




Indwe



Environmental Consulting

PROJECT TITLE	PROPOSED NGQAMAKHWE REGIONAL WATER SUPPLY SCHEME, PHASE 3, NGQAMAKHWE, AMATHOLE DISTRICT MUNICIPALITY
REPORT TYPE	DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)
DATE	APRIL 2026
PREPARED FOR	AMATHOLE DISTRICT MUNICIPALITY
DEDEAT REFERENCE NO.	EC/15/A/LN1/LN3/M/25-34
INDWE PROJECT NO.	J2017/37





COPYRIGHT AND DISCLAIMER

This document contains proprietary information of Indwe Environmental Consulting CC and is protected by copyright in favour of Indwe Environmental Consulting CC and may not be reproduced, or used without the written consent by Indwe Environmental Consulting CC, which has been obtained beforehand. This document is subject to all confidentiality, copyright and trade secrets, rules, intellectual property law and practices of South Africa.

Indwe Environmental Consulting is an independent entity with no interest in the activity and operation other than fair remuneration for services rendered. Remunerations for services are not linked to approval by decision making authorities and Indwe Environmental Consulting and its Members has no interest in secondary or downstream development as a result of these services. There are no circumstances that compromise the objectivity of this report. The findings, results, observations, and recommendations given in this report are based on the author's best scientific and professional knowledge and available information. Indwe Environmental Consulting reserves the right to modify aspects of this report, including the recommendations if new information become available which may have a significant impact on the findings of this report.

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED NGQAMAKHWE REGIONAL WATER SUPPLY SCHEME, PHASE 3,

NGQAMAKHWE, AMATHOLE DISTRICT MUNICIPALITY

CONTENTS

Chapter	Description	Page
1.	INTRODUCTION	4
	1.1 Background Information	4
	1.2 Project Location	5
	1.3 Project Description	5
	1.4 Listing Notice Activities Triggered	8
	1.5 Draft EMPr	9
	1.6 General Environmental Principles	10
2.	ROLES AND RESPONSIBILITIES	11
	2.1 Project Proponent (Amathole District Municipality)	11
	2.2 Consulting Engineer (Sontinga Consulting Services)	11
	2.3 Contractor (Main Contractor)	12
	2.4 Environmental Control Officer	12
3.	REPORTING AND ADMINISTRATION	13
	3.1 Environmental Site File	13
	3.2 Environmental Induction & Awareness and Training	13
	3.3 Method Statements	14
4.	PROJECT PHASES	15
5.	ENVIRONMENTAL SPECIFICATIONS – PLANNING & DESIGN PHASE	16
	5.1 General Legal Compliance	16
	5.2 Environmental Authorisation Compliance	16
	5.3 EMPr Compliance	16
6.	ENVIRONMENTAL SPECIFICATIONS – CONSTRUCTION PHASE	17

6.1	Site Camp Establishment and Management	17
6.2	Construction and Development Footprint	18
6.3	Works within Watercourses	19
6.4	Plant and Animal Species Protection	20
6.5	Solid Waste Management	21
6.6	Hazardous Materials, Fuel and Waste Management	21
6.7	Sanitation/Ablutions	23
6.8	Fire	23
6.9	Cultural and Heritage Areas	24
6.10	Palaeontological Features	24
6.11	External Site Access and Traffic Control	25
6.12	Alien Vegetation Management	25
6.13	Vegetation Clearing	30
6.14	Topsoil Management	31
6.15	Erosion Management	32
6.16	Stormwater Management	34
6.17	Wet Works/Concrete Mixing	34
6.18	Public Protection	36
6.19	Existing Services	36
6.20	Dust Control	36
6.21	Noise Control	37
6.22	Hazardous Waste Management	37
6.23	Rehabilitation & Landscaping	38
6.24	Close Out of Site Camp	40
7.	ENVIRONMENTAL SPECIFICATIONS – OPERATION PHASE	41
7.1	Erosion Impact Management	41
7.2	Stormwater Management	41
7.3	Infrastructure Management	41

7.4	Invasive Alien Species Management	41
8.	ENVIRONMENTAL SPECIFICATIONS – DECOMMISSIONING PHASE	42
8.1	Rehabilitation	42
8.2	Alien Vegetation	42
8.3	Planting of Vegetation	42
9.	COMPLIANCE	43
9.1	Work Stoppage	43
9.2	Monitoring and Auditing	43
9.3	Non-Compliance	43
9.4	Penalties	44
9.5	Incident Reporting and Remedial Measures	45
10.	DETAILS OF AUTHORS	46
10.1	Indwe Environmental Consulting	46
10.2	Expertise	46
11.	APPENDIX A – PROPOSED ENVIRONMENTAL AWARENESS EDUCATION COURSE GUIDELINE	48
12.	APPENDIX B – METHOD STATEMENT EXAMPLE	52

1. INTRODUCTION

1.1 Background Information

Indwe Environmental Consulting (Indwe) has been appointed by Sontinga Consulting Services on behalf of Amathole District Municipality (ADM) as the Professional Service Provider (PSP) to conduct an Environmental Impact Assessment in terms of the National Environmental Management Act (NEMA) (Act 107 of 1998) for the proposed Ngqamakhwe Regional Water Supply Scheme Phase 3 in Ngqamakhwe, Amathole District Municipality, Eastern Cape.

It is the intention of the ADM to implement the Ngqamakhwe Regional Water Supply Scheme, Phase 3, to service areas without adequate supply systems in the area. Phase 3 will include the transfer, storage and distribution of water to the Ngqamakhwe Town Centre and 29 villages in Wards 13, 16, 18 and 20 of the Mnquma Local Municipality area in the Eastern Cape Province (refer to Figure 1).

The proposed development involves the implementation of a regional water supply scheme to supply potable water to the Greater Ngqamakhwe area. Several options for providing water to the area have been considered and include the following:

- Surface water from Tsomo River
- Groundwater from existing boreholes
- Delay water supply until the implementation of the full Ngqamakhwe Regional Water Supply Scheme (RWSS)

