

The following relevant competent authorities were informed / consulted:

- Hibiscus Coast Municipality, the licence holder
- Ugu District Municipality
- DAEA and DWA
- DEA
- The draft BA and draft EMPr was submitted to all authorities for comment prior to final submission to DAEA.

2.2.2 Public Participation Process

The PPP conducted during the project included the following:

- I&AP Database: The I&AP register was maintained and updated throughout the project.
- Adverts: An advert was placed in The Mercury, the Isolezwe, the South Coast Herald and the Ugu Eyethu notifying all I&APs of the project.
- Notice Board: Notices were placed along the boundary fence, at the entrance gate and at the weighbridge of the landfill site, advertising the project.
- Flyer: flyers were distributed to the neighbours.
- Background Information Document (BID): This was distributed to all I&APs, including the MC members.
- Input into and attendance at MC meetings.
- Public Meeting: All I&APs were invited to a meeting where the project i.e. the proposed expansion of the site, was presented.
- Newsletter: Newsletter 1 was sent to all I&APs to update them on the process and to highlight the inclusion of leachate treatment in the BA process. (However, the treatment of leachate has subsequently been removed from this application – to be dealt with separately in a later application.)
- Comments and Responses Report: All comments / issues received have been recorded and responded to in the Comments and Responses Report which has been updated throughout the project and included as Appendix E in the BAR.
- The draft BAR and draft EMPr was submitted to all I&APs for comment prior to final submission to the DAEA.

2.2.3 Issues raised

All issues / comments received to date have been recorded and are summarised below. Issues / comments were received / recorded at meetings with the neighbours, at MC meetings, at the Public Meeting and in writing following the distribution of the following documents to all I&APs:

- Project adverts, notices and flyers (March 2013)
- The Background information Document (BID) (March 2013)
- Public Meeting (May 20130)
- MC Meetings (January 2013, March 2013)

- Newsletter 1 (October 2013)
- Draft Basic Assessment Report and draft Environmental Management Programme

A brief summary of the potential environmental impacts and issues identified during the project included the following:

- The potential to contaminate / pollute the iBilanhlolo River and the Ramsgate Lagoon
- Water management on site: stormwater, potentially contaminated water and leachate
- Leachate generation, containment, treatment and final disposal options
- Waste reduction, recovery and recycling

3. ENVIRONMENTAL IMPACTS

Based on issues identified in the report above, the following impacts have been identified and assessed. The mitigation tables provided in Table 3 have been carried through and expanded upon in the EMPr.

The following section comprises a summary table of the implications and mitigation of each environmental aspect. The methodology used to rate the environmental impacts was qualitative. Each category was divided into a number of different levels. These levels were then assigned various criteria. This is detailed in the table below.

Table 1 Impact Assessment Scoring

Duration (time scale)	Short term	Impact restricted to construction phase only (0-1 years)
	Long term	Impact will exist throughout operational phase and cease after closure
	Permanent	Impact will have permanent potential – mitigation will not occur
Geographic Spatial Scale / extent	Site	Impact will be limited to within the site boundaries
	Local	Impact will affect surrounding areas
	Regional	Impact will affect areas far beyond the site boundary but limited to the Province of KwaZulu-Natal
Probability	Improbable	<40%
	Probable	>40%
	Highly Probable	>70%
	Definite	>90%
Intensity	Low	Where the impact affects the environment in such a way that natural, social, and cultural functions or processes are not affected.
	Medium	Where the affected environment is altered, but natural, social, and cultural functions or processes continue albeit in a modified way
	High	Where natural, social, and cultural functions or processes are altered to the extent that it will temporarily or permanently cease.
Significance rating pre / post-mitigation (positive / negative)	None	There will be no impact on the environment
	Low	The impact will have a limited effect on the environment
	Medium	The impact will have a measurable effect on the environment
	High	The impact will have a significant effect on the environment

Table 2 Impact Assessment Table and Proposed Mitigation Measures

Impact	Duration	Geographical Spatial Scale	Probability	Intensity	Significance Pre-mitigation (+) or (-)	Significance Post-mitigation (+) or (-)	Mitigation Measures and Comments
Air Quality							
Emissions LFG (methane, carbon dioxide, etc.)	Long term	Local	Definite	Medium	Low - Medium (-)	Low (-)	No mitigation necessary, however, full mitigation is possible. LFG extraction can be implemented if deemed necessary in future.
Health							
Increase in risks to health of surrounding residents (air quality)	Long term	Local	Probable	Low	Medium (-)	None	Full mitigation possible. Ensure that the site is operated optimally as a sanitary landfill site.
Odour							
Odour generated from the landfill operations	Long term	Site	Definite	Low	Medium (-)	None	Full mitigation possible. Ensure good operational practices; deodorisers can be used if needed.
Noise							
Increase in noise levels – construction phase	Short term	Local	Definite	Low	Medium (-)	Low (-)	No mitigation necessary. Ensure plant and equipment used during the construction phase is well maintained and operating optimally.
Increase in noise levels – operational phase	Long term	Local	Improbable	Low	Low (-)	Low (-)	No mitigation necessary. No additional vehicle or plant noise anticipated.
Dust							
Potential dust – construction phase	Short term	Local	Definite	Low	Medium (-)	None	Full mitigation possible. Area can be watered to suppress dust.
Potential dust – operational phase	Long term	local	Definite	Low	Medium (-)	None	Full mitigation possible. Area can be watered to suppress dust.
Surface Water							
Contamination of surface water – construction phase	Short term	Local	Probable	Low	Medium (-)	None	Full mitigation possible. A cut-off drain to be constructed to ensure no contamination from cement, sediment, etc. Ensure all stormwater management recommendations are implemented.
Contamination of surface	Long term	Local	Highly	Low	Medium	None	Full mitigation possible.

water – operational phase			probable		(-)		Stormwater drainage systems to be extended around new cells.
Surface water consumption – construction phase	Short term	Regional	Definite	Low	Medium (-)	Low (-)	Partial mitigation possible. Contractors to be made aware of and educated in the scarcity and value of water. Water wastage to be minimised as far as possible.
Surface water consumption – operational phase	Long term	Regional	Probable	Low	Low (-)	None	Partial mitigation possible. Employees to be made aware of and educated in the scarcity and value of water. Water wastage to be minimised as far as possible.
Groundwater							
Contamination of groundwater - construction phase	Short term	Regional	Improbable	Low	Low (-)	Low (-)	No mitigation possible.
Contamination of groundwater – operational phase	Long term	Regional	Probable	Medium	Medium (-)	Low (-)	Full mitigation possible. Site to be lined and constructed to ensure leachate cannot pollute the groundwater.
Leachate							
Leachate could potentially contaminate ground or surface water – operational phase	Long term	Regional	Probable	Medium	High (-)	None	Full mitigation possible. Site to be lined, leachate to be contained and treated.
Waste							
Inappropriate disposal of waste - construction phase	Short term	Local	Highly probable	Low	Low (-)	None	Full mitigation possible. All construction waste to be collected and disposed on the landfill site.
Traffic							
Increase in traffic – construction phase	Short term	Local	Definite	Low	Medium (-)	Low (-)	No mitigation possible.
Increase in traffic – operational phase	Long term	Local	Definite	Low	Low (-)	Low (-)	No mitigation possible.
Risk of spillage	Long term	Regional	Definite	Low	Medium (-)	Low (-)	Partial mitigation possible. Ensure transporters use correct vehicles and safety procedures are followed; ensure drivers are trained and have emergency procedures in place.
Geology and Soils							
Change in geology/soils	Long term	Local	Improbable	Low	Low (-)	None	Full mitigation possible. Ensure site is adequately lined.
Flora and Fauna							
Loss of natural grassland and associated faunal	Short term	Local	Definite	Low	None	N/A	No mitigation necessary. The site is characterised by disturbed grassland and

habitat – construction phase							does not fall within a mandatory reserve for any fauna species.
Loss of natural grassland and associated faunal habitat – operational phase	Long term	Local	Definite	Low	None	N/A	No mitigation necessary. The site is characterised by disturbed grassland and does not fall within a mandatory reserve for any fauna species.
Visual and Aesthetics							
Neighbours will have view of the site – construction phase	Short term	Local	Definite	Low	Low (-)	None	Full mitigation possible. A row of screening trees / shrubs to be planted along the boundaries of the site, especially the eastern boundary.
Neighbours will have view of the site – operational phase	Long term	Local	Definite	Medium	Low (-)	None	Full mitigation possible. A row of screening trees / shrubs to be planted along the boundaries of the site, especially the eastern boundary.
Operational Aspects							
Spillage risk (leachate)	Long term	Local	Highly probable	Medium	High (-)	None	Full mitigation possible. Ensure emergency procedures are in place; ensure drains are kept clear and free-flowing; ensure capacity in dams is adequate; ensure pumps, etc. are maintained and operational; ensure contractors have suitably trained drivers and operators.
Fire and explosion risk	Long term	Local	Highly probable	Medium	High (-)	Low (-)	Partial mitigation possible. Ensure no smoking / naked flames on site; ensure emergency procedures are in place; ensure adequate fire fighting equipment and training of staff.
Socio-Economics							
Increased / optimising airspace, existing infrastructure	Long term	Regional	Definite	Low	High (+)	N/A	No mitigation necessary.
Property devaluation	Long term	Local	Probable	Medium	Low (-)	Low (-)	Partial mitigation possible. Ensure proper site management and housekeeping to reduce negative perceptions.
Employment opportunities – construction phase	Short term	Local	Definite	Medium	Medium (+)	Medium (+)	Limited opportunities available.
Employment opportunities – operational phase	Long term	Local	Definite	Medium	Medium (+)	Medium (+)	Limited opportunities available.

4. ENVIRONMENTAL MANAGEMENT PROGRAMME

4.1 Introduction

The aim of this Environmental Management Programme (EMPr) is to identify and minimise, as far as possible, potential impacts that the site may have on the surrounding biophysical and socio-economic environment.

The purpose of the EMPr is to:

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to:
  - Minimise disturbance of the natural environment;
  - Prevent or minimise all forms of pollution;
  - Protect indigenous flora and fauna;
  - Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment; and,
  - Adopt the best practicable means available to prevent or minimise adverse environmental impacts.
- Develop waste management recovery practices (for recycling);
- Describe all monitoring procedures required to identify impacts on the environment; and,
- Train employees and contractors with regard to environmental obligations.

4.2 Focus

This EMPr has been developed to outline measures that are to be implemented in order to minimise adverse environmental impacts associated with the operation of the site. It serves as a guide for the operator and the workforce on their roles and responsibilities concerning environmental management on site, and it provides a framework for environmental monitoring throughout the project.

4.3 Background

This EMPr has been prepared by Ms M Chettle of Mary Chettle and Associates. Ms Chettle has many years of experience in the waste management industry and has participated in / written / co-authored and / or reviewed numerous environmental documents which have been approved by the Authorities.

The activities which will be governed by this EMPr include:

- Construction activities,
- Operation of the stormwater management system, the contaminated water system and the leachate collection system,
- Operation and management of the landfill site,
- Water quality monitoring,
- Closure and rehabilitation of the site

A copy of the EMPr will be kept on site at all times.

4.4 Training and Induction of Employees

The operator 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. The operator will have to give some assurance that they understand the EMPr and that they will undertake to comply with the conditions

therein. All senior and supervisory staff members shall familiarise themselves with the full contents of the EMPr. They shall know and understand the specifications of the EMPr and be able to assist other staff members in matters relating to the EMPr. The person undertaking the training must have extensive understanding and knowledge of environmental issues.

All staff members shall be appropriately briefed about the EMPr and relevant occupational health and safety issues.

4.5 Complaints Register and Environmental Incident Book

Any complaints received from the community must be registered and recorded by the operator on site. The complaint must be brought to the attention of the site manager, who will respond accordingly. The following information will be recorded:

- Time, date and nature of the complaint;
- Response and investigation undertaken; and
- Actions taken and by whom.

All complaints received will be investigated and a response (even if pending further investigation) is to be given to the complainant within 7 days.

All environmental incidents occurring on the site will be recorded. The following information must be provided:

- Time, date, location and nature of the incident; as well as,
- Actions taken and by whom.

The site manager will ensure that all complaints and incidents have been dealt with in an appropriate manner. This will be reviewed during the auditing of the EMPr.

4.6 Environmental Monitoring

Environmental monitoring of the operation will be undertaken by an independent, suitably qualified individual on an annual basis. Surface, groundwater and leachate monitoring will be undertaken in accordance with the monitoring programme presented in the relevant sections of the EMPr. A biannual monitoring report will be prepared and submitted to DAEA.

4.7 Non-Compliance with the EMPr

Difficulties may be encountered with carrying out mitigation measures that could result in future non-compliance. The operator shall put in place procedures to motivate staff members to comply with the EMPr, and to deal with acts of non-compliance, or malicious damage to the environment. Penalties for non-compliance need to be discussed with the operator at the earliest stage.

5.8 EMPr Amendments / EMPr Instructions

EMPr amendments (relaxation or revision of mitigation measure) shall not be allowed without approval from the relevant authority (DAEA). Motivations for amendments to the EMPr may be discussed with the Department.

4.9 Site Management and Mitigation Measures

Potential environmental impacts, impact sources and objectives are described, and environmental

management mitigation measures to be implemented are specified. The site operator/licence holder shall adhere to these measures at all times. Diligent implementation of the approved EMPr for the lifetime of the operation will be a requirement of the WML and failure to comply is an offence in terms of the National Environmental Management Act.

4.9.1 Responsible Personnel

Site Manager: Person appointed by the contractor to oversee and manage the operation on a daily basis.
Landowner/Project Applicant: Hibiscus Coast Municipality.
Contractor: Contractor appointed for the construction of the site or the operation of the site.
Staff: All people employed on site, including temporary, permanent and contract workers.
Environmental Control Officer: Suitably qualified independent environmental specialist appointed by the applicant.
Ground and Surface water Specialist: Suitably qualified hydrological/hydrogeological specialist
Engineer: Suitably qualified engineer

Responsibilities of the Project Team:

Project Applicant/Site Manager

- To ensure that all staff on site are aware of the EMPr requirements and therefore know their responsibilities;
- To notify the Environmental Control Officer (ECO) if there are any changes in construction planning;
- To notify the ECO of any activity that may potentially affect the environment;
- To monitor and assist the ECO in ensuring that the contractor is complying with the environmental requirements;
- To ensure compliance with local bylaws;
- To assist the ECO in ensuring that there is an emergency procedure in place and that staff is aware of the assembly points etc.;
- Ensure that equipment used by the contractor is acceptable and in good working order.

The Contractor/Staff

- Familiarize themselves with and understand the content of the Environmental Management Programme;
- Ensure that contractor employees understand what is expected during the construction of the site;
- Ensure compliance with applicable Occupational, Health and Safety Act (Act 85 of 1993);
- Notify the ECO of any activities undertaken which may have a negative impact on the environment;
- Comply with rules and regulations, bylaws etc. of the Hibiscus Coast Municipality;
- Ensure that the EMPr is available on site at all times;
- First aid box, emergency procedures and numbers to be contacted in case of urgency must be made known to all people working on site.

Environmental Control Officer

- Ensure that work on site is undertaken as per the requirements in the EMPr;
- Conduct inspections with the contractor to check that activities on site are not negatively affecting the environment and the surrounding communities;
- Offer remediation options in instances where work was undertaken incorrectly;

- Undertake environmental training for site employees prior to the commencement of construction activity;
- Submit monthly reports on the progress of work undertaken on site as well as provide photographic evidence of such. In cases where improvement is required, recommendations must be included in the report and be communicated to the contractor and the engineer;
- Ensure sound environmental management during the operations on site;
- Ensure that periodic environmental performance audits are undertaken on the project implementation;
- Ensure compliance with conditions of the Waste Management Licence.
- Ensure that environmental audit reports are submitted to the relevant Departments on time.

4.9.2 Planning and Design Phase

The planning and design of the landfill expansion (phases 4, 5 and 6) will be in accordance with relevant regulations and local by-laws, etc.

Potential Impacts

- Lack of appropriate planning could lead to non-compliance with the EMPr.

Objectives

- Ensure that planning is undertaken appropriately to ensure compliance with the EMPr.

Performance Indicators

- EMPr compliance.

Compliance Monitoring

- Provisions of the EMPr will be audited regularly.

Table 3 Management Programme for the Project Planning and Design Phase

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
4.1 On-site Documentation	The Project Applicant must ensure that a copy of this EMPr and the Waste Management Licence (WML) are available on site at all times.	Project Applicant	Duration of the project	ECO	At all times
4.2 Authority Notification	2 weeks written notice must be given to the relevant authority prior to the commencement of any construction activities.	Project Applicant/ECO	2 weeks prior to commencement of construction	ECO	2 week prior to commencement of construction
4.3 Appointment and Duties of Environmental Control Officer	An Environmental Control Officer (ECO) must be appointed 1 week prior to the commencement of the construction activities. The name and details of the ECO must be provided to the Authority.	Project Applicant	1 week prior to commencement of construction	ECO	1 week prior to commencement of construction
	The ECO must monitor the site, preferably monthly, for the duration of the construction period in terms of this EMPr and environmental authorizations.	Project Applicant	Duration of construction	ECO	Monthly
	The ECO must keep records relating to the compliance/ non-compliance with the conditions of the WML and EMPr. Such records must be made available to the Authority within 7 days of receipt of written request by the Authority for such records.	ECO	Duration of Construction	ECO	As required
	ECO has the responsibility to conduct environmental training to contractors and site managers to ensure that they understand their role in environmental management.	ECO	Duration of construction	ECO	As required
4.4 Public Liaison	The Project Applicant must send out correspondence to landowners/neighbours located adjacent and the MC to the site notifying them of the commencement of construction activities. Contact numbers should be also included in the correspondence should landowners wish to make complaints during the construction phase.	Project Applicant	Prior to commencement of construction	ECO	Prior to commencement of construction
4.5 Site Offices/ Construction Camps					
4.5.1 Location	The site manager and the ECO must decide on the appropriate location of the construction camp/site office prior to moving on to the site.	Project Applicant/ ECO	Prior to commencement of construction	ECO	Prior to commencement of construction
	The site camp must not be located in close proximity to steep areas as this may increase soil erosion.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	The site manager must ensure free drainage of run-off from the office/ construction camp to avoid standing water and erosion.	Project Applicant/contractor	Prior to commencement of construction	ECO	At all times
	The area with the construction camp must occupy as small an area as possible.	Project Applicant/contractor	Prior to commencement of	ECO	As required

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
			construction		
4.5.2 Ablutions	Temporary chemical toilets must be provided at the construction site and must be made available to all staff.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	Staff must be instructed not to use any other areas within the site for ablutions.	Project Applicant/contractor	Prior to commencement of construction	ECO	As required
	A maintenance plan must be created for the servicing of the toilets.	Project Applicant/contractor	Prior to commencement of construction	ECO	As required
	The construction of long-drop toilets is forbidden.	Project Applicant/contractor	Prior to commencement of construction	ECO	As required
	No ablution facilities may be placed close to a water resource.	Project Applicant/contractor	Prior to commencement of construction	ECO	As required
4.5.3 Solid Waste Management	All staff must be instructed to dispose of all waste in a proper manner	Project Applicant/contractor	Prior to commencement of construction	ECO	At all times
	Appropriate waste disposal receptacles must be placed within the construction camps/site offices.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	All contractors must be made aware that they will be required to remove all their waste from site and dispose of it legally and that the site manager or the ECO may request to view the safe disposal certificates.	Contractor/ECO	Prior to commencement of construction	ECO	Prior to commencement of construction
	Recycling and the provision of separate waste bins for different types of waste should be encouraged.	Project Applicant	Prior to commencement of construction	ECO	Prior to commencement of construction
4.6 Pollution	Any sources or potential sources of pollution must be identified by the Project Manager and appropriate measures must be taken to prevent any pollution of the environment.	Project Applicant /ECO	Prior to commencement of construction	ECO	Prior to commencement of construction
4.7 Soil and Water Quality	The site manager must ensure that there are no activities that will be undertaken during construction that will affect soil and water quality.	Project Applicant	Prior to the commencement of construction	ECO	Prior to commencement of construction
4.8 Storm water management	Stormwater management must be undertaken; a cut-off trench will be excavated to separate clean and dirty areas during construction.	Project Applicant/contractor	Prior to the commencement of construction	ECO	Prior to commencement of construction
4.9 Flora	No fauna must be intentionally harmed and killed during	Project Applicant/contractor	Prior to the	ECO	Prior to the

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	construction activities.		commencement of construction		commencement of construction
	An indigenous landscape plan will be developed in order to screen off the facility. This plan must be submitted for comment and approval to the relevant department within the Hibiscus Coast Municipality prior to the commencement of any site works.	Project Applicant	Prior to the commencement of construction.	ECO	Prior to the commencement of construction.
4.10 Fauna	Further habitat degradation as well as habitat fragmentation must be minimized through the avoidance of areas not planned for the development.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
4.11 Hazardous Materials	Potentially hazardous materials (if any) must be identified before being brought to the site.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	Materials Safety Data Sheets must be available on site for all hazardous substances.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	Hazardous substance storage and refuelling areas must be bunded and lined (impermeable).	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	These storage areas must be clearly sign-posted as such and access must be strictly controlled.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	Emergency procedures for the handling of such substances during incidents must be available on site.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	Staff working with such substances must be trained and be competent to deal to emergency situations	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	A spill kit must be available on site prior to construction taking place.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	A first aid kit must be made available on site.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
4.12 Worker Conduct	The site manager and any contractors must understand the contents of this EMPr and be proved competent in implementing its requirements.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	Construction workers must be made aware of their specific responsibilities in terms of environmental impacts i.e. controlling noise levels, reducing dust.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	Construction workers must be made aware that no alcohol or drugs will be allowed on site and no workers under the influence will be permitted on site.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	Construction workers must be made aware that firearms or traditional weapons will not be allowed on site.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	Construction workers must be made aware that no fires will be permitted on site.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
4.13 Site Vehicles	All construction vehicles must be fitted with standard silencers before accessing site.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction
	All site vehicles must be inspected and be found to be at an acceptable standard before accessing site.	Project Applicant/contractor	Prior to commencement of construction	ECO	Prior to commencement of construction

4.9.3 Construction Phase

The construction of phases 4, 5 and 6 will involve significant earthworks or construction activities; there will be some site clearing and excavation.

Potential Impacts

- Damage to the landscape, flora and, or fauna.
- Disturbance to surface water drainage.
- Construction activities will result in the exposure of the soil to erosive factors, i.e. wind and water, and the compaction of the soil in other areas.
- Tracks are created when vehicles, equipment and pedestrians move over an area.
- Soil erosion/water pollution due to disturbance and poor rehabilitation.
- Noise and dust from construction activities.

Sources of Potential Impacts

- Vegetation is cleared prior to construction.
- Inefficient/inappropriate rehabilitation.
- Deviation from the approved plan or this EMPr.
- Inadequate management of stormwater.
- Earthworks associated with construction.

Objectives

- Rehabilitation undertaken as soon as possible after completion of infrastructure.
- Replanting of trees and shrubs throughout the area wherever possible.
- Leave as much vegetation as possible.
- Avoidance of water contamination as a result excavations and infrastructure.
- Avoidance of disturbance to surface water drainage.

Performance Indicators

- Assessment of re-vegetation.
- Prevention of soil erosion.
- Prevention of water contamination.
- Prevention of noise and dust.

Compliance Monitoring

- Inspection of all rehabilitated areas.
- Ongoing assessment of noise and dust pollution.
- Assessment of water quality in surrounding areas.

Table 4 Management Programme for the Project Construction Phase

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
5.1 Roles and Responsibilities	The construction activities for the proposed development must be carried out by the contractor appointed by the Project Applicant.	Project Applicant	Duration of construction period	ECO	At all times
5.2 Construction Time Period	Construction work on site must commence within the dates specified in the Waste Management Licence.	Project Applicant	Duration of construction period	ECO	As required
5.3 Duties of ECO	The ECO must monitor the site monthly for the duration of the construction period in terms of this EMPr and WML.	Project Applicant	Duration of construction period	ECO	Monthly
	The ECO must keep records relating to compliance/ non-compliance with the conditions of the WML and EMPr. Such records must be made available to DAEA within 7 days of receipt of written request by DAEA for such records.	ECO	Duration of construction period	ECO	As required
	The ECO must prepare monthly audit reports for the Project Applicant, detailing any contractor non-compliances and provide recommendations.	ECO	Duration of the construction period	ECO	Monthly
5.4 Site Offices/ Construction Camps	Site offices and construction camps should be kept clean and tidy (i.e. good housekeeping should be employed).	Project Applicant/contractor	Duration of construction period	ECO	At all times
	Drainage across the construction camp must be monitored regularly to avoid standing water and erosion.	Project Applicant/contractor	Duration of construction period	ECO	Daily
	Chemical toilets must be easily accessible and be positioned within walking distance from where construction activities are taking place.	Project Applicant/contractor	Duration of construction period	ECO	At all times
	Waste receptacles must be emptied regularly by a recognised legal waste contractor.	Project Applicant/contractor	Duration of construction period	ECO	Weekly
	A registered company must be used for the removal of the chemical toilet contents.	Project Applicant/contractor	Duration of construction period	ECO	As required
	All litter must be collected from the working and camp areas daily.	Project Applicant/contractor	Duration of construction period	ECO	Daily
5.5 Vehicular Access to Site	All spillages on or adjacent to the site access roads must be cleaned up immediately.	Contractor	Duration of construction period	Engineer	As required
	Construction vehicles must be restricted to demarcated areas within the site.	Contractor	Duration of construction period	Engineer	At all times
	Vehicle access to the site must be controlled by security appointed by the Project Applicant.	Project Applicant/contractor	Duration of construction period	Engineer	At all times
	Any vehicles with oil leaks must be repaired. Any potentially leaking equipment must be parked over a	Project Applicant/contractor	Duration of construction period	ECO	At all times

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	drip tray.				
	No vehicles will be serviced or repaired on site except in emergency situations.	Project Applicant/contractor	Duration of construction period	ECO	At all times
5.6 Access to Site	No pedestrians are allowed on site.	Project Applicant/contractor	Duration of construction	Engineer	At all times
	All contractors must be made aware that they may only access the site through the main entrance.	Project Applicant/contractor	Duration of construction	ECO	At all times
5.7 Staff Conduct	The Project Applicant and any site foreman must understand the contents of the EMPr and be proved competent in implementing and monitoring the requirements.	Project Applicant/contractor	Duration of construction period	ECO	As required
	No alcohol/drugs are allowed on site and no workers under the influence will be permitted on site.	All staff	Duration of construction period	ECO	At all times during construction
	No firearms or traditional weapons allowed on site.	All staff	Duration of construction period	ECO	At all times during construction
	Fires/open flames will not be allowed on site.	All staff	Duration of construction period	ECO	At all times during construction
	No pets, including hunting dogs will be allowed on site. No hunting or trapping of any animals will be allowed.	All staff	Duration of construction period	ECO	At all times during construction
	Staff may not use any area for ablutions apart from the designated ablutions facilities.	All staff	Duration of construction period	ECO	At all times during construction
	Contractors to be made aware of and educated in the scarcity and value of water. Water wastage to be minimised as far as possible.	All staff	Duration of construction period	ECO	At all times during construction
5.8 Stormwater Management	The contamination of stormwater must be avoided at all times.	Project Applicant/contractor	Construction period	ECO	As required
	No water contaminated with cement or sediment etc. must be allowed to leave the site.	Project Applicant/contractor	Duration of construction period	ECO	At all times during construction
	A stormwater cut-off trench will be excavated to separate clean and dirty water on the site.	Project Applicant/contractor	Duration of construction period	ECO	At all times during construction
	The environmental impacts of construction (e.g. excavations) must be restored as soon as possible in order to reduce the impact of stormwater run-off.	Project Applicant/contractor	Duration of construction period	ECO	As required
5.9 Soil Protection	Topsoil must be removed from all areas where physical disturbance will occur and must be placed and protected from weed generation.	Contractor	Duration of construction period	ECO	As required
	Clearing and grubbing should be undertaken only in the areas to be worked in. This can be achieved by phasing or sequencing construction.	Contractor	Duration of construction period	ECO	As required

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	The top 60-600 mm of topsoil should be stripped off on all areas in which construction is planned to take place and stored carefully for use in rehabilitation	Contractor	Duration of construction period	ECO	As required
	Suitable erosion control measures will be required and possible methods must be discussed by the ECO and project applicant.	Project Applicant/contractor	Prior to the clearing of sloped areas	ECO	As required
	Soil stockpiles must not exceed 2m and must be covered at all times to avoid erosion as dust generation.	Project Applicant/contractor	Duration of construction period	ECO	As required
	Any topsoil stockpiles to be used after construction activities should be covered to avoid being windblown.	Project Applicant/contractor	Duration of construction period	ECO	As required
	All erosion control works should be regularly inspected, especially after a rainfall event.	Project Applicant/contractor	Duration of the construction period	ECO	As required
5.10 Water Quality	The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes.	Project Applicant/contractor	Duration of the construction period	ECO	At all times
	Streams, rivers, wetlands, dam, pans and their catchments must be protected from erosion and from direct or indirect spillage of pollutants.	Project Applicant/contractor	Duration of the construction period	ECO	At all times
	Mixing/decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these areas should then be disposed of to a registered disposal site.	Contractor	Duration of construction period	ECO	As required
	Every effort should be made to ensure that any chemicals or hazardous substances do not contaminate the soil or groundwater on site.	Project Applicant/contractor	Duration of construction period	ECO	At all times
	Emergency contact numbers must be supplied on site in order to deal with spillages and contamination events.	Project Applicant	Duration of construction period	ECO	At all times
	The Project Applicant and contractors on site must ensure that dirty water is separated from clean water through the implementation of the stormwater management plan.	Project Applicant/ECO	Duration of construction period	ECO	At all times
5.11 Flora and Fauna	The site manager must ensure that removal of vegetation is only limited to areas where construction is planned to take place.	Project Applicant/ECO	At the commencement of construction	ECO	At the commencement of construction
	No fauna or flora must be intentionally harmed or killed during the development.	Project Applicant/ECO	During construction	ECO	At all times
	The re-growth of alien invasive plants due to site clearance must be monitored	Project Applicant/ECO	During construction	ECO	At all times