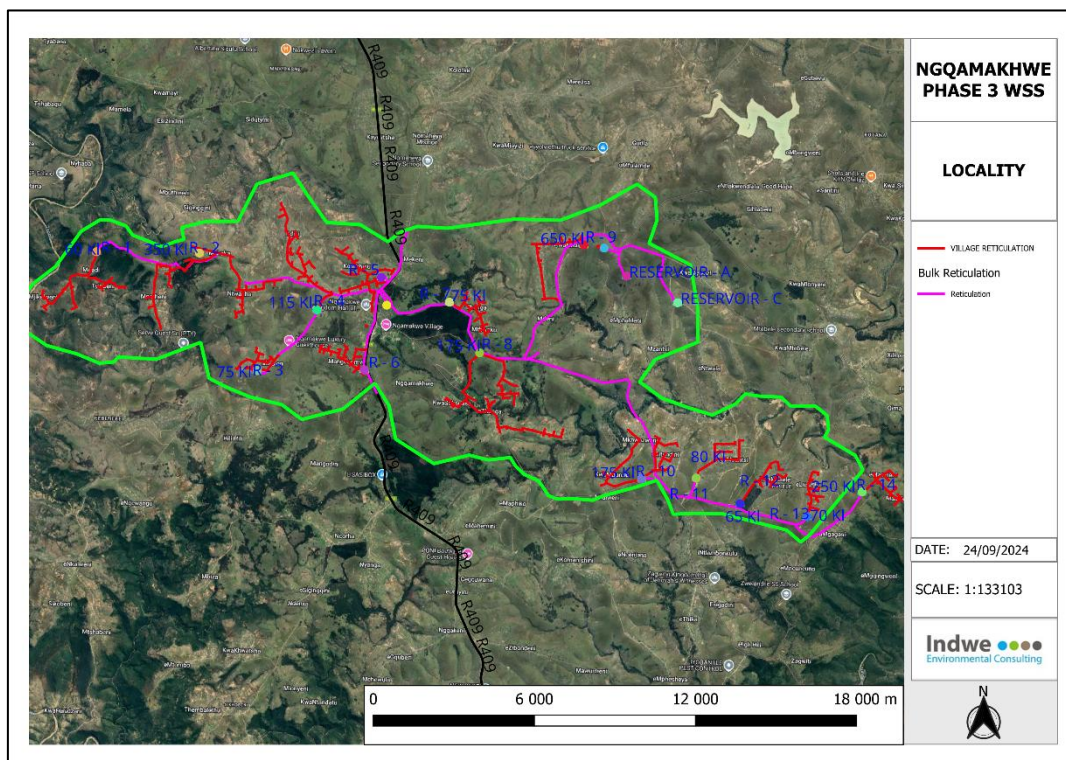


Figure 1: A view of the project layout for the proposed Ngqamakhwe Phase 3 Project.

1.2 Project Location

It is the intention of the ADM to implement the Ngqamakhwe Water Supply Scheme Phase 3 to service areas without adequate supply systems in the area. Phase 3 will include the transfer, storage and distribution of water to the Ngqamakhwe Town Centre and 29 villages in Wards 13, 16, 18 and 20 of the Mnquma Local Municipality area in the Eastern Cape Province. See the below map for an indication of the layout of the project.

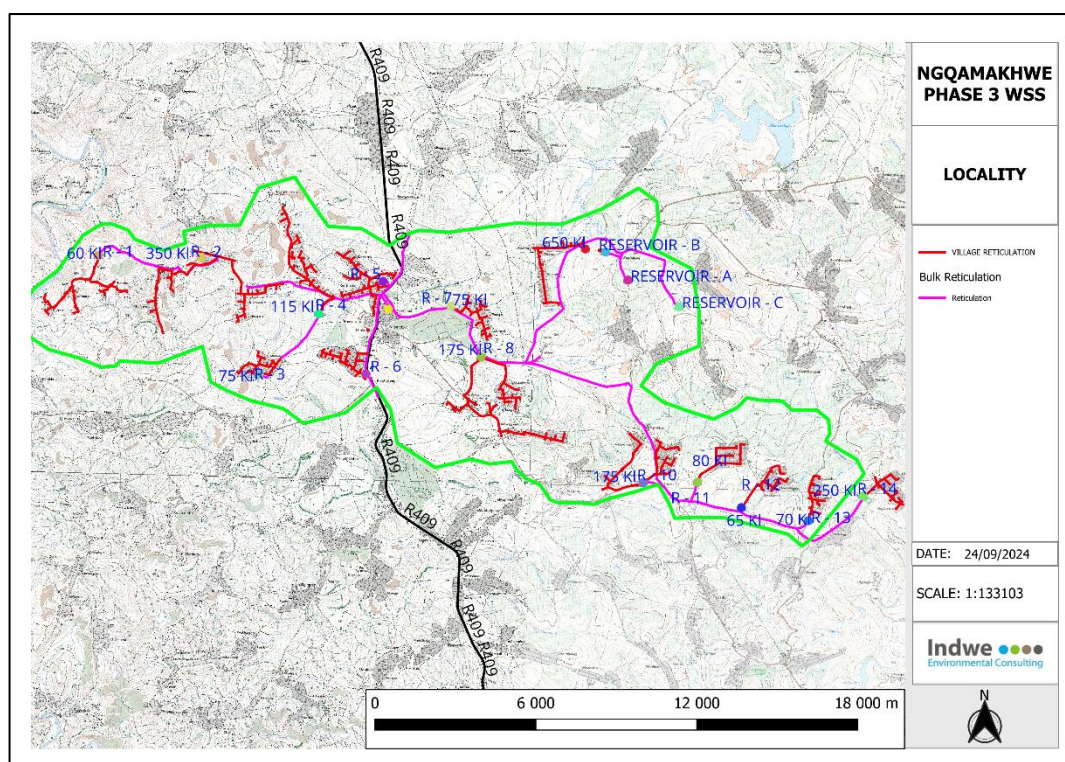


Figure 2: A topographical view of the project layout for the proposed Ngqamakhwe Phase 3 Project.

1.3 Project Description

Reservoirs and Clear Water Storage

There will be four distribution reservoirs namely Reservoir 2, 5, 9, 14 ranging between 250 and 980kL in capacity. Ten service reservoirs are proposed for Phase 3 ranging between 60 and 175kL in capacity. A total of 48 hours clear water storage for distribution reservoir and 24 hours for services reservoirs is proposed for Phase 3.

Bulk Mains

The clear water gravity main will be sized to cater for a medium to long term demand of 60l/ capita/ day and will include a transmission loss factor of 10%. To regulate pressure difference, break pressure tanks will be installed at strategic points to dissipate residual pressures.

The following table summarises the length and diameter of bulk pipelines anticipated:

Diameter (mm)	Length	Material
50	14810	HDPE
63	1808	UPVC
75	8316	UPVC
90	6860	UPVC
110	5376	UPVC
160	15689	UPVC
200	5943	UPVC

Reticulation and Standpipes

The reticulation shall be designed to deliver 0.17l/s per standpipe. There may be exceptions where this would not be achieved due to local topography. No pipe smaller than 50mm in diameter shall be used for the reticulation.

The standpipes will be spaced in order for each household to be within 200m walking distance from a standpipe. The total number of standpipes to be installed will be 325.

The following table summarised the length and diameter of reticulation anticipated:

Diameter (mm)	Length	Material
50	77055	HDPE
63	18060	HDPE
75	14448	HDPE
90	4816	HDPE
110	3612	HDPE
160	2409	HDPE

The overall Ngqamakhwe Regional Water Supply Scheme, which phase 3 falls under, is a significant infrastructure project, considered a major investment and a priority development initiative, crucial for providing permanent, bulk water to vast rural areas in the Eastern Cape, particularly serving communities in Mquma Local Municipality, like Butterworth and surrounding villages, addressing severe water challenges.