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
5.12 Hazardous Substances	Hazardous substances or materials must be transported in sealed containers or bags.	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	The emergency number in Section 8 should be consulted should any accidents/spillages of hazardous substances and/or materials take place.	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	The MSDS for any hazardous substance on site must be available at the site office/ construction camp at all times	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	Hazardous substance storage and refuelling areas must be bunded and lined (impermeable).	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	These hazardous substance storage areas must be clearly signposted as such and access strictly controlled.	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	Emergency procedures for the handling of such substances during incidents must be available on site.	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	Staff working with such substances must be trained and be competent to deal with emergency situations.	Project Applicant/ Contractor	Duration of construction period	ECO	As required
	Any spills will be dealt with in the correct manner and waste disposed of appropriately. Spill kits must be available on site.				
5.13 Waste and Materials Management	Refuse must be placed in the designated skips/bins which must be regularly emptied. These should remain within demarcated areas and should be designed to prevent refuse from being blown out by wind.	Project Applicant /contractor	Duration of construction period	ECO	At all times
	Lime, cement and other powders must not be mixed during excessively windy conditions.	Contractor	Duration of construction period	ECO	As required
	All hazardous wastes will be appropriately stored and disposed of.	Contractor	Duration of construction period	ECO	As required
	No burning of refuse may take place on the site.	All staff	Duration of construction period	ECO	At all times
	Littering on site is forbidden and the site shall be cleared of all litter at the end of each working day	Project Applicant /contractor	Duration of construction period	ECO	As required
	Waybills proving disposal of hazardous waste shall be provided for the Project Applicant's or the ECO's inspection.	Contractor	Duration of construction period	ECO	As required
	Washing and refuelling of vehicles and the transferral of hazardous substances must be done within a demarcated area.	Contractor	Duration of construction period	ECO	As required
	Material stockpiles or stacks, such as pipes, must be stable and well secured to avoid collapse and possible	Contractor	Duration of construction period	ECO	At all times

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	injury to site workers.				
	Storage areas must be designated, demarcated and fenced if necessary.	Project Applicant /contractor	Duration of construction period	ECO	As required
	Storage areas should be secure so as to minimize the risk of crime.	Contractor	Duration of construction period	ECO	As required
5.14 Social Impact	Disruption of access for neighbouring landowners must be minimised and must have the Project Applicant's permission.	Project Applicant /contractor	Duration of construction period	ECO	As required
	The Project Applicant must inform neighbours in writing of disruptive activities at least 24 hours beforehand. This can take place by way of leaflets placed in the post-boxes giving the contact details of the Project Applicant and any responsible contractor, or other method approved by the Project Applicant and ECO.	Project Applicant	Duration of construction period	ECO	As required
	A detailed complaints register must be maintained by the Contractor and all complaints should be documented.	Contractor	Duration of construction period	ECO	As required
	Local people must be given preference with regards to jobs created during the construction phase.	Project Applicant /contractor	Duration of construction period	ECO	At all times
5.15 Visual Impact	The site must be kept clean to minimise negative visual impacts.	Project Applicant /contractor	Duration of construction period	ECO	At all times
	The site manager must ensure the timeous removal of waste from the site throughout the project and waste can be stored on site for a short period of time.	Project Applicant /contractor	Duration of construction period	ECO	As required
5.16 Dust/Air Pollution	Vehicles entering the site must adhere to the speed limit.	Project Applicant /contractor	Duration of construction period	ECO	At all times
	Dust producing delivery loads should be covered with tarpaulins.	Project Applicant /contractor	Duration of construction period	ECO	As required
	Dust suppression should be undertaken in instances where dust poses a threat to the workers on site and neighbouring properties.	Project Applicant /contractor	Duration of construction period	ECO	As required
	Vehicles and machinery must be kept in good working order.	Project Applicant /contractor	Duration of construction period	ECO	At all times
	Stockpiles must be managed appropriately to reduce dust generation.	Contractor	Duration of construction period	ECO	As required
	No fires are allowed at the site	All staff	Duration of construction period	ECO	At all times
5.17 Noise	Machinery and vehicles must be kept in good working order for the duration of the project to minimise noise	Project Applicant /contractor	Duration of construction period	ECO	At all times

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	nuisance to neighbours.				
	Compliance with appropriate legislation with respect to noise must be achieved.	Project Applicant /Contractor	Duration of construction period	ECO	At all times
	Workers must be instructed to keep shouting, whistling, etc. to a minimum.	Project Applicant /Contractor	Duration of construction period	ECO	At all times
	Noisy activities must be restricted to the times given in the Project Specification of General Conditions of Contract i.e. weekdays 07h00 to 16h30, Saturdays 07h00 to 15h00. No work on Sundays	Project Applicant /contractor	Duration of construction period	ECO	As required
5.18 Safety and Security	The construction site should be fenced and secured in order to reduce the opportunity for trespassing.	Project Applicant /contractor	Duration of construction period	ECO	At all times
	A security guard should be stationed at the access point in order to control access to the site.	Project Applicant /contractor	Duration of construction period	ECO	At all times
	Contractor is to comply with Occupational Health & Safety Act, No 85 of 1993 to ensure the health and safety of the workers	Contractor	Duration of construction period	ECO	At all times
5.19 Heritage Resources	Be aware of "chance finds" i.e. the possibility that currently unrecorded heritage sites and artefacts may be found during excavation activities.	Contractor	Duration of construction period	ECO	As required
	In the case of heritage resources being discovered advise the Environmental Control Officer, cease operations and notify and obtain advice from Amafa aKwaZulu-Natali: Tel: (033) 394-6543.	Contractor	Duration of construction period	ECO	As required
	No structures older than 60 years or parts thereof are allowed to be demolished, altered or extended without a permit from AMAFA	Contractor	Duration of construction period	ECO	As required
	When a potential heritage site or artefact is found: • Carefully work around the site to avoid damage • Do not remove any object from the site • Document the nature and location of the site. • If damage to the site cannot be avoided, report the discovery to AMAFA aKwaZulu-Natali or Archaeological Specialist to obtain their advice, and do not damage or destroy the site without their permission.	Contractor	Duration of construction period	ECO	As required
	AMAFA should be contacted if any graves are identified during construction and the following procedure must be followed:	Contractor	Duration of construction period	ECO	As required

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	• Stop construction • Report finding to local police station • Report to AMAFA to investigate.				

4.9.4 Operational Activities

Potential Impacts

- Air Quality impacts.
- Water quality impacts.
- Poorly managed site drainage systems resulting in surface water or groundwater contamination.
- Contamination of surface water supplies by spillage / overflow, etc.
- Growth of alien invasive vegetation.
- Damage or loss of possible cultural, historical or pre-historical sites and artefacts in the unlikely event that any are found on site
- Noise impacts.
- Visual impacts.
- Non-compliance with the EMPr.

Objectives

- Increased awareness among management and employees of acceptable actions as listed in this EMPr document.
- Prevent polluted water from entering surface water systems.
- Reduction of the environmental impact of remaining activities on site.
- Protection for indigenous flora and fauna on the property.
- Eradication of alien invasive species.
- No heritage objects may be moved without a permit from the Amafa aKwaZulu-Natali and any permitted removal of heritage objects must be undertaken under the supervision of a qualified specialist.

Performance Indicators

- No serious incidents reported.
- No complaints received from the public.
- Stormwater management system in place and operating properly.
- Leachate management system in place and operating properly.
- Good vegetation cover in the area.
- No alien vegetation on the site.

Compliance Monitoring

- Provisions of the EMPr will be audited regularly.
- Ongoing water quality monitoring.
- Ongoing leachate quality monitoring.
- Undertake frequent monitoring of vegetation cover and alien plant growth

Table 5 Management Programme for the Project Operational Phase

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
6.1 Stormwater Management	All stormwater management channels need to be kept clear of debris at all times	Project Applicant	During operation	Project Applicant	At all times
	Parking bays must be kept clear of litter and any material having potential to cause pollution	Project Applicant	During operation	Project Applicant	As required
	Any spills that may occur from operations within the site must be cleaned up immediately and must not be allowed to enter nearby water resources.	Project Applicant	During operation	Project Applicant	As required

	The stormwater plan is designed to ensure that water is used on site optimally; to ensure that the wetland / stream down gradient of the site is not impacted on by increased stormwater flows; and to ensure that no possible contamination of surface water can take place. The design parameters will take cognisance of climate change predictions of increased rainfall events and increased storm events.
	• Stormwater falling outside the boundary of the site will be diverted away from the site.
	• Stormwater falling within the landfill area will be drained to the CSW dam and used either on site for dust suppression or in the garden.
	• Leachate will be drained to the leachate dam.
	• The 'operational area' of the site will include:
	  ○ the buildings within which:
	  ▪ the offices and ablutions are housed
	  ▪ the workshop is located
	  ▪ the security / weighbridge office at the entrance to the site
	  ○ the vehicle access roads to the site
	  ○ the landfill phases / cells
	• The area outside the 'operational area' will be grassed and / or planted up with indigenous plants, allowing absorption of the stormwater falling within this area.
		Project Applicant	During operation	Project Applicant	As required

6.2 Site Rehabilitation and re-vegetation	Re-establishment of vegetation must include the planting of indigenous species and growth must be regularly monitored.	Project Applicant	Immediately after construction	ECO	As required
	Topsoil excavated as part of site preparation must be replaced after construction activities for re-vegetation purposes.	Project Applicant	Immediately after construction	ECO	As required
6.3 Flora and Fauna Management	Once construction activities have been completed on the site, rehabilitation with indigenous species will be undertaken.	Project Applicant	During operation	Project Applicant	At all times
	Where possible, previous natural fauna habitats should be developed on areas not disturbed by the operation.	Project Applicant	During operation	ECO	As required
	Catching, hunting, shooting, or setting devices to trap or kill any wild animal	Project Applicant	During operation	ECO	At all times

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	is prohibited.				
6.4 Alien vegetation	Management of alien vegetation must be undertaken regularly, it is recommended that invasive species are removed by hand to prevent the use of herbicides.	Project Applicant	During operation	ECO	As required
	An alien plant management plan will be developed and implemented.	Project Applicant	During operation	ECO	As required
6.5 Visual impacts	Ensure that all buildings and fencing are properly maintained and regularly painted.	Project Applicant	During operation	ECO	At all times
	The use of muted, non-reflective colours on all painted surfaces should be encouraged.	Project Applicant	During operation	ECO	As required
	Ensure that the site is kept neat and tidy at all times with no litter/waste outside designated areas.	Project Applicant	During operation	ECO	At all times
	The indigenous landscaping plan will be implemented. A row of screening trees is required specifically along the eastern boundary of the site.	Project Applicant	During operation	ECO	As required
6.6 Water quality	Clean and dirty water will be separated at all times.	Project Applicant	During operations	Project Applicant	At all times
	The stormwater management plan will be implemented and surface water management infrastructure will be well maintained at all times.	Project Applicant	During operation	ECO	As required
	Dirty water containment systems must be designed by an engineer and must be able to accommodate all dirty water from the site.	Project Applicant	During operation	ECO	As required
	Uncontaminated runoff water must not be allowed to dilute effluent from the site.	Project Applicant	During operation	ECO	As required
	A surface water monitoring programme will be developed for the site.	Project Applicant	During operation	ECO	As required
	Every effort should be made to ensure that any chemicals or hazardous substances do not contaminate the soil or groundwater on the site.	Project Applicant	During operation	ECO	As required
	Leachate generated from the site will be collected in the leachate containment system and dams and will ultimately be treated to river discharge standards. Testing will be undertaken in accordance with the WML requirements and compliance with the requirements ensured in terms of quality etc.	Project Applicant	During operation	ECO	As required
	Emergency contact numbers must be supplied on site in order to deal with any accidental occurrences that may occur. See Section 8 of this EMPr for emergency numbers.	Project Applicant	During operations	Project Applicant	At all times
	Vehicles, containers and the 'dirty' areas of the site will be washed down regularly with biodegradable disinfectants. High pressure washers will be used to reduce water consumption.	Project Applicant	During operation	ECO	As required
6.7 Water usage	Water saving ideas and devices should be employed on site at all times.	Project Applicant	During operation	ECO	As required
6.8 Waste management	Only general waste for which the site has been licenced will be disposed on the site.	Project Applicant	During operation	ECO	As required
	Operational procedures will be developed for the waste entering the facility	Project Applicant	During operation	ECO	As required

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	to ensure that it is recorded and disposed of correctly.				
	All refuse must be disposed of only in the receptacles provided for such use and these must remain sealed in order to prevent access by domestic animals.	Project Applicant	During operation	ECO	As required
	No waste may be disposed of outside areas designated for waste disposal.	Project Applicant	During operation	ECO	As required
6.9 Plant Maintenance	The plant must be on a scheduled maintenance programme as per the suppliers' recommendations. Maintenance must be carried out as per this schedule.	Project Applicant	During operation	ECO	As required
	Unscheduled maintenance must be carried out as effectively and efficiently as possible.	Project Applicant	During operation	ECO	As required
	Critical spares for the plant must be kept in stock if possible.	Project Applicant	During operation	ECO	As required
	There must be a back-up generator, adequately sized, for the purpose of running the entire facility in the event of a power failure.	Project Applicant	During operation	ECO	As required
6.10 Site access/ transportation	Site access will be strictly controlled and a register kept of people and vehicles accessing the site.	Project Applicant	During operation	ECO	As required
	A waybill system will be developed in order to track and manage waste entering the site.	Project Applicant	During operation	ECO	At all times
	All waste transporters must be legally compliant, use correct vehicles, etc.	Project Applicant	During operation	ECO	At all times
	All waste transporters must be prepared for spill clean ups and aware of their responsibilities in terms of any spillages.	Project Applicant	During operation	ECO	At all times
	All drivers must be in possession of the correct driver's licences and trained in terms of emergency procedures.	Project Applicant	During operation	ECO	At all times
	The site will be fully fenced to a height of 1.8m and entrance gates manned/locked at all times.	Project Applicant	During operation	ECO	At all times
	Appropriate warning signage will be placed at the site entrance.	Project Applicant	During operation	ECO	At all times
6.11 Air Quality	Good operational practices will be undertaken to reduce emissions, odours, etc. Deodorisers will be used if necessary.	Project Applicant	During operation	ECO	At all times
6.12 Noise	Operating hours will be limited to normal working hours.	Project Applicant	During operation	ECO	At all times
	Equipment will be kept in good working order to reduce noise emissions.	Project Applicant	During operation	ECO	At all times
6.13 Energy	Electricity saving devices should be used wherever possible on site.	Project Applicant	During operation	ECO	At all times
6.14 Hazardous substances	Hazardous substances or materials must be transported in sealed containers or bags.	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	The emergency number in Section 8 should be consulted should any accidents/spillages of hazardous substances and/or materials take place.	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	The MSDS for any hazardous substance on site must be available at the site office/ construction camp at all times	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	Hazardous substance storage areas must be bunded and lined (impermeable).	Project Applicant/ Contractor	Duration of construction period	ECO	At all times

Aspect	Description of Action	Person Responsible for Implementing Action	Period of Implementation	Monitor	Frequency
	These hazardous substance storage areas must be clearly signposted as such and access strictly controlled.	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	Emergency procedures for the handling of such substances during incidents must be available on site.	Project Applicant/ Contractor	Duration of construction period	ECO	At all times
	Staff working with such substances must be trained and be competent to deal with emergency situations.	Project Applicant/ Contractor	Duration of construction period	ECO	As required
	Fire prevention facilities must be present and easily accessible at all storage facilities.	Project Applicant	During operation	ECO	At all times
	The operator must submit plans for the storage of hazardous substances and emergency procedures.	Project Applicant	During operation	ECO	At all times
	All flammable substances must be stored in an approved, locked storage area which must comply with the local Municipal bylaws.	Project Applicant	During operation	ECO	At all times
6.15 Health and Safety	The operator must ensure strict compliance with the Occupational Health and Safety Act 1993 (Act 85 of 1993).	Project Applicant	During operation	ECO	At all times
	Adequate fire fighting equipment must be present on the site and constantly maintained/checked. Appropriate fire fighting training must be undertaken and responsibilities on site defined.	Project Applicant	During operation	ECO	At all times
6.16 Incident Reporting	The operator must, within 24hrs, notify the Director of any occurrence or detection of any incident on the site or incidental to the operation which has the potential to cause or has caused water pollution, pollution of the environment, health risks or nuisance conditions.	Project Applicant	During operation	ECO	At all times
6.17 Pest Control	Appropriate pest control will be undertaken at all times on the site.	Project Applicant	During operation	ECO	At all times

5. CLOSURE REQUIREMENTS

A WML (closure) is required. A detailed capping, closure and decommissioning plan must be developed. All infrastructure must be removed, recycled or disposed of at a suitable landfill site or scrap facility. The site must be rehabilitated as per an approved rehabilitation plan to ensure that there is no ongoing pollution. A post-closure monitoring programme to be developed and approved by the relevant competent authority and post-closure monitoring to take place as per the approved programme.

6. CONCLUSION

In terms or NEMA everyone is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally responsible manner. Furthermore, in terms of NEMA, the cost to repair any environmental damage shall be borne by the person responsible for the damage.

Should any amendments or additions to this EMPr be required, DAEA will need to be approached to make a decision regarding the proposed amendments or additions.

The main actions to be undertaken in order to effectively measure and manage the environmental impacts of the site include:

- Development and implementation of a stormwater management system, a contaminated water management system and a leachate management system.
- Development and management of a leachate treatment system.
- Keeping the site clear of litter and generally tidy.
- Ensuring waste is correctly disposed on the site, i.e. the implementation of sanitary landfilling methods (daily compaction and cover).
- Ensuring that appropriate spill and fire fighting equipment are available on the site.
- Ensuring that appropriate emergency preparedness programmes are developed and implemented.

If the above-mentioned management recommendations are adopted, however, it is anticipated that the potential negative environmental impacts of the operation will be minimised.

7. CONTACT NUMBERS

To be filled in by the designated responsible environmental person on site:

Organization:	**Contact Number:**
Hibiscus Coast Municipality Representative	
Site Manager / Contractor	
Safety Officer	

Environmental Control Officer	
Department of Agriculture and Environmental Affairs	
Department of Water Affairs	
Ugu District Municipality	
SAPS	
Local Fire Department	

8. SPILLAGE RESPONSE PROCEDURES

This response procedure delineates the specific measures to be carried out in the event of an accidental spill of any hazardous substance, waste or leachate on the site. It must be emphasized that in the event of an accidental spill, the contractors' response must be both immediate and correct.

It is essential that personnel involved with any activity that requires the use of potentially dangerous substances be familiar with the contingency plan.

Preventative Measures
The primary obligation is to reduce to an absolute minimum the possibility of spilled material entering watercourses or other areas where the material spilled could cause harm. To help minimize the possibility of a spill the following procedures will be adhered to:

1. Transportation

The transportation of waste or hazardous chemical substances must comply with all pertinent SANS codes including placarding and container specifications. In addition the following will be observed:

- Containers with dangerous / hazardous chemicals must be transported as little as possible.
- Trucks transporting waste or hazardous substances will comply with speed limits on public roads but will never travel faster than is safe for the prevailing conditions.
- Trucks transporting waste or hazardous chemicals will be maintained in a safe and roadworthy condition.
- Trucks transporting waste will be covered with nets or tarpaulins.

2. Storage and handling

- Hazardous chemicals must be stored and handled in accordance with the EMPr, relevant SANS codes and their specific MSDSs.
- Provisions of the Hazardous Substances Act and Occupational Health and Safety Act will be complied with.
- Staff will be fully briefed on the risks associated with each operation and will be trained on an ongoing basis to ensure that they are familiar with their tasks to reduce the risk of human error and accidents.

- At close of business each day, all chemicals will be locked away or attended by security personnel until operations resume.
- A spill containment and clean-up kit must be kept in the vicinity of any area where hazardous chemicals are used or leachate is managed. The location of the kit shall provide for rapid and efficient clean-up of spills anywhere within the area.

Spills

In the event of a spill it is of paramount importance that the discharge be stopped at its source and that the spilled material be contained. Shovels and other hand tools should be used for immediate containment and or channelization of the spilled material into the containment area.

In the event of a spill, the following actions should be initiated in the listed order:

- Locate the source and try to stop the spill where it originates
- Contain the spilled material
- Notify the project supervisor, resident engineer and ECO
- Clean-up
- Disposal
- Determination of soil, groundwater or other environmental impact
- Undertake remedial action if required (in consultation With Department of Water Affairs)

The project supervisor or engineer will decide upon further actions required and will report the incident to the relevant authorities.

The project supervisor, engineer or operator will:

- Ascertain the spill particulars
    - Location
    - Time of spill
    - Name of material spilled
    - Quantity spilled
    - Equipment and manpower needed to contain and clean up
    - Disposal requirements

- Notify the following authorities (within 48 hours) if the spill is cannot be contained or poses a serious threat to the local environment:
    - The Local Authority
    - Department of Water Affairs
    - Department of Agriculture and Environmental Affairs (Pollution and Waste Management)
    - The Local Fire Department
    - Any other affected party.

- Obtain a safe disposal certificate for any contaminated material taken off site.

Note: If there is an immediate threat to a water resource DWA and DAEA must be notified immediately.

Spill Clean-up Procedures

Immediately following a spill of hazardous chemicals or leachate or its discovery, all individuals present shall leave the area until any aerosol settles.

The clean-up crew shall implement the following procedures for cleaning up a spill:

- Put on clean-up outfits and secure the spill area from entry by unauthorized persons;
- Place broken containers and spillage in the packing bags in the kit;
- Clean and disinfect non-disposable items and clothing;
- Remove clean-up outfits and place disposable items in a clean-up bag;
- Take prompt steps to initiate procedures for the replenishment of the spill kit.

Spill kit requirements for small quantity spills

- 2 Red bags
- 1 Pair of gloves
- 1 Face mask (surgical type or equivalent)
- 1 Pair of goggles or equivalent eye protection
- 1 Absorbent material capable of absorbing 2.5 litres of liquid

These items must be stored in a heavy container with a tight fitting lid which can be used to contain wastes generated after a spill clean-up. The inclusion of a disposable pan and broom are also required for sweeping up sharps.

9. LANDSCAPING GUIDELINES

The objective of these guidelines is to describe a method whereby the design and rehabilitation of open spaces will enhance the landscape philosophy and environment of the site for the surrounding neighbours.

The owner is committed to these guidelines and has undertaken the responsibility of landscaping.

FOR OPEN SPACES

- Rehabilitate open space areas outside of the landfill foot print with 100% indigenous plants, to reflect the surrounding natural flora.
- Ensure areas are free from alien vegetation.
- Trees to be planted within the parking and road areas to create shade and interest.
- Trees / shrubs to be planted along the boundary fence to create a screen – where appropriate.
- Planting within the landfill footprint may be 70% indigenous and 30% non-indigenous.
- Flowering trees will be encouraged, to reflect seasonal changes in the landscape.

- No alien plants are to be introduced.

Invasive alien plants will not be permitted anywhere on the property.

All work will be monitored, to ensure all EMPr requirements are achieved.

C4: SITE INFORMATION

C4.1 NATURE OF GROUND AND SUBSOIL CONDITIONS

C4.1.1 Geology of the Site

A previous geotechnical investigation revealed that an underlying clay deposit occurred in the vicinity of Cells (3) and (4A), where the characteristics of the clay were found to be suitable for the construction of compacted clay liners (CCL's). The development of Cells (3) and (4A) has now resulted in a situation where this clay source is no longer accessible.

The geology of the site indicates that the site is generally underlain by fill, colluvial, and residual soils overlying weathered granite bedrock. The residual granite horizon was intersected across the site, and it was generally profiled as a moist, yellowish speckled light yellowish orange and light grey/ light grey to light yellowish orange speckled white/light yellowish orange speckled black and white/brown mottled grey, medium dense/dense, clayey sandy gravel/clayey gravel with granite relict rock/clayey gravelly sand. The residual granite extended from a depth of 0.40 m to 1.50 m below NGL. Granite bedrock was generally intersected across the site from a minimum depth of 0.90 m below NGL.

"Soft" excavation conditions can be anticipated during excavation of the non-engineered fill, colluvial and residual granite material, which occurs over a depth range of 0.00 m to 1.80 m below NGL. "Intermediate" to "Hard" excavation conditions can be anticipated during excavation of the medium hard rock strength granite bedrock, which occurs at a minimum depth of 0.90 m below NGL. Boulder excavation conditions may be anticipated in isolated areas in the residual granite in the form of core stones.

A review of a geotechnical reports undertaken previously indicates that the existing water-table is close to the natural ground level, especially in the vicinity of the valley floor. Field investigations revealed that the water table was encountered at TP1, TP3 and TP3, at depths ranging from 1.20 m to 1.50 m below NGL. A perched groundwater table can be expected during and after periods of rainfall or wet seasons. In addition, marshy ground conditions can be anticipated in the low-lying areas, particularly in the wet season. It can therefore be expected that construction activities may be affected during the rainy season.

A summary of the results of previous trial pits excavations is presented below. The geotechnical and groundwater information is provided as for guidance only and the Tenderer/Contractor must determine the soil and groundwater conditions for purposes of pricing the items set out in the Bill of Quantities.

TABLE 1: SUMMARY OF TP1 PROFILE FOR OATLANDS CELL 4C

DEPTH	DESCRIPTION	COMMENTS
0.00 – 0.50	Slightly moist, dark brown, soft, intact, sandy clay - Colluvium.	Samples retrieved between 0.50 – 1.20m.
0.50 – 1.20	Moist, yellowish speckled light yellowish orange and light grey, medium dense, clayey sandy gravel with granite rock relict – Residual Granite.	Groundwater seepage encountered at 1.50m.
1.20 – 1.50	Light yellowish orange, moderately weathered, coarse grained, soft to medium hard rock strength, granite – Humberdale Complex.	Refusal on bedrock.

TABLE 2: SUMMARY OF TP2 PROFILE FOR OATLANDS CELL 4C

DEPTH	DESCRIPTION	COMMENTS
0.00 – 0.40	Moist, light grey speckled reddish orange, soft, intact, slightly gravelly clay - Colluvium	Samples retrieved between 0.40 – 0.90m. No groundwater seepage encountered. Refusal on bedrock.
0.40 – 0.90	Moist, light grey to light yellowish orange speckled whitish, medium dense, clayey gravelly sand – Residual Granite.	
0.90 – 1.10	Light grey to light yellowish orange, moderately weathered, coarse grained, medium hard rock strength, granite rock – Humberdale Complex.	

TABLE 3: SUMMARY OF TP3 PROFILE FOR OATLANDS CELL 4C

DEPTH	DESCRIPTION	COMMENTS
0.00 – 0.70	Moist, black, medium dense, gravelly silt with minor rootlets – Colluvium.	Samples retrieved between 0.00 – 0.70m. Groundwater seepage encountered at 1.30m. Refusal on bedrock.
0.70 – 1.10	Moist, yellowish speckled light yellowish orange and light grey, medium dense, clayey sandy gravel with granite rock relict – Residual Granite.	
1.10 – 1.30	Light yellowish orange, moderately weathered, coarse grained, soft to medium hard rock strength, granite rock – Humberdale Complex.	

TABLE 4: SUMMARY OF TP4 PROFILE FOR OATLANDS CELL 4C

DEPTH	DESCRIPTION	COMMENTS
0.00 – 0.90	Moist, dark grey, medium dense, gravelly silt with minor rootlets and builder's rubble – Fill.	Samples retrieved between 0.00 – 0.90m. No groundwater seepage encountered. Refusal on bedrock.
0.90 – 1.50	Light yellowish orange, moderately weathered, coarse grained, soft to medium hard rock strength, granite rock – Humberdale Complex.	

TABLE 5: SUMMARY OF TP5 PROFILE FOR OATLANDS CELL 4C

DEPTH	DESCRIPTION	COMMENTS
0.00 – 0.90	Moist, yellowish speckled light yellowish orange and light grey, medium dense, clayey sandy gravel with granite rock relict – Residual Granite.	Samples retrieved between 0.00 – 0.90. No groundwater seepage encountered. Refusal on bedrock.
0.90 – 1.20	Light yellowish orange, moderately weathered, coarse grained, soft to medium hard rock strength, granite rock – Humberdale Complex.	

TABLE 6: SUMMARY OF TP6 PROFILE FOR OATLANDS CELL 4C

DEPTH	DESCRIPTION	COMMENTS
0.00 – 1.20	Moist, light orange to light yellowish orange speckled black and whitish, dense, clayey gravel with granite rock relict – Residual Granite.	Samples retrieved between 0.00 – 1.30m. No groundwater seepage encountered. Refusal on bedrock.
1.20 – 1.60	Light yellowish orange, moderately weathered, coarse grained, soft to medium hard rock strength, granite rock – Humberdale Complex.	

TABLE 7: SUMMARY OF TP7 PROFILE FOR OATLANDS CELL 4C

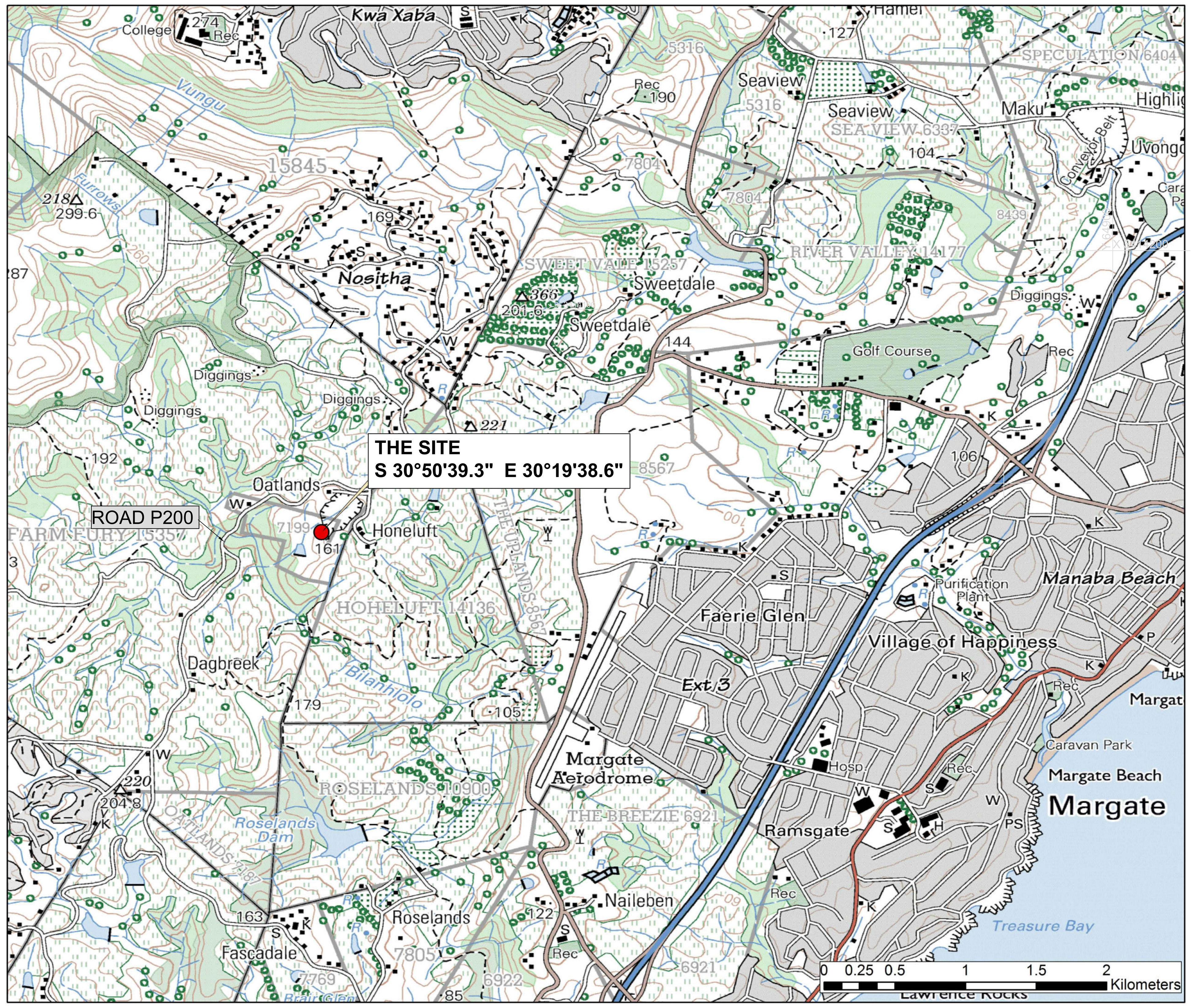
DEPTH	DESCRIPTION	COMMENTS
0.00 – 1.80	Moist to very moist with depth, dark grey to black, soft, intact, silty clay with boulders, vegetation and builder's rubble - Fill.	No sample retrieved. Groundwater seepage encountered at 1.60m. Sidewall collapse observed at 1.20m.