According to the Aquatic Specialist Report submitted by GroundTruth, appropriate buffers have been determined to limit the impacts to the surrounding watercourse features located within the project footprint. The buffer for the proposed development is split up between the construction and the operation phases. There was no difference between the poor mitigation and the best-case mitigation scenarios and therefore the buffer areas have been consolidated into one buffer zone per phase. Furthermore, given the extensive number of ecosystems, and taking a pragmatic approach to defining buffer zones for so many systems, a general construction buffer zone and a general

operational buffer zone has been applied to all ecosystems. This will reduce the possible confusion and administration for the contractor and the environmental control officer while implementing onsite. The buffer zones can be considered as being 'conservative' (i.e. they are possibly wider than necessary), but it is the opinion of the specialist that, given the steep nature of the landscape, it is better to be cautious. While the development poses **Low** risks to the ecosystems, it is recommended that appropriate mitigation activities are adopted.

Table 1: Recommended buffer distance to be adopted for the aquatic ecosystems present within the development footprint

Watercourse	Buffer Distance per Phase	
	Construction	Operational
All watercourses	15m	15m

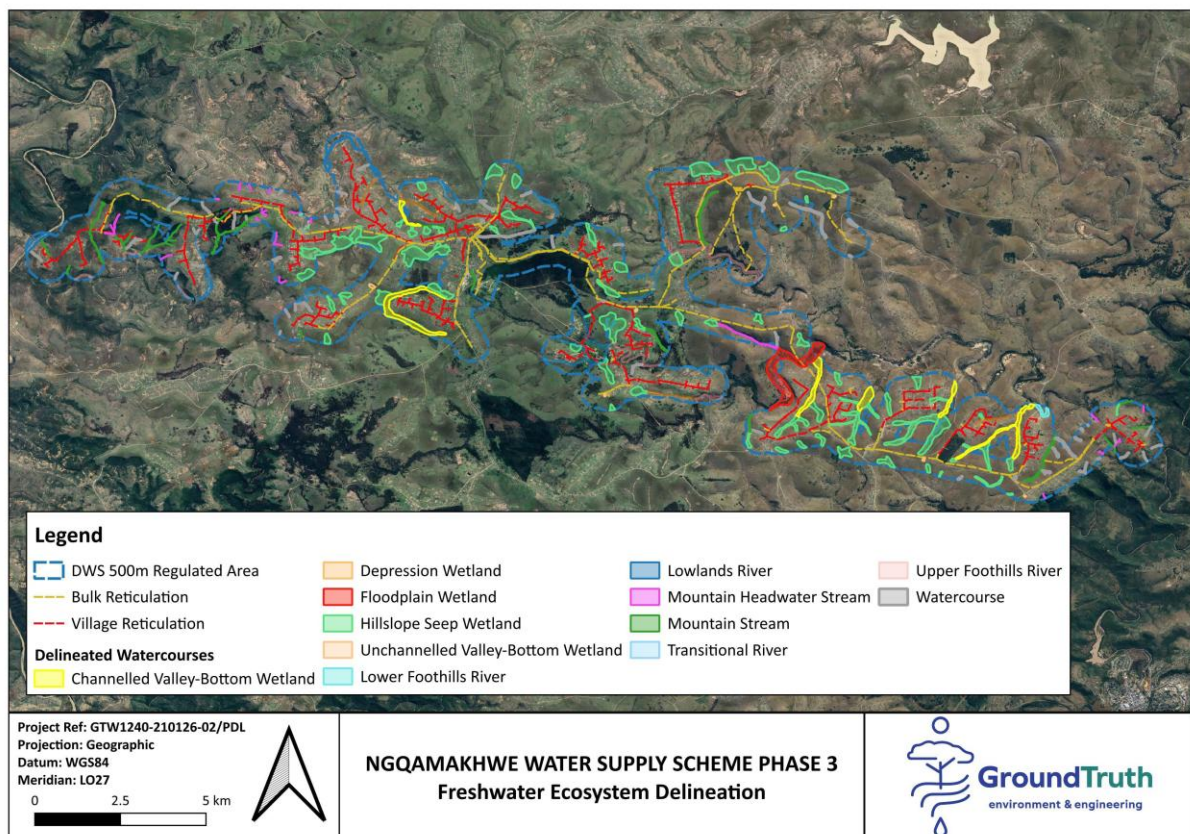


Figure 3: At Risk Delineated Watercourses

1.4 Listing Notice Activities Triggered

The listed activities that are triggered in terms of the EIA Regulations, 2014, as amended are as follows:

Table 1: Listed Activities Triggered by the Project.

Listing Notice and Activity No.	Project Activity
<p>LN 1 Activity 12:</p> <p>The development of</p> <p>(ii) infrastructure or structures with a physical footprint of 100 square metres or more</p> <p>Where such development occurs-</p> <p>(a) Within a watercourse;</p> <p>(c) Within 32 metres of a watercourse</p>	<p>Certain sections of the project traverses watercourses whereby pipelines of various diameters will be installed within the watercourse boundaries. Cumulatively, it is anticipated that 100 square metres of infrastructure is expected to be constructed within 32m of various watercourses.</p> <p>It must be noted that all pipeline routes are following existing main and internal roads through and into the village clusters.</p>
<p>LN 1 Activity 19:</p> <p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</p>	<p>Certain sections of the project traverses watercourses whereby in order to install the pipeline, trenches will be excavated and material will be used as backfill once the pipe has been installed. These sections that fall within watercourses will trigger this activity and therefore require Environmental Authorisation.</p> <p>It must be noted that all pipeline routes are following existing main and internal roads through and into the village clusters.</p>
<p>LN 3 Activity 2:</p> <p>The development of reservoirs, for bulk water supply, excluding dams, with a capacity of more than 250 cubic metres.</p> <p>Eastern Cape:</p> <p>ii) Outside urban areas in:</p> <p>dd) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</p>	<p>The project will include the construction of 4 distribution reservoirs of 250- 980kL each. Critical Biodiversity Areas, as defined by the Eastern Cape Biodiversity Conservation Plan (ECBCP), will be intercepted by the infrastructure. The ECBCP is considered a systematic biodiversity plan by the Eastern Cape Department of Economic Development, Environmental Affairs, and Tourism (DEDEAT).</p>

<p>LN 3 Activity 12:</p> <p>The clearance of an area of 300 square meters or more of indigenous vegetation</p> <p>a. <u>Eastern Cape</u></p> <p>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p>	<p>The project includes the installation of approximately 30km of pumping mains, and 120km of village reticulation. It is anticipated that at least 300 square metres of indigenous vegetation will need to be cleared to accommodate the infrastructure.</p> <p>The area falls within the Mthatha Moist Grassland vegetation unit which is listed as “Critically Endangered” in the National Environmental Management: Biodiversity Act, 2004 (Act no 10 of 2004): National List of Threatened Ecosystems.</p>
<p>LN 3 Activity 14:</p> <p>The development of — (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p>a. <u>Eastern Cape</u></p> <p>i. <u>Outside urban areas:</u></p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>The project includes the installation of approximately 30km of pumping mains, and 120km of village reticulation. Certain sections of the project traverses watercourses whereby pipelines of various diameters will be installed within the watercourse boundaries. Cumulatively, it is anticipated that 10 square metres of infrastructure is expected to be constructed within 32m of various watercourses.</p> <p>The ECBCP (2019) is considered a “systematic biodiversity plan” according to the Department of Economic Development, Environmental Affairs and Tourism (DEDEAT).</p> <p>It must be noted that all pipeline routes are following existing main and internal roads through and into the village clusters.</p>

1.5 Draft EMPr

An Environmental Management Programme (EMPr) must consist of a set of mitigation, monitoring and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed to implement these measures.