TABLE 8: SUMMARY OF TP8 PROFILE FOR OATLANDS CELL 4C

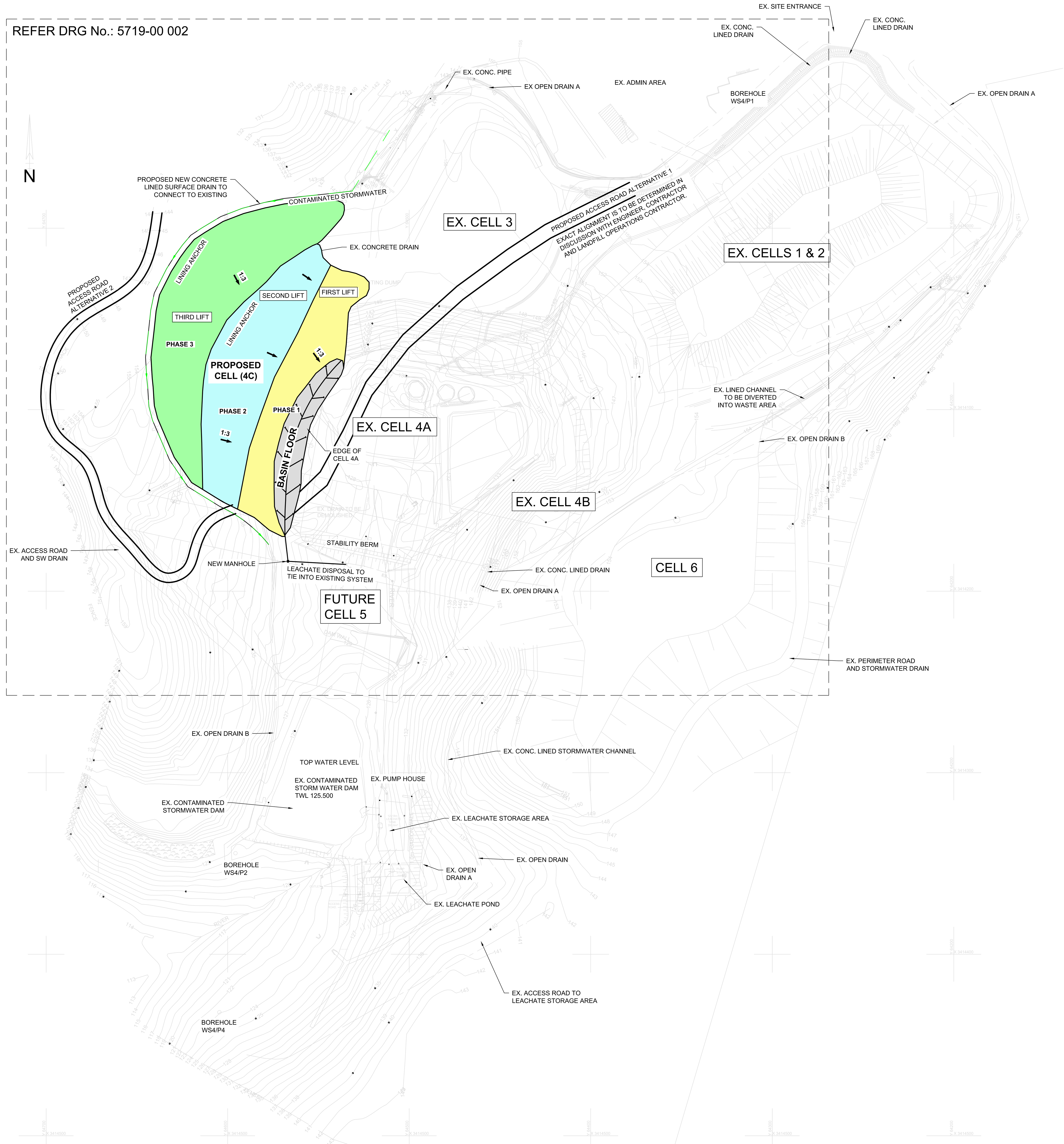
DEPTH	DESCRIPTION	COMMENTS
0.00 – 0.40	Slightly moist, dark brown, soft, intact, slightly sandy clay with rootlets – Colluvium.	No sample retrieved. No groundwater seepage encountered. Refusal on bedrock.
0.40 – 1.00	Moist, brown mottled grey, medium dense, clayey gravelly sand with relict rock – Residual Granite.	
1.00 – 1.30	Light grey to light yellowish orange, moderately weathered, coarse grained, medium hard rock strength, granite rock – Humberdale Complex.	

C4.1 LOCALITY

Please refer to Drawing 5719-00-001 Rev A for a locality map.



LOCALITY PLAN



NOTES	REF. DRAWINGS	DRWG. No.'s	DESCRIPTION

REV	NATURE OF REVISION	DATE	SIGNED
A	ISSUED FOR TENDER	04/03/2022	

DESIGNED	M. MILLAR
CHECKED	N. BROMLEY
DRAWN	Q. SHINGA / T. PHASHA
CHECKED	N. BROMLEY

DESIGN APPROVED: JG AFRIKA (Pty) Ltd
NEAL BROMLEY
NAME
SIGNATURE
MARCH 2022
DATE

JG AFRIKA

© COPYRIGHT RESERVED

DESIGN APPROVED: CLIENT
NAME
SIGNATURE
DATE

CLIENT
10 CONNOR STREET
PORT SHEPSTONE
4240
P.O. BOX 5
PORT SHEPSTONE
4240
TELEPHONE
+27 39 688 2000

RAY NKONYENI

PROJECT
OATLANDS LANDFILL SITE CELL 4C

DRAWING TITLE
CELL 4C
GENERAL
ARRANGEMENT

ISSUED FOR TENDER

SHEET 1 OF 1
SCALE 1:1000
SIZE A0
Contract No.
Tender No.: 8/2/RNM0352
JG AFRIKA (Pty) Ltd. DRAWING No 5719-00-001
REVISION A