An EMPr can be defined as, “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the project are enhanced”. The EMPr is an important tool used to ensure the sound environmental management of projects, provided the specifications are implemented and the user understands the contents of the report and the reasons for the implementation of certain specifications.

This EMPr informs all relevant parties, which are in this case, the Project Coordinator, the Contractor, the Environmental Control Officer (ECO) and all other staff employed by **Amathole District Municipality** at the site as to their duties in the fulfilment of the legal requirements for the construction and operation of the road upgrade with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

This report is the draft EMPr and should be updated with the conditions of Environmental Authorisation (EA) prior to project implementation.

1.6 General Environmental Principles

The following principles should be considered at all times during the implementation of this project:

1. The Environment is considered to be composed of both biophysical and social components.
2. Minimisation of areas disturbed by construction (i.e. the footprint of construction activities) should minimise many of the related environmental impacts of the project and reduce rehabilitation requirements and costs.
3. As minimum requirements, all relevant standards relating to international, national, provincial and local legislation, as applicable, shall be adhered to. This includes the following legislation which can, inter alia, have an effect on construction activities or the environment. This list is not necessarily complete and the onus shall remain on the Proponent and Contractor to ensure that all relevant legislation is conformed with:
 - National Environmental Management Act (No. 107 of 1998).
 - National Environmental Management: Waste Act (No. 59 of 2008)
 - National Water Act (No. 36 of 1998).
 - National Heritage Resources Act (No. 25 of 1999).
 - Conservation of Agricultural Resources Act (No. 43 of 1983).
 - National Environmental Management: Biodiversity Act (No. 10 of 2004).
 - Occupational Health & Safety Act (No.85 of 1993).
 - National Dust Control Regulations, 2013, in terms of section 53 (o), read with section 32 of the National Environmental Management: Air Quality Act, 2004 (Act no. 39 of 2004).
 - All relevant provincial legislation, Municipal by-laws and ordinances.
4. Every effort should be made to minimise, reclaim and/or recycle “waste” material.
5. The Environment is held in public trust for the benefit of people, due care must therefore be exercised to ensure that the rights of others with respect to its use are respected. This requires that a risk averse and cautious approach to the management of activities associated with the project be adopted at all times.

2. ROLES AND RESPONSIBILITIES

2.1 Project Proponent (Amathole District Municipality)

The Proponent will be responsible for:

1. Appointment of a Consulting Engineer (CE) to oversee the implementation of the works.
2. Appointment of an Environmental Control Officer (ECO).
3. Ensure that all permits, authorisations and associated conditions regarding site establishment and construction activities are in place.
4. Being familiar with the contents of the EMPr.
5. Making sufficient budget available for implementation of the EMPr including a provisional sum for additional environmental protection measures that may be necessary as construction and rehabilitation proceeds.
6. Supporting the Consulting Engineer in enforcing the Environmental Specifications.
7. Communicating with all role players in the interests of a co-ordinated effort to protect the environment.
8. Implement and take responsibility for those specifications relating to the operational phase of the project.
9. Where the project proponent physically undertakes construction work, then the roles and responsibilities of the Contractor apply.

2.2 Consulting Engineer (Sontinga Consulting Services)

The Consulting Engineer (CE) is required to:

1. Ensure that Contractors are aware of and familiar with the contents of the EMPr.
2. Be familiar with the contents of the EMPr.
3. Assist with monitoring the Contractor's compliance to the specifications contained within this document and enforce compliance when deemed necessary.
4. Together with the ECO, review and approve method statements received from the Contractor.
5. Issue site instructions giving effect to the ECO requirements contained in audit reports.
6. Discuss with the ECO the application of any penalties and other possible enforcement measures when necessary.
7. Facilitate communication between all role-players in the interest of effective Environmental Management.

2.3 Contractor (Main Contractor)

The Contractor is required to:

1. Be familiar and comply with the contents of this EMPr.
2. Sign a letter as commitment to implementing the EMPr.
3. Compile an environmental site file and keep accurate and detailed records of all activities on site.
4. Regularly conduct environmental awareness training amongst all site personnel.
5. Prepare method statements and obtain approval from the CE and ECO for all work that will take place in environmentally sensitive areas.
6. Undertake rehabilitation of all areas affected by construction activities to restore them to their original states, as determined by the ECO.
7. Report all incidences of non-compliance with the content of the EMPr to the ECO.
8. Timeously implement mitigation measures for non-compliances identified in previous audit reports.
9. Ensure all sub-contractors are aware of the EMPr and environmental conditions.

2.4 Environmental Control Officer

The ECO is responsible for:

1. Conducting an induction session with the Consulting Engineer and main Contractor on the content and requirements of the EMPr.
2. Confirming that all permits required in terms of the applicable legislation have been obtained by the contractor prior to construction commencing.
3. Undertaking regular site inspections to ensure that the provisions contained within this EMPr and all other permit conditions are complied with throughout the construction period.
4. Undertaking periodic audits to measure the Contractors compliance with the provisions of the EMPr and distribute these reports to the relevant parties.
5. Keeping a photographic record of progress on site from an environmental perspective.
6. Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance identified in previous site inspections and compliance audits.
7. Monitoring the Contractors environmental awareness training for all personnel on site.
8. Reviewing and approving construction method statements in conjunction with the Engineer prior to work commencing.
9. Undertaking a detailed close out post construction compliance audit and distribute these reports to the relevant parties.

3. REPORTING AND ADMINISTRATION

3.1 Environmental Site File

The Contractor is to maintain an environmental site file which must contain the following:

1. A copy of this EMPr.
2. All relevant authorisations, permits and licences.
3. Records of attendance and proof of on-going environmental awareness training of all personnel.
4. Copies of the approved method statements:
 - a. Waste management
 - b. Hazardous storage area
 - c. Concrete mixing
 - d. Ablution facilities
 - e. Site camp location and layout
 - f. Stockpiling (Spoil and Topsoil)
5. An emergency incidence register.
6. A register of public complaints.
7. A copy of all previous site inspection and audit reports.
8. A copy of all relevant correspondence of an environmental nature.
9. Any other information of environmental importance.

The environmental file must be kept on site and made available to any authority that requests to review its contents.

3.2 Environmental Induction & Awareness and Training

1. Before construction commences the ECO must coordinate an induction session with the Contractor. The ECO must brief the contractor on the specifications contained within the environmental management programme as well as all conditions of authorisation.
2. The Contractor shall be responsible for conducting regular toolbox talks with all employees in order to ensure that they have the necessary knowledge to comply with the specifications contained in this EMPr.
3. Environmental awareness training programmes shall contain the following information:
 - The names, positions and responsibilities of personnel that training will be provided.
 - The framework for appropriate training plans.
 - The summarised content of each training course.
 - A schedule for the presentation of the training courses.