NOTES	REF. DRAWINGS	DRWG. No.'s	DESCRIPTION

REV	NATURE OF REVISION	DATE	SIGNED
A	ISSUED FOR TENDER	04/03/2022	

DESIGNED	M. MILLAR
CHECKED	N. BROMLEY
DRAWN	Q. SHINGA / T.PHASHA
CHECKED	N. BROMLEY

DESIGN APPROVED:
JG AFRIKA (Pty) Ltd
NEAL BROMLEY
NAME
SIGNATURE
MARCH 2022
DATE

JG AFRIKA

bvi ENGINEERING PROCUREMENT MANAGEMENT

CESA

DEKRA

© COPYRIGHT RESERVED

DESIGN APPROVED:
CLIENT
NAME
SIGNATURE
DATE

CLIENT
10 CONNOR STREET
PORT SHEPSTONE
4240
P.O. BOX 5
PORT SHEPSTONE
4240
TELEPHONE
+27 39 688 2000

RAY NKONYENI MUNICIPALITY
The Game changer of South Coast development

PROJECT
OATLANDS LANDFILL SITE CELL 4C

DRAWING TITLE
CELL 4C
LAYOUT

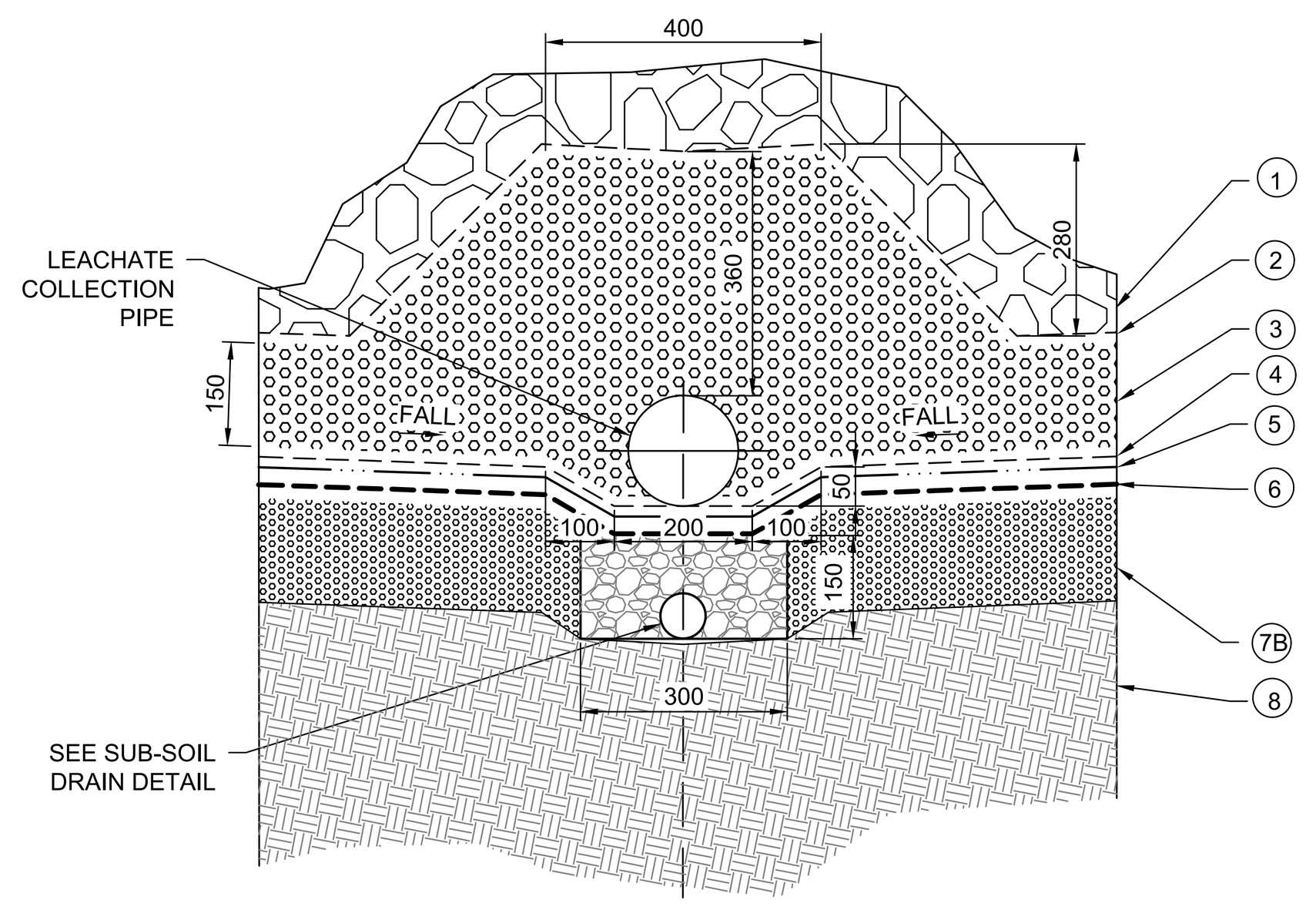
ISSUED FOR TENDER

SHEET 1 OF 1 | SCALE 1: 500 | SIZE A0

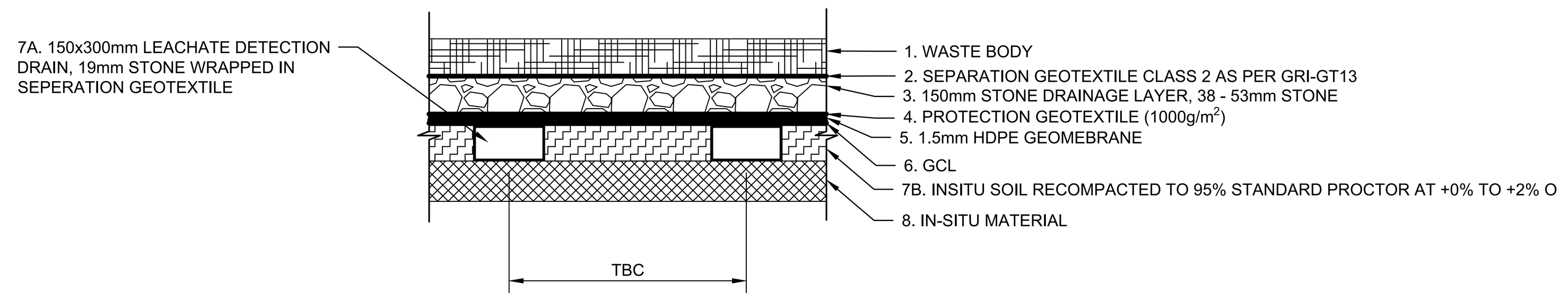
Contract No.
Tender No.: 8/2/RNM0352

JG AFRIKA (Pty) Ltd. DRAWING No 5719-00-002 | REVISION A

Njabulo 25.04.2022



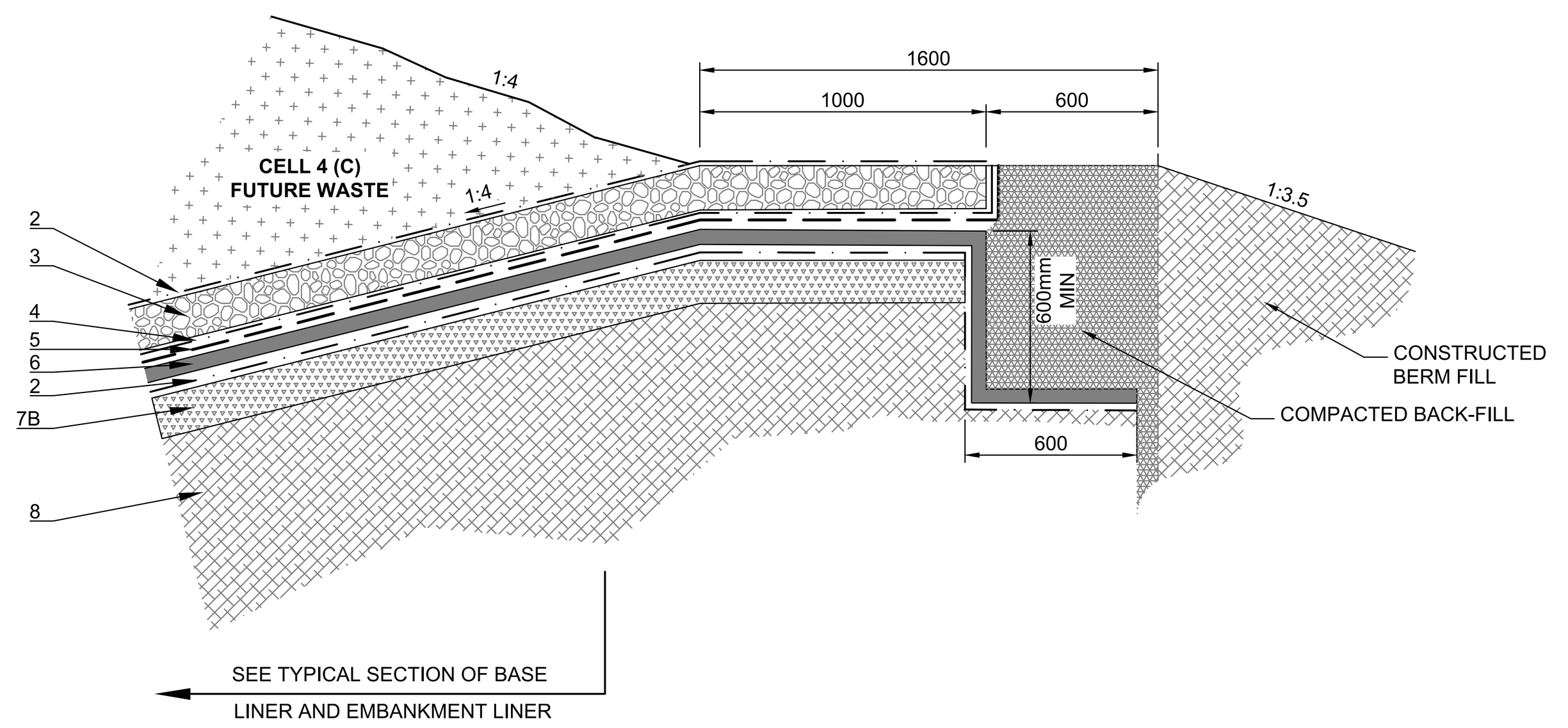
TYPICAL LEACHATE COLLECTION DETAIL
SCALE 1:10



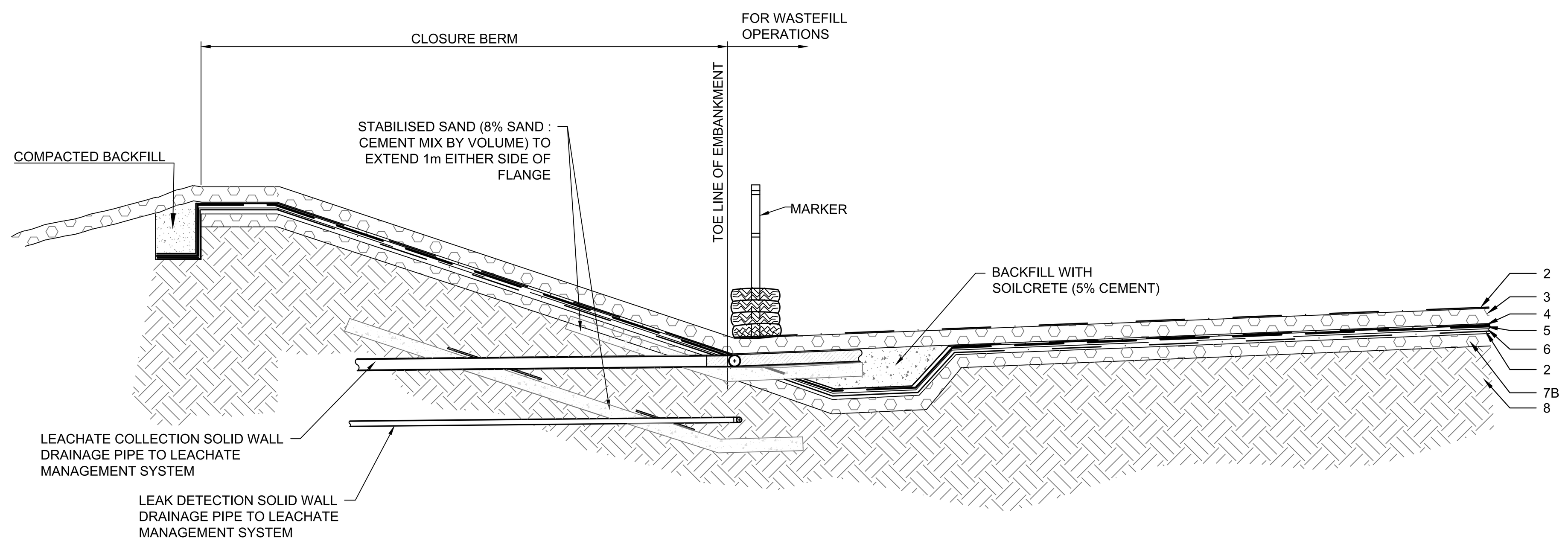
BASE LINER
SCALE 1:20

LAYERWORKS LEGEND

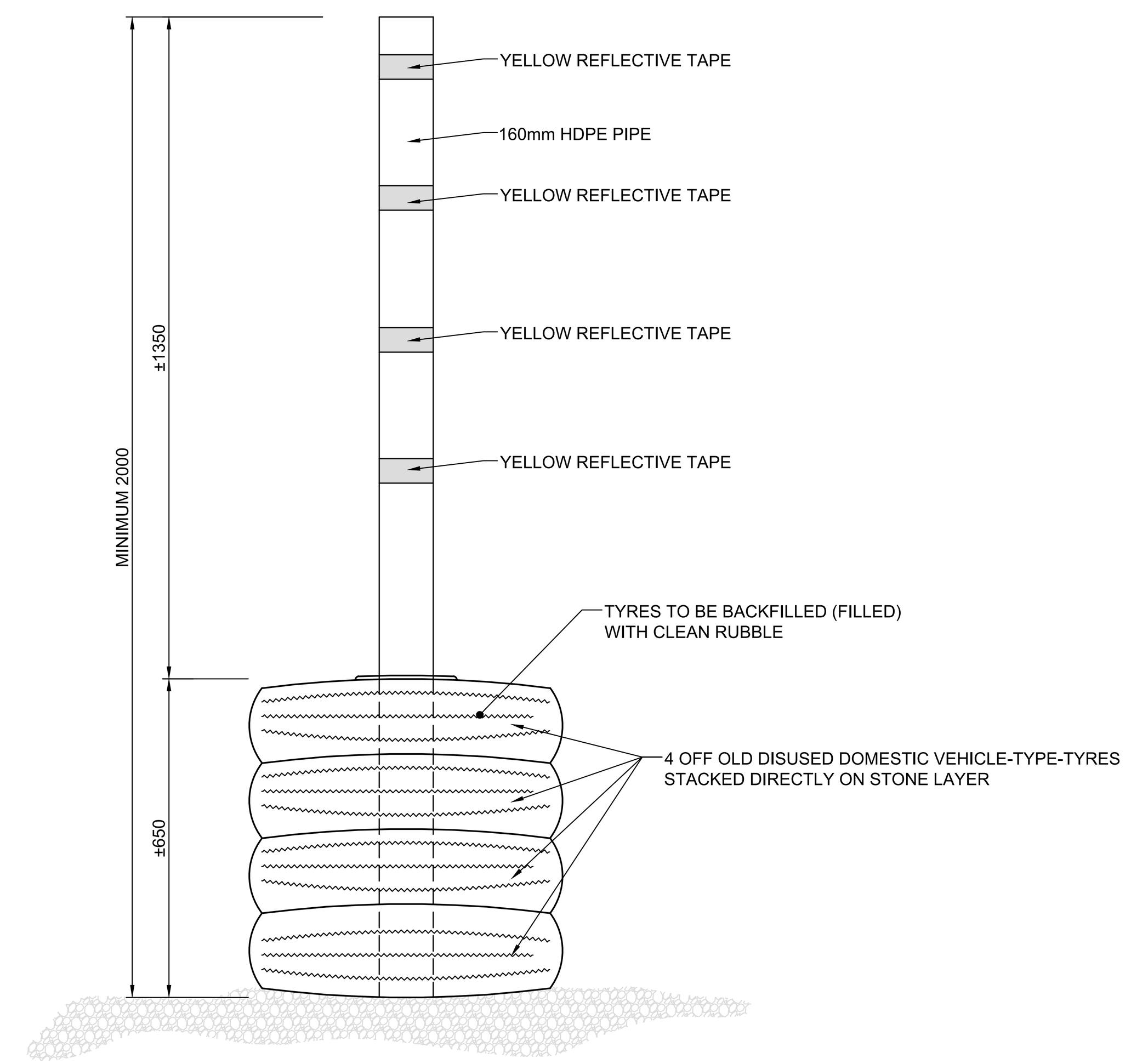
1. WASTE BODY
2. GEOTEXTILE SEPARATION LAYER CLASS 2 AS PER GRI-GT13
3. 38-53mm STONE LEACHATE COLLECTION LAYER
4. PROTECTION GEOTEXTILE (1000g/m²)
5. 1.5mm SMOOTH - TEXTURED HDPE GEOMEMBRANE
6. GCL
7A.19mm STONE LEAK DETECTION LAYER
7B. INSITU SOIL RECOMPACTED TO 95% STANDARD PROCTOR AT +0% TO +2% OMC
8. IN-SITU SOIL



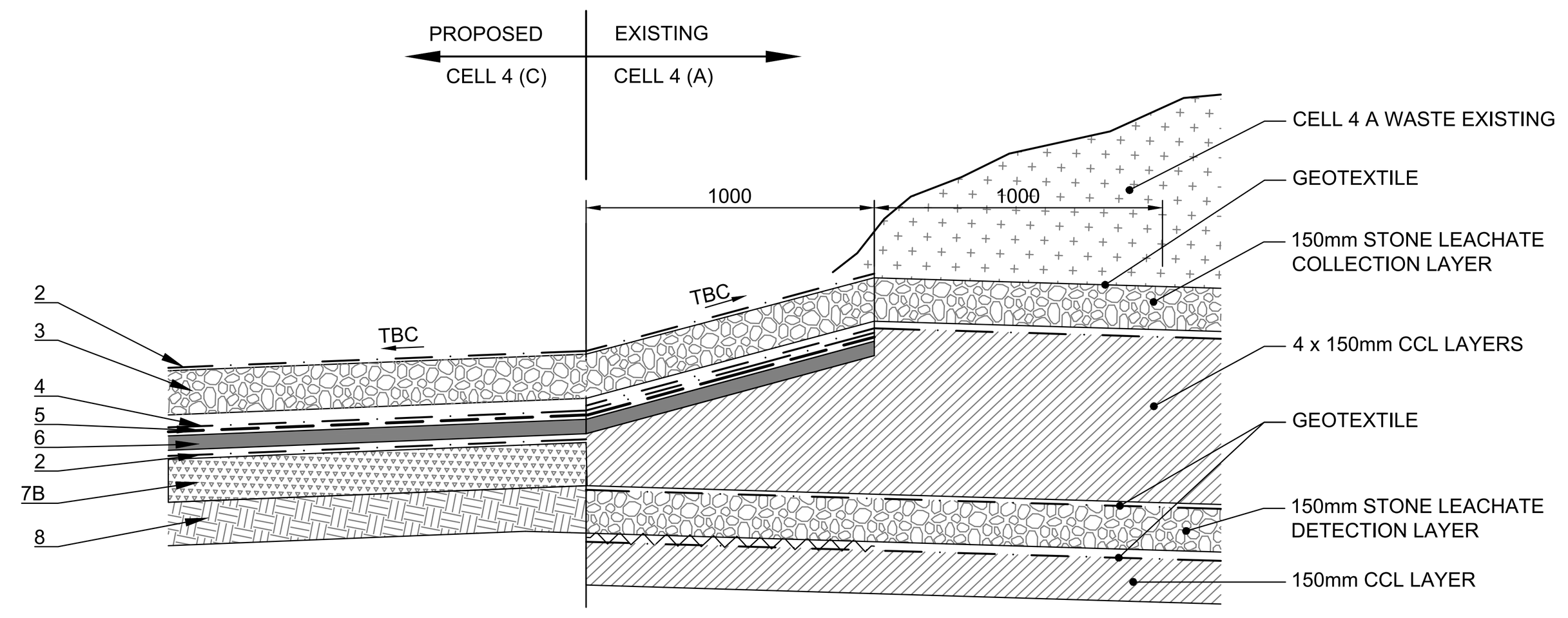
TYPICAL DETAIL OF ANCHOR TRENCH AT STABILITY BERM
SCALE 1:20



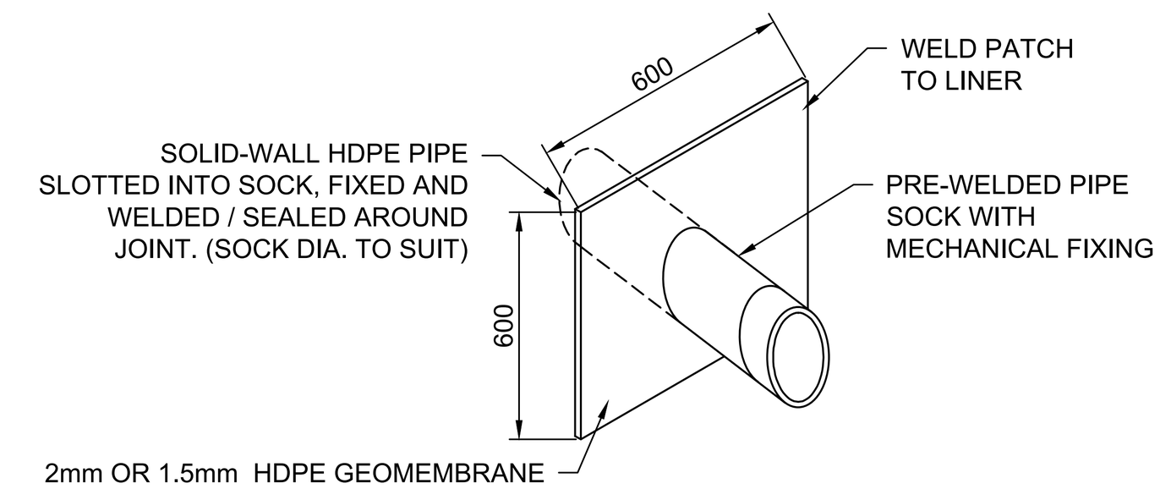
TYPICAL PIPE PENETRATION DETAIL
SCALE 1:50



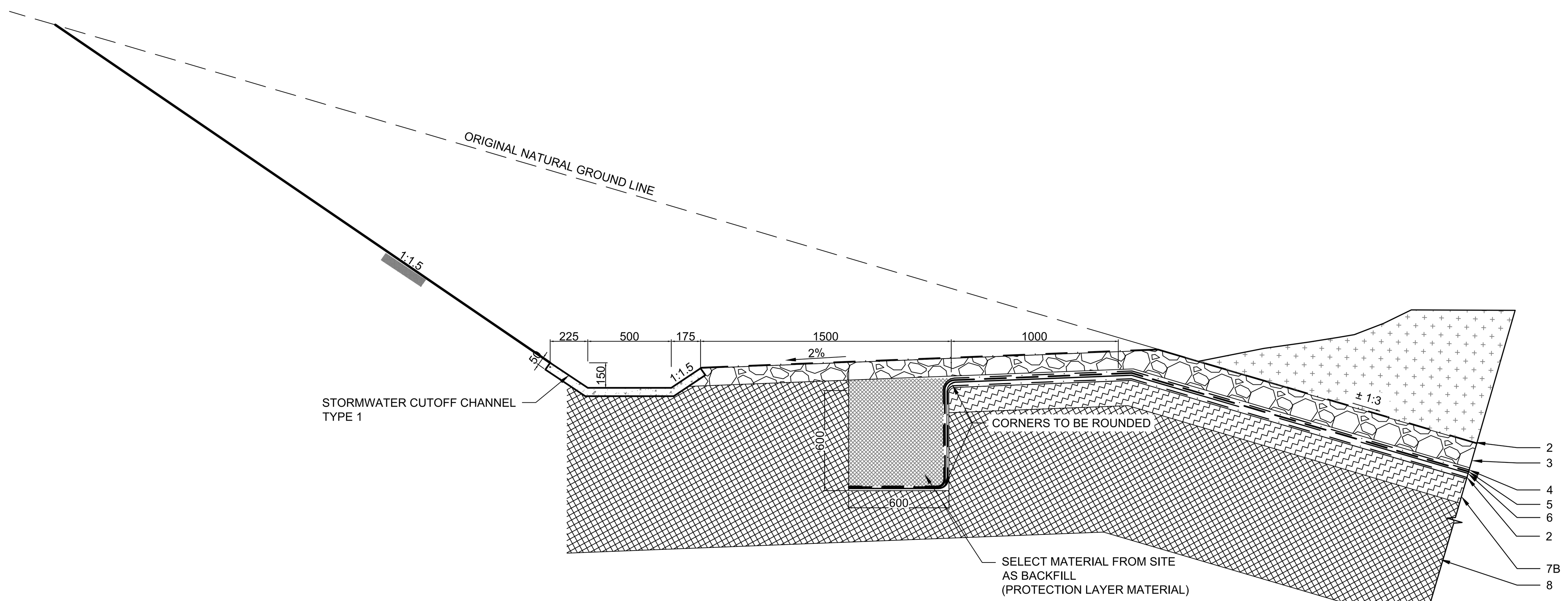
WASTEFILL DEMARCATION POSTS
SCALE 1:10



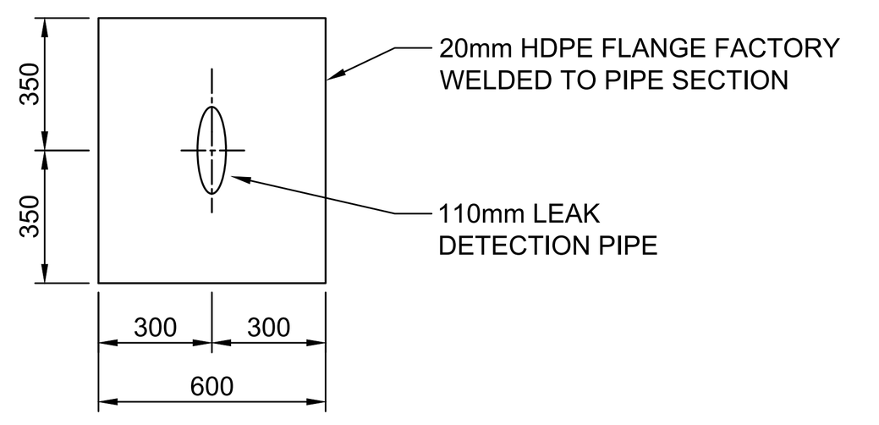
CELL 4 (A) AND CELL 4 (C) BASIN LINER DETAILS
SCALE 1:20