4. Copies of all attendance registers as proof of training must be kept in the site environmental file.
5. The Proponent (Amathole District Municipality) shall ensure that environmental training takes place (see **Appendix A** for an example of an environmental education and awareness guideline to use). All employees shall be given an induction presentation on environmental awareness and the content of the EMPr (to be done by the ECO). The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training shall, as a minimum, include the following:
 - The importance of compliance with all available environmental policies.
 - The environmental impacts, actual or potential, associated with their work activities.
 - The environmental benefits of improved personal performance and liability.
 - Their roles and responsibilities in achieving compliance with the environmental policy and procedures and with the requirement of the entities environmental management systems, including emergency preparedness and response requirements.
 - The consequences of noncompliance with the relevant systems
 - The mitigation measures required to be implemented when carrying out their work activities.
 - Environmental legal requirements and obligations.
 - Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed, should these be encountered.

3.3 Method Statements

1. Work in environmentally sensitive areas (areas of indigenous bush, watercourses, etc.) will require method statements that reflect the manner in which the Contractor intends to protect the environment while conducting construction work within the area.
2. Any other aspect of environmental management may require a method statement (i.e. waste disposal, concrete batching, etc.). This especially applies where there is a deviation from the EMPr specifications.
3. These method statements are required 7 days prior to any work commencing within sensitive areas, and then the work may only start once the method statements have been approved by the CE and ECO.
4. An example of a method statement can be found in **Appendix B**.

4. PROJECT PHASES

Environmental specifications have been split according to the project phases:

- **Planning and Design Phase**

The Planning and Design Phase includes all activities that are taking place up to appointment and establishment of a contractor on site. This phase does not include site clearance.

- **Construction Phase**

The Construction Phase includes all activities from site establishment, site clearance, by a contractor to practical completion of construction activities and typically ends when the final payment certificate has been processed by the site agent. This phase usually terminates on completion of civil services.

- **Operation and Maintenance Phase**

The Operation Phase commences once the site has been handed over by the principal contractor. Essentially the proponent will be responsible to ensure that the relevant specifications are implemented to safeguard the environment during the operational phase. It should be noted that should there be further construction activities taking place, post the Construction Phase, then the specifications of the Construction Phase will still apply.

- **Closure and Decommissioning Phase**

This phase is applicable to any closure, decommissioning or rehabilitation aspects of the project.

5. ENVIRONMENTAL SPECIFICATIONS – PLANNING & DESIGN PHASE

5.1 General Legal Compliance

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. All other licenses, permits and other authorisations must be obtained prior to construction commencing on site.	Project Proponent	Before Construction

5.2 Environmental Authorisation Compliance

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The Environmental Authorisation must be assessed to determine the requirements and to comply with all conditions outlined therein. All professionals, including architects, must familiarize themselves with the Environmental Authorisation conditions and the EMPr.	Project Proponent Consulting Engineer Contractor ECO	Before Construction

5.3 EMPr Compliance

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. This EMPr must be signed by the Main Contractor	Project Proponent	Before Construction
2. An ECO must be appointed for the construction phase.	Project Proponent	Before Construction

6. ENVIRONMENTAL SPECIFICATIONS – CONSTRUCTION PHASE

6.1 Site Camp Establishment and Management

In the event that a site camp is required for this project, the following guidelines must be adhered to for site camp establishment and operation:

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The Contractor shall ensure that the site camp is located in a manner that does not adversely affect the environment and which is easily accessible. It is preferable to have the site camp located in a transformed/previously disturbed area.	Contractor	Before Construction
2. Site camps, laydown areas, stockpile areas, construction material, equipment storage areas, vehicle parking areas, bundled vehicle servicing areas and re-fuelling areas should be located in designated areas of already hardened surface or disturbed areas on site. These areas should preferably be located on level ground in a previously disturbed area of vegetation approved by the Environmental Control Officer (ECO). Cut and fill must be avoided where possible during the set-up of the construction site camp	Contractor ECO	Before Construction
3. Prior to site camp establishment, the Contractor must supply the ECO with a layout plan demarcating the location and physical extent of the site camp including access road, offices, workshops, laydown areas, topsoil stockpile areas, etc. 4. This plan must be approved by the ECO prior to any clearing taking place.	Contractor	Before Construction
4. The Contractor must erect a fence around the site camp and install lockable gates at the entrance.	Contractor	Before Construction
5. The Contractor is to provide sufficient information and emergency signage at the entrance as well as within the site camp.	Contractor	Before Construction
6. Topsoil must be removed and stockpiled from all areas within the site camp that will be used for storage purposes (i.e. sand & stone, pipeline sections, diesel bund, containers etc.).	Contractor	During Site Establishment
7. Topsoil must be stockpiled in such a manner and in such a place that it will not cause damming of water or lead to erosion.	Contractor	During Site Establishment
8. The site camp must be maintained in a clean, orderly and presentable condition at all times.	Contractor	Throughout Construction period

6.2 Construction and Development Footprint

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Prior to work commencing, the contractor must supply the ECO with a layout plan demarcating the location and physical extent of trenching and construction works.	Contractor ECO	Before Construction
2. This plan must be approved by the ECO prior to any clearing taking place.	ECO	Before Construction
3. Portions of the watercourses and their associated buffer areas that are located outside of the demarcated construction footprint must be designated as No-Go areas.	Contractor	Before Construction
4. ECO is to assist the contractor in defining No-Go areas.	ECO	Before Construction
5. In order to avoid unnecessary disturbance, all work areas must be clearly demarcated and work is to be limited to within these work areas.	Contractor	Before Construction
6. Construction vehicles may only be permitted and managed within the demarcated working areas or on existing roads. No-Go areas are to be strictly avoided.	Contractor	Before Construction Throughout Construction Period
7. Construction vehicles, machinery and materials must remain within the project footprint i.e., no parking of cars or storing bricks/sand in intact habitat.	Contractor	Throughout Construction Period
9. The construction zone should be demarcated and the activities that should be implemented to minimise the area of soil disturbance and the potential for mobilisation of sediments from bare areas include: a. Soil stabilisation practices such as sediment blankets and mulching introduced onsite. b. Earth dikes and diversions to direct all storm flows from disturbed areas into silt traps.	Contractor	Throughout Construction Period
10. The width of the working area within freshwater ecosystems should be kept to a minimum (12m) to ensure that impacts on these systems are minimised.	Contractor	Throughout Construction Period
11. During construction works, the topsoil should be removed and stockpiled separately from the underlying sub-soil on either side of the trench.	Contractor	Throughout Construction Period
12. The vegetation should be carefully removed and suitably stored for replanting upon the completion	Contractor	Throughout Construction Period

of the backfilling process.		
13. The excavation should be carried out immediately prior to the laying of the pipeline feature foundations in order to minimise the time during which the trench remains open.	Contractor	Throughout Construction Period
14. Pipe installation should be concluded in the shortest amount of time. It is suggested that short sections are installed at a time and rehabilitated as soon as possible, with indigenous grass species.	Contractor	Throughout Construction Period
15. When digging trenches, topsoil horizons should be stacked separately to lower soil horizons on either side of the trench, and the trench backfilled with lower horizons first and ending with the topsoil layer on top.	Contractor	Throughout Construction Period

6.3 Works within Watercourses

Definition: a "**watercourse**" means -

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, pan, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998(Act No. 36 of 1998); and a reference to a watercourse includes, where relevant, its bed and banks.