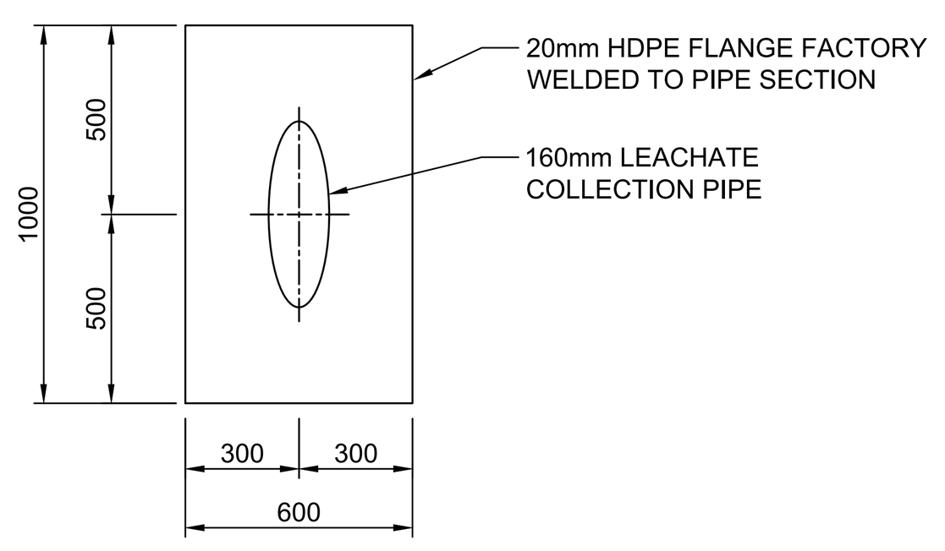
DETAILS OF SOCK FLANGE
SCALE 1:20



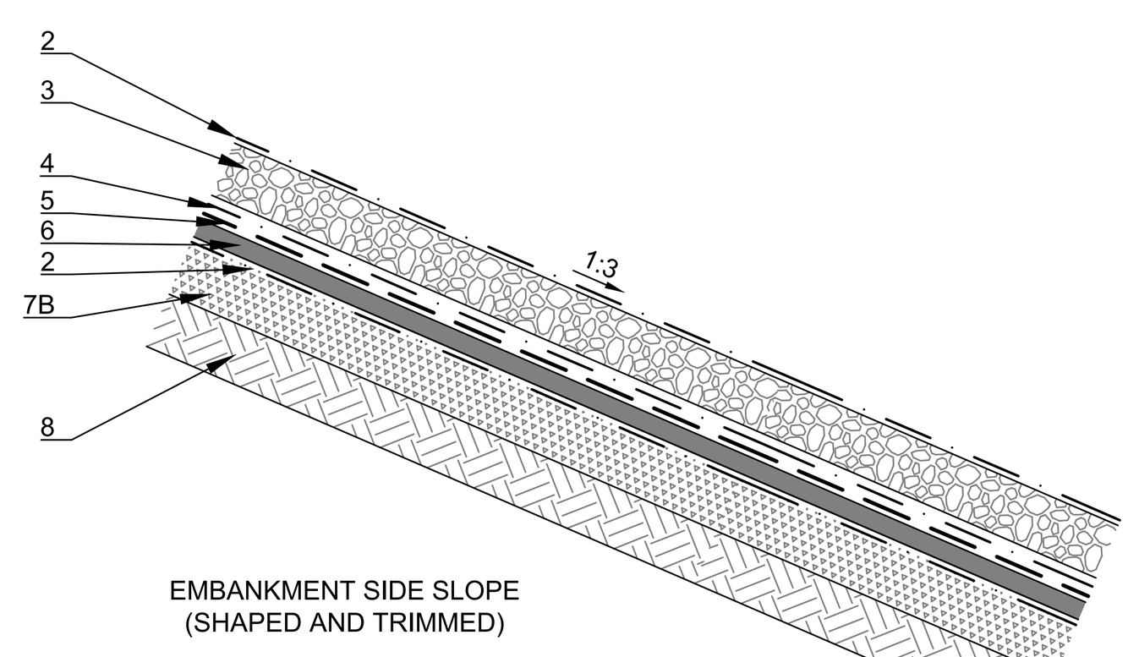
CELL EDGE DETAIL
SCALE 1:20



DETAIL OF HDPE FLANGE SPECIAL TYPE 1
SCALE 1:20



DETAIL OF HDPE FLANGE SPECIAL TYPE 2
SCALE 1:20



TYPICAL CROSS-SECTION OF LINING SYSTEM ON EMBANKMENT SIDE SLOPE
SCALE 1:20

ON ORIGINAL
0 10 20 30 40 50mm

NOTES	REF. DRAWINGS	DRWG. No.'s	DESCRIPTION

REV	NATURE OF REVISION	DATE	SIGNED
A	ISSUED FOR TENDER	04/03/2022	

DESIGNED	M. MILLAR
CHECKED	N. BROMLEY
DRAWN	Q. SHINGA / T. PHASHA
CHECKED	N. BROMLEY

DESIGN APPROVED: JG AFRIKA (Pty) Ltd.
NEAL BROMLEY
NAME
SIGNATURE
MARCH 2022
DATE

JG AFRIKA — CESA — bvi ENGINEERING PROCUREMENT MANAGEMENT — DEKRA

© COPYRIGHT RESERVED

DESIGN APPROVED: CLIENT
NAME
SIGNATURE
DATE

CLIENT
10 CONNOR STREET
PORT SHEPSTONE
4240
P.O. BOX 5
PORT SHEPSTONE
4240
TELEPHONE
+27 39 688 2000
RAY NKONYENI

PROJECT
OATLANDS LANDFILL SITE CELL 4C

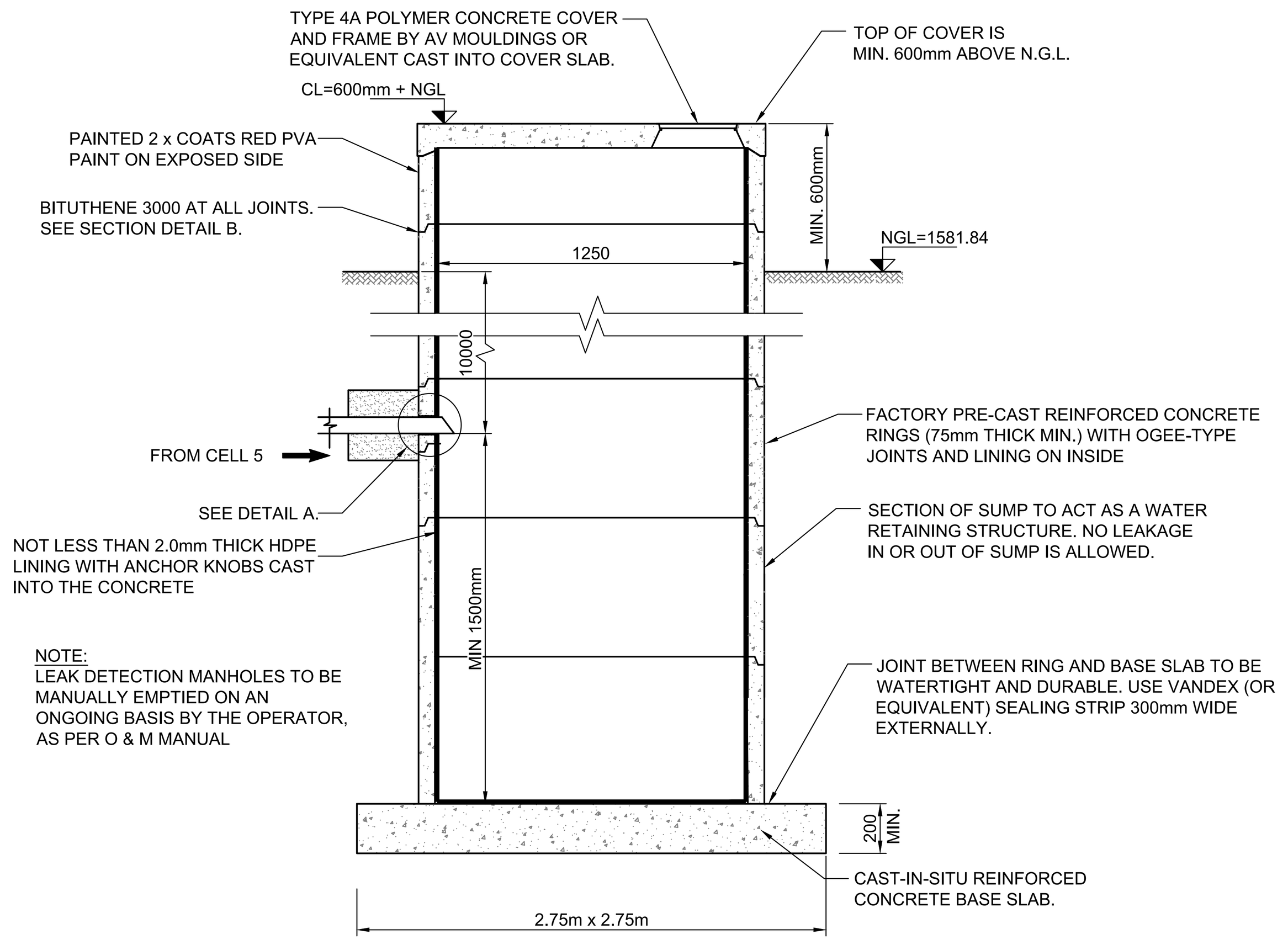
DRAWING TITLE
CELL 4C
TYPICAL SECTIONS & DETAILS
WITH GEOSYNTHETIC CLAY
LINER

ISSUED FOR TENDER

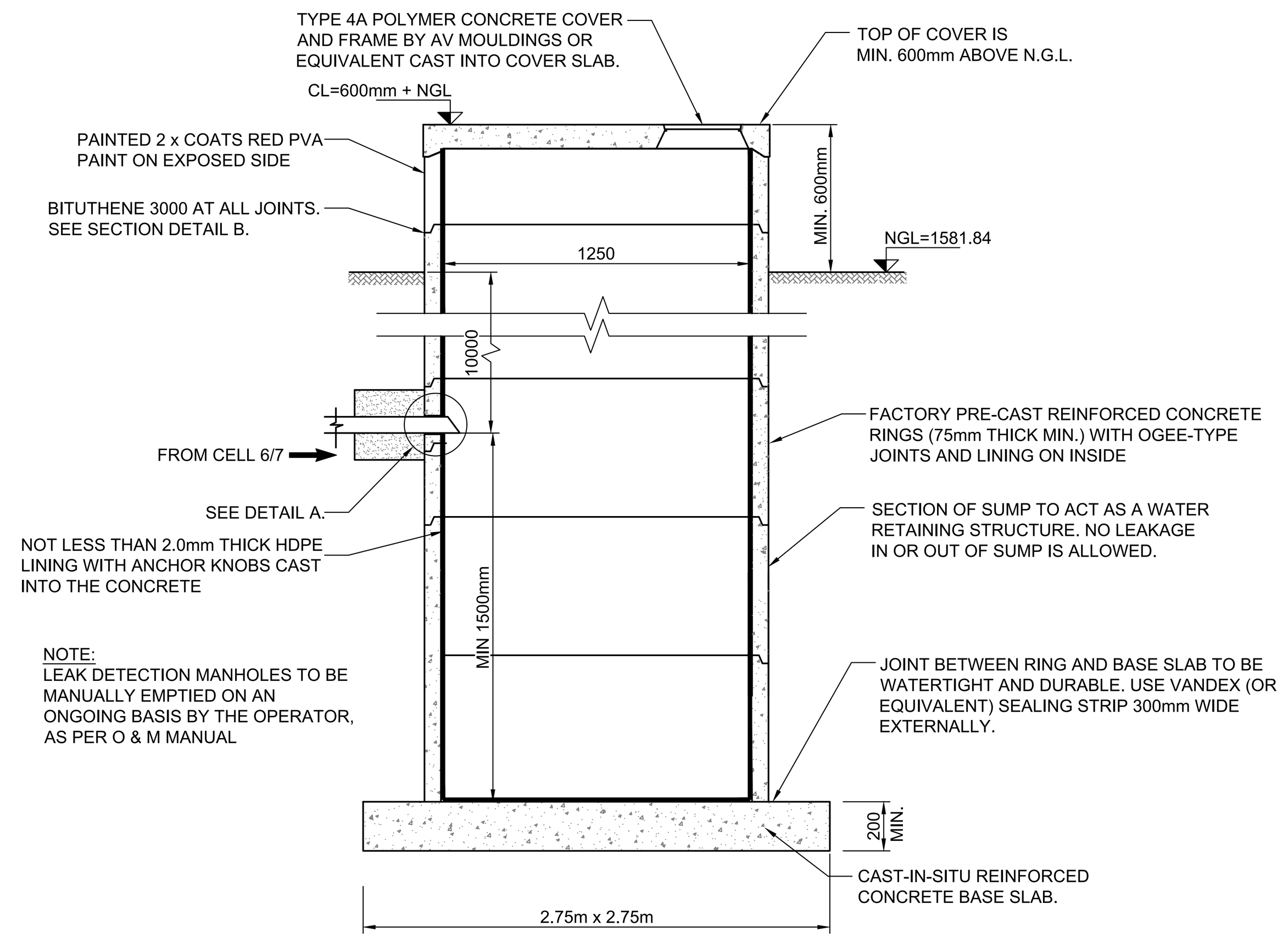
SHEET 2 OF 2 — SCALE AS SHOWN — SIZE A0

Contract No. Tender No.: 8/2/RNM0352

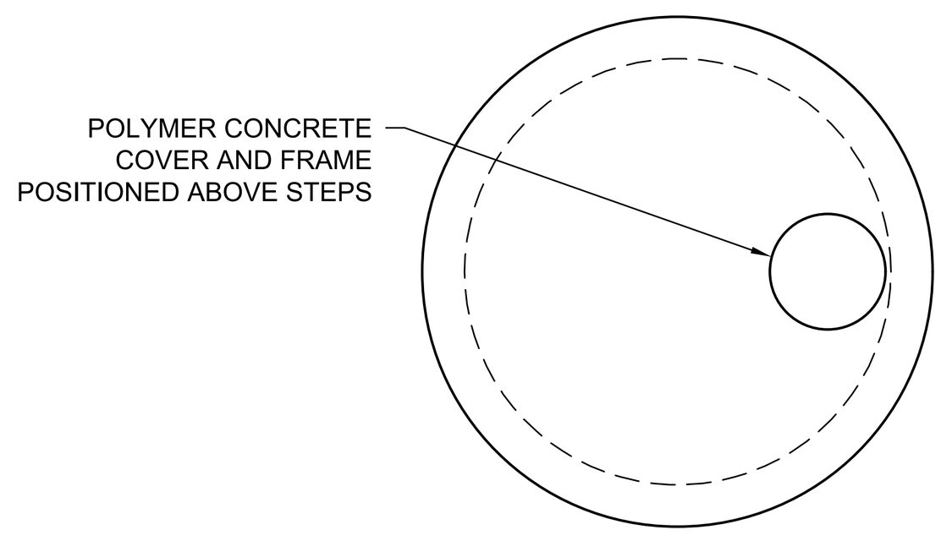
JG AFRIKA (Pty) Ltd. DRAWING No 5719-00-003-2 — REVISION A



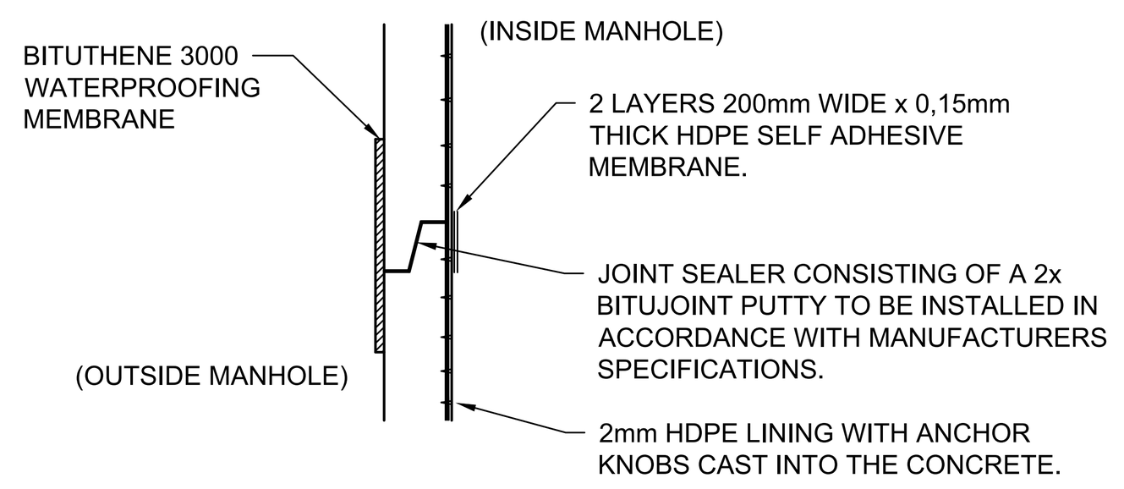
NEW CELL 4C LEACHATE DETECTION (LD) MANHOLE
SCALE 1:20



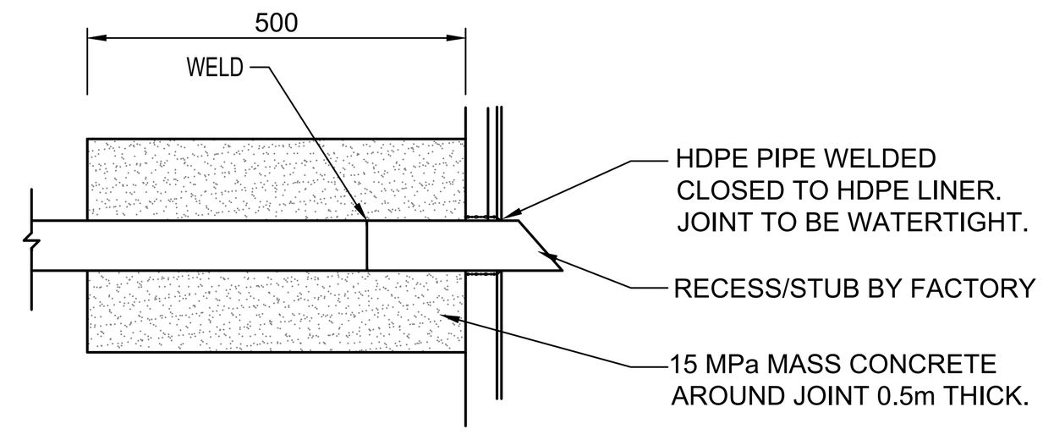
NEW CELL 4C LEACHATE COLLECTION (LC) MANHOLE
SCALE 1:20



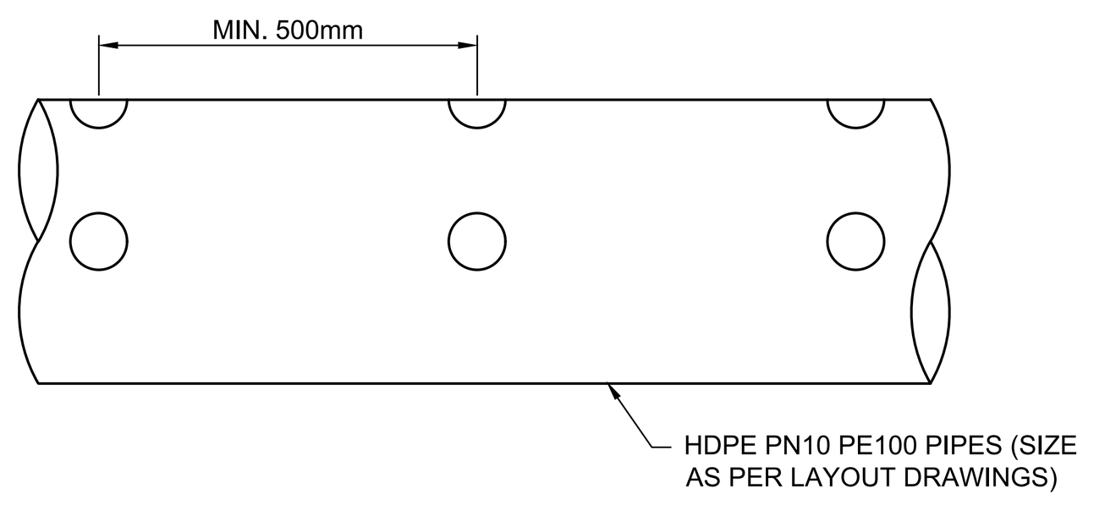
PLAN VIEW OF COVER SLAB
SCALE 1:20



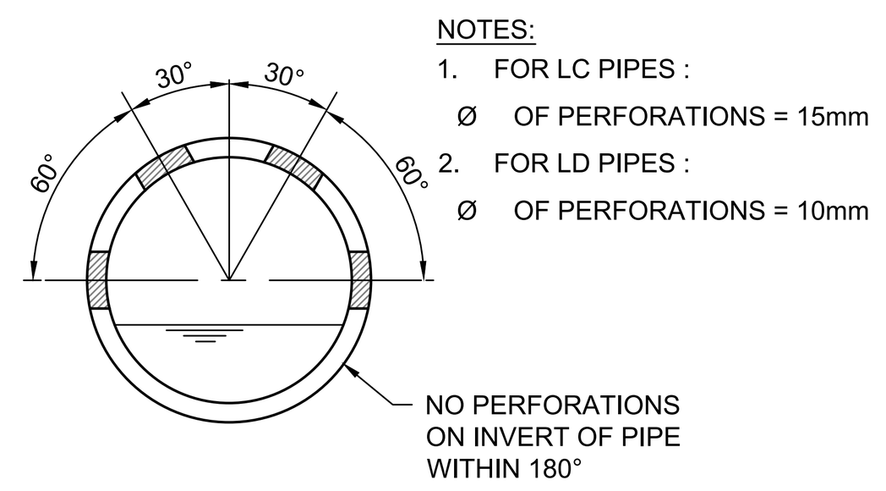
SECTION OF DETAIL B : SEALING OF JOINTS BETWEEN RINGS
SCALE 1:5



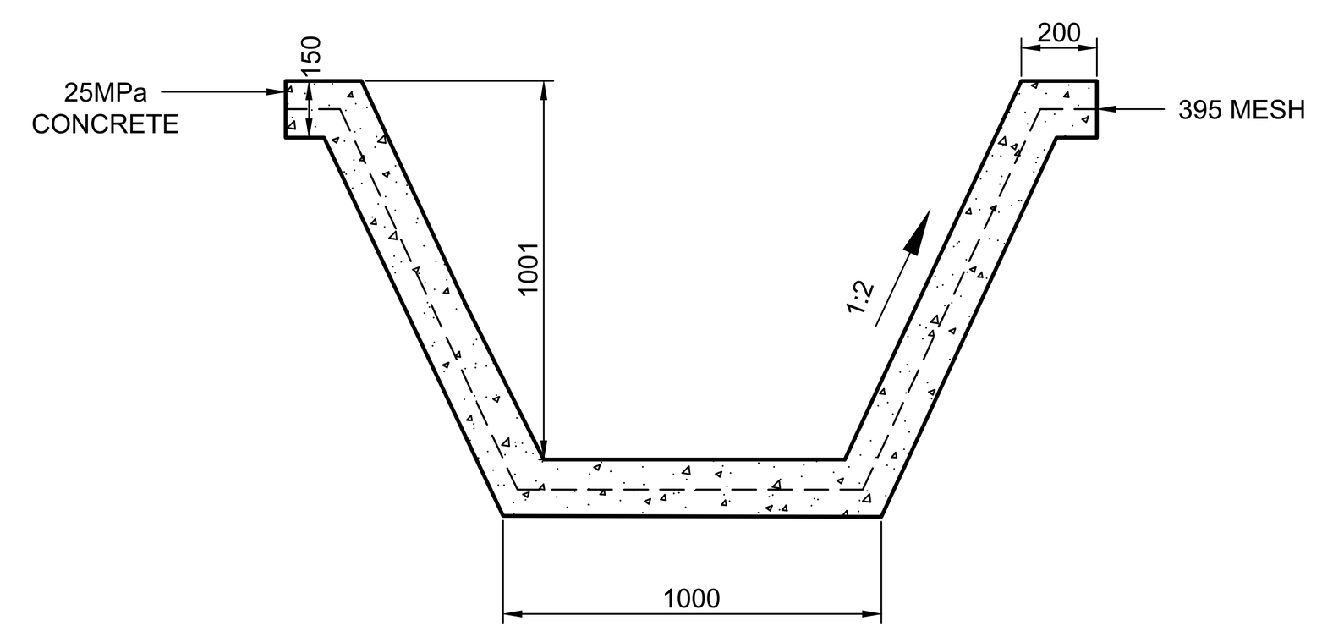
DETAIL A : PIPE PENETRATION THROUGH MANHOLE WALL (PLAIN ENDED PIPE)
SCALE 1:10



PERFORATED PIPE DETAIL PLAN
N.T.S



PERFORATED PIPE DETAIL CROSS SECTION
N.T.S



CONTAMINATED STORMWATER CONCRETE LINED CHANNEL EXTENSION
SCALE 1:20

ON ORIGINAL
0 10 20 30 40 50mm

NOTES	REF. DRAWINGS	DRWG. No.'s	DESCRIPTION

REV	NATURE OF REVISION	DATE	SIGNED
A	ISSUED FOR TENDER	04/03/2022	

DESIGNED	M. MILLAR
CHECKED	N. BROMLEY
DRAWN	Q. SHINGA / T. PHASHA
CHECKED	N. BROMLEY

DESIGN APPROVED:
JG AFRIKA (Pty) Ltd
NEAL BROMLEY
NAME
SIGNATURE
MARCH 2022
DATE

JG AFRIKA
CESA
bvi ENGINEERING PROCUREMENT MANAGEMENT
DEKRA

© COPYRIGHT RESERVED

DESIGN APPROVED:
CLIENT
NAME
SIGNATURE
DATE

CLIENT
10 CONNOR STREET
PORT SHEPSTONE
4240
P.O. BOX 5
PORT SHEPSTONE
4240
TELEPHONE
+27 39 688 2000
RAY NKONYENI MUNICIPALITY
The Game changer of South Coast development

PROJECT
OATLANDS LANDFILL SITE CELL 4C
DRAWING TITLE
CELL 4C
LEACHATE DETECTION /
SUB-SOIL DRAIN

ISSUED FOR TENDER

SHEET 1 OF 1	SCALE AS SHOWN	SIZE A0
Contract No. Tender No.: 8/2/RNM0352		
JG AFRIKA (Pty) Ltd. DRAWING No 5719-00-004		REVISION A

Njabulo 25.04.2022