"**riparian habitat**" includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Where applicable, disturbed riparian zones (i.e. for those areas that will not form part of the operational footprint but that were disturbed as part of the construction activities) should be re-vegetated using site-appropriate indigenous vegetation.	Contractor	Throughout Construction Period
2. Alien invasive vegetation must be eradicated and not be allowed to colonize the disturbed riparian and in-stream areas.	Contractor	Throughout Construction Period
3. Rehabilitation of disturbed riparian zone must occur during and after completion of construction. An aquatic ecologist must oversee this process.	Contractor	Throughout Construction Period
4. Construction camps must be at least 100m from the edge of the riparian zone.	Contractor	Throughout Construction Period

5. No harvesting of indigenous plants and animals in and adjacent to the construction area is allowed.	Contractor	Throughout Construction Period
6. No stockpile areas should be located within 100m from the edge of the riparian zone.	Contractor	Throughout Construction Period
7. Slope/bank stabilization measures must be implemented where necessary, to prevent erosion during the construction and operational phases.	Contractor	Throughout Construction Period
8. The use of machinery within the riparian zone may lead to compaction of soils & vegetation. This will lead to decreases of infiltration of rainwater, increases in run-off water will limit re-vegetation from taking place. It is thus recommended that all compacted areas that do not form part of the footprint activity be ploughed and landscaped to approximate the natural slope of the area and aerated followed by re-vegetation.	Contractor	Throughout Construction Period
9. Methods used during construction of infrastructure must limit turbidity, sedimentation and chemical changes to the composition of the water.	Contractor	Throughout Construction Period
10. Any disturbance to the riparian zone that can cause undercutting and/or bank slumping must be prevented. Disturbed areas should be rehabilitated.	Contractor	Throughout Construction Period
11. Dumping of excavated material, building materials or removed vegetation within watercourses or their associated buffer areas is prohibited.	Contractor	Throughout Construction Period
12. Avoid the use of infill material or construction material with pollution / leaching potential. Where possible, <i>in situ</i> earthen materials must be used during construction to reduce the risk of leachate from imported materials contaminating the downstream areas.	Contractor	Throughout Construction Period
13. All pipeline alignments that cross a watercourse must be constructed perpendicular to the direction of flow. This is vital to reduce the risk of erosion and scour within the watercourses.	Contractor	Throughout Construction Period

6.4 Plant and Animal Species Protection

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Steep sided drains, gutters, canals, and open pits/trenches must be covered with mesh (5mm x 5mm) to prevent fauna from falling in and getting stuck. No unnecessary structures that may act as pitfall traps for animals may be constructed.	Contractor	Throughout Construction Period
2. No animals are to be harmed or killed during the course of operations.	Contractor	Throughout Construction Period
3. Workers may not snare any faunal species.	Contractor	Throughout Construction Period
4. Speed restrictions for all vehicles using the access	Contractor	Throughout

road must be in place to reduce the potential of faunal mortalities on the project roads ($\leq 40\text{km/h}$ is recommended).		Construction Period
5. Should any slow-moving fauna (e.g. tortoises) be in harm's way during construction, these must be moved to adjacent suitable habitat. The ECO should appoint a member of staff to walk ahead of construction machinery directly prior to vegetation clearance to look for slow moving species.	Contractor	Throughout Construction Period
6. Conduct a search and rescue prior to clearing especially along the edges of streams at stream-crossings and the edges of wetlands where construction is likely to impact the vegetation.	Contractor	Throughout Construction Period
7. Rehabilitate/re-vegetate construction areas with indigenous plant species as soon as possible. Installing small sections at a time will decrease the time that soil is exposed and allow for revegetation as trenches are closed.	Contractor	Throughout Construction Period

6.5 Solid Waste Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The Contractor shall provide sufficient weather and scavenger proof waste bins within the site camp.	Contractor	Throughout Construction Period
2. All refuse stored outside should be contained to one area and bins must be wildlife proof.	Contractor	Throughout Construction Period
3. Litter within the site camp must be picked up on a daily basis.	Contractor	Throughout Construction Period
4. Recycling and waste minimisation practices must be encouraged i.e. separate skips should be available for different recyclable waste.	Contractor	Throughout Construction Period
5. All waste bins shall be regularly emptied and the accumulated waste disposed of at an appropriately permitted waste disposal site. The contractor is to keep documented proof of waste disposal.	Contractor	Throughout Construction Period
6. Any rubble or litter that may have been accidentally deposited into the no-go areas as a result of construction activities must be cleared and dispose of at an appropriate registered facility.	Contractor	Throughout Construction Period
7. The burning or burying of any waste within the site camp is strictly prohibited.	Contractor	Throughout Construction Period

6.6 Hazardous Materials, Fuel and Waste Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. A method statement must be developed indicating how the contractor will minimise the passage of fuel	Contractor	Throughout Construction Period

contaminants into the watercourses. This method statement must be approved by the ECO prior to the commencement of construction activities.		
2. Fuel, chemicals, and other hazardous substances should preferably be stored offsite, or as far away as possible from the watercourses and their associated buffer areas.	Contractor	Throughout Construction Period
3. Hazardous substances must be stored in suitable secure weather-proof containers with impermeable and bunded floors to limit pilferage, spillage into the environment, flooding, or storm damage.	Contractor	Throughout Construction Period
4. All hazardous material must be stored at a dedicated hazardous waste container/containment area.	Contractor	Throughout Construction Period
5. The hazardous waste container/containment area must be maintained in a clean orderly and presentable condition at all times.	Contractor	Throughout Construction Period
6. Diesel storage tanks shall be bunded with a 110% storage volume and the bund is to be fitted with a drainage control valve.	Contractor	Throughout Construction Period
7. The contractor will be required to conduct all routine servicing of machines and equipment within a designated area within the site camp, excluding emergencies.	Contractor	Throughout Construction Period
8. Inspection of all storage facilities, vehicles, and machinery must occur daily for the early detection of deterioration or leaks, and strictly prohibit the use of any vehicles or machinery from which leakage has been detected.	Contractor	Throughout Construction Period
9. The Contractor shall ensure that there are adequate facilities for the handling and storage of used parts, oils, grease, cleaning fluids and fuels.	Contractor	Throughout Construction Period
10. Drip trays are to be placed under plant and vehicles that are parked overnight and must be available for use at the servicing area. The disposal of the contents of drip trays is to be in accordance with relevant hazardous materials disposal requirements.	Contractor	Throughout Construction Period
11. Mixing and transferring of chemicals or hazardous substances must take place outside of the watercourses and their associated buffer areas, and must take place on drip trays, shutter boards or other impermeable surfaces.	Contractor	Throughout Construction Period
12. Hazardous material spill kits must be kept within the site camp and be accessible at all times.	Contractor	Throughout Construction Period
13. Hazardous material spills are to be avoided as far as is practically possible. Where spills occur compromised soil/vegetation should be removed and disposed of in a hazardous waste drum.	Contractor	Throughout Construction Period
14. The Contractor is to record all hazardous material spills in the emergency incidence register.	Contractor	Throughout Construction Period

15. All collected and stored hazardous waste, wash water from cement and other pollutants must be disposed of at a registered waste handling facility for toxic/hazardous materials/chemicals.	Contractor	Throughout Construction Period
16. Receipts from such sites must be kept in the environmental file.	Contractor	Throughout Construction Period
17. Vehicles and machinery should preferably be cleaned off site. Should cleaning be required on site, it must only take place within designated areas outside of the watercourses and their associated buffer areas and should only occur on bunded areas with a water/oil/grease separator.	Contractor	Throughout Construction Period

6.7 Sanitation/Ablutions

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Adequate toilet facilities for men and women are to be provided for at the site camp.	Contractor	Throughout Construction Period
2. Portable toilets where work is being undertaken must be provided (1 toilet per 10 workers). These toilets must be located within an area designated by the ECO outside of the watercourses and their associated buffer areas and should preferably be located on level ground.	Contractor	Throughout Construction Period
3. These toilets are to be maintained and serviced by a reputable service provider.	Contractor	Throughout Construction Period
4. Receipts from the service provider must be kept in the environmental file.	Contractor	Throughout Construction Period
5. Any spills relating to chemical toilets are to be responded to and cleaned up with immediate effect and the contaminated soil and vegetation disposed of as hazardous waste	Contractor	Throughout Construction Period
6. No long drop toilets are permitted on site.	Contractor	Throughout Construction Period

6.8 Fire

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The lighting of fires is strictly forbidden.	Contractor	Throughout Construction Period
2. Smoking may only take place in areas that have been cleared of their vegetation and not near any flammable substances. It is preferable for smoking to take place in a dedicated spot within the site camp.	Contractor	Throughout Construction Period
3. Care must be taken to ensure that completed cigarettes are correctly extinguished.	Contractor	Throughout Construction Period
4. There must be an emergency preparedness plan in	Contractor	Throughout

place in order to fight accidental fires or veld fires. The adjacent landowners/ users/ managers should also be informed or otherwise involved.		Construction Period
---	--	---------------------

6.9 Cultural and Heritage Areas

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. In the event of a grave being disturbed, or artefacts being uncovered, work is to stop immediately and the area must be secured. Under no circumstances is the site to be covered over or efforts made to remove or relocate the remains or the artefacts.	Contractor	Throughout Construction Period
2. Work at the point of the discovery is to cease, and may not recommence until such time as guidance from the ECO has been received. The point of discovery is to be clearly demarcated and no unauthorised entry should be permitted.	ECO Contractor	Throughout Construction Period
3. The ECO is to contact the national/provincial heritage agency or a suitably qualified and recognised specialist for guidance on the way forward.	ECO	Throughout Construction Period
4. Construction managers/ foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.	ECO Contractor	Throughout Construction Period

6.10 Palaeontological Features

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. In the un-likely case of reporting of any unusual sedimentary structures, the Palaeontologist must be notified, and a site visit must be arranged at the earliest possible time with the Palaeontologist. In the case of the site ECO or the Site Manager becoming aware of suspicious looking material that might be a "Significant Find", the excavation must be halted in that specific area and the Project Environmental Manager (PEM) must be informed who will inform the Project Engineer. The Palaeontologist must be given enough time to reach the site and the PEM will request a Site Instruction from the Engineer to allow for removal the material before excavation continues.	Project Proponent Contractor ECO	Throughout Construction Period
2. In the event that the access roads are damaged through construction related activities the contractor will be responsible for repairing the	Contractor	Throughout Construction Period

damage.		
3. All roads in the surrounding area of the construction activities are to remain accessible to other users.	Contractor	Throughout Construction Period
4. Construction personnel will not be allowed to move on any other road or track, other than the established access roads.	Contractor	Throughout Construction Period
5. The contractor is to provide a method statement to the ECO which at a minimum must outline where the access roads will be located with specifications of the track and how it will be rehabilitated.	Contractor	Throughout Construction Period

6.11 External Site Access and Traffic Control

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The Contractor shall be responsible for protecting the public from anything dangerous to persons or property and for the safe and easy passage of pedestrians and vehicular traffic in those areas affected by the works.	Contractor	Throughout Construction Period
2. Heavy vehicle signs within the specifications of the relevant traffic ordinance should be erected at all work areas/construction sites.	Contractor	Throughout Construction Period
3. All drivers of construction vehicles must maintain reasonable speeds at all times in order to avoid accidents, excessive noise and dust.	Contractor	Throughout Construction Period
4. In the event that the access roads are damaged through construction related activities the contractor will be responsible for repairing the damage.	Contractor	Throughout Construction Period
5. All roads in the surrounding area of the construction activities are to remain accessible to other users.	Contractor	Throughout Construction Period
6. Construction personnel will not be allowed to move on any other road or track, other than the established access roads.	Contractor	Throughout Construction Period
7. The contractor is to provide a method statement to the ECO which at a minimum must outline where the access roads will be located with specifications of the track and how it will be rehabilitated.	Contractor	Throughout Construction Period

6.12 Alien Vegetation Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. In terms of the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1984), all declared aliens must be effectively controlled. Landowners and operators are legally responsible for the control of invasive alien plants on their properties or the properties of which they manage. In terms of this Act, 198 were listed as declared	Contractor	Throughout Construction Period

<p>weeds and invaders and ascribed to one of the following categories:</p> <ul style="list-style-type: none"> • Category 1: Prohibited and must be controlled. • Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and steps are taken to prevent their spread. • Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands. 		
<p>2. The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauns and flora. Regulations have been published in Government Notices R. 506, R. 507, R. 508 and R. 509 of 2013, under NEMBA. According to this Act, any species designated under Section 70 cannot be propagated, grown, bought, or sold without a permit. Below is an explanation of the three categories:</p> <ul style="list-style-type: none"> • Category 1a (Prohibited): Listed Invasive Species: A person in control of a Category 1a Listed Invasive Species must comply with the provisions of section 73(2) of the Act; immediately take steps to combat or eradicate listed invasive species in compliance with sections 75(1), (2) and (3) of the Act; and allow an authorised official from the Department to enter onto land to monitor, assist with or implement the combatting or eradication of the listed invasive species. • Category 1b (Prohibited / Exempted if in Possession or Under control): Listed Invasive Species: A person in control of a Category 1 b Listed Invasive Species must control the listed invasive species in compliance with sections 75(1), (2) and (3) of the Act. A person contemplated in sub-regulation (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of the Act. • Category 2 (Permit Required): Listed Invasive Species: Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the 	Contractor	Throughout Construction Period

<p>case may be. A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit. Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1 b Listed Invasive Species and must be managed according to Regulation 3. Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.</p> <ul style="list-style-type: none"> Category 3 (Prohibited): Listed Invasive Species: Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of the Act, as specified in the Notice. Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3. 		
<p>3. A clearing plan for invasive plant species should take place to effectively deal with establishment, re-establishment and complete infestation of invasive alien plants. This includes the following:</p> <ul style="list-style-type: none"> The lighter infested areas should be cleared first to prevent the build of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of aliens are easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep records of which areas are due for follow up clearing. 	Contractor	Throughout Construction Period
4. Different species required different clearing	Contractor	Throughout

methods such as manual, chemical or biological methods or a combination of both. Care should however be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.		Construction Period
5. Fire shall not be used for alien control or vegetation management at the site.	Contractor	Throughout Construction Period
6. Mechanical control of invasive alien plants includes the following: <ul style="list-style-type: none"> • Techniques for mechanical control involve uprooting, felling, slashing, mowing, ringbarking or bark stripping. • This control option is only really feasible in sparse infestations or on small scale, and for controlling species that not coppice after cutting. • Species that tend to coppice, need to have the stumps cut, namely <i>Acacia clyclops</i>, <i>Acacia saligna</i>, and <i>Eucalyptus</i> sp. or coppice growth treated with herbicides following the mechanical treatment. • All stems must be cut as close to ground level as possible, using loppers or chainsaws (depending on size), and stumps must be immediately hand painted with a suitable Tricolpyr herbicide (e.g. Garlon, Timbrel, with colour dye) to prevent resprouting. • Mechanical control is labour intensive and could cause soil disturbance if not done correctly or unsupervised. 	Contractor	Throughout Construction Period
7. Chemical control of invasive alien plants includes the following: <ul style="list-style-type: none"> • Reference to “Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation” to be made for all proposed herbicide applications. • Reference to “Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947” to be made for all proposed herbicide applications. • Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control. • All care must be taken to prevent contamination of any water bodies. This includes die care in storage application, cleaning equipment and disposal of containers, product and spray mixtures. 	Contractor	Throughout Construction Period

<ul style="list-style-type: none"> • Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of at a suitable site. • To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation. • Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation. • The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides. • No herbicide spraying should be undertaken anywhere within natural vegetation, due to the extensive collateral damage. • Any Contractor or subcontractor using herbicides must have a valid Pest Control Operators License. This is regulated by DAFF. 		
<p>8. Biological control of invasive alien plants includes the following:</p> <ul style="list-style-type: none"> • This control method consists of the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. • Biological control agents include insects, mites, and micro-organisms such as fungi or bacterial. • Biological control agents attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers, fruits) or the seeds after they have dropped. • The stress caused by the biological control agent may kill a plant outright or it might impact on the plants reproductive capacity. In many instances the reproductive capacity is reduced to zero and the populations is effectively sterilised. • To obtain biocontrol agents, provincial representatives for the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), DAFF may be contacted. 	Contractor	Throughout Construction Period
<p>9. An alien invasive plant management and control plan should be put in place for duration of the project.</p>	Contractor	Throughout Construction Period
<p>10. The Contractor, during the various construction phases, should ensure that immediate removal of alien invasive species (seedlings) is implemented as these species establish themselves rapidly within disturbed areas. Mechanical removal is preferred and should follow the guidelines above.</p>	Contractor	Throughout Construction Period

11. The effectiveness of vegetation control varies seasonally, and this is also likely to impact alien species. Control early in the wet season will allow species to re-grow and follow up control is likely to be required. Therefore, vegetation control should be aimed at the middle of the wet season, with a follow up event towards at the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.	Contractor	Throughout Construction Period
12. Alien management is an iterative process and it may require repeated control efforts to significantly reduce the abundance of species. Repeated control usually results in rapid decline once seed banks become depleted.	Contractor	Throughout Construction Period
13. Soil stockpiles should not stand for extended periods as these will allow for alien species establishment i.e. pipelines should be trenched, laid and rehabilitated in stages.	Contractor	Throughout Construction Period
14. The ECO or a suitably qualified professional must check the construction footprint and immediately adjacent areas, construction camp, stockpile area and any additional bare areas for alien and invasive species on a weekly basis and any alien and invasive species noted must be immediately removed.	ECO	Throughout Construction Period
15. Alien species removal is to take place manually as far as possible. The use of herbicides should be avoided. However, if necessary, only herbicides which have been certified safe for use in wetlands / aquatic environments by an independent testing authority may be considered. Aerial spraying of herbicides should be strictly prohibited. The DWS / ECO must be consulted in this regard.	Contractor	Throughout Construction Period

6.13 Vegetation Clearing

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Vegetation should remain intact where possible during the construction phase to limit high surface flows and mobilisation of sediment.	Contractor	Throughout Construction Period
2. No burning of vegetation is allowed to take place on site, unless authorised by the Fire Department or Local authority.	Contractor	Throughout Construction Period
3. Stockpiled vegetation must be mulched or removed from site.	Contractor	Throughout Construction Period
4. Areas to be cleared of vegetation will be clearly demarcated before clearing commences.	Contractor	Throughout Construction Period
5. All vegetation within construction footprint must be	Contractor	Throughout

cleared and removed from site. Cleared vegetation must not be dumped into the surrounding watercourses.		Construction Period
6. All alien vegetation within the immediate areas should be cleared to improve ecological functioning.	Contractor	Throughout Construction Period
7. Any seed-bearing alien invasive plants or weeds must be removed from site.	Contractor	Throughout Construction Period
8. Disturbed areas should be rehabilitated as soon as possible after earthworks to minimise erosion and downstream sedimentation.	Contractor	Throughout Construction Period
9. Should site construction occur in a phased manner, then clearing activities should also take place in a phased manner, ahead of construction work in order to minimise erosion risk.	Contractor	Throughout Construction Period
11. No plant harvesting by construction staff is allowed.	Contractor	Throughout Construction Period
12. Clearing of vegetation should be kept to a minimum, keeping to the width and length of the earth works to a minimum and only as required considering the duration of the construction period.	Contractor	Throughout Construction Period

6.14 Topsoil Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. All removed topsoil must be stockpiled in such a manner and in such a place that it will not cause damming of water.	Contractor	Throughout Construction Period
2. All topsoil stockpiles must be protected against wind/soil erosion as well as weeds.	Contractor	Throughout Construction Period
3. Non-woody vegetation such as grasses and forbs should not be removed prior to stripping topsoil from work areas in order to assist in maintaining viability of the soil during storage.	Contractor	Throughout Construction Period
4. Compaction of the topsoil by, <i>inter alia</i> , driving over it is not permitted.	Contractor	Throughout Construction Period
5. Topsoil stockpiles should not exceed 1.5m in height.	Contractor	Throughout Construction Period
6. Topsoil stockpiles should not be located within any of the No-Go areas. The ECO is to approve all stockpile areas prior to stockpiling.	Contractor	Throughout Construction Period
7. Topsoils and subsoils removed from the construction footprint must be stored separately at the designated stockpile area for future rehabilitation.	Contractor	Throughout Construction Period
8. Under no circumstances is stockpiled topsoil to be mixed with any other material (e.g. spoil and building rubble).	Contractor	Throughout Construction Period
9. All topsoil stockpiles should be dampened during dry conditions in order to prevent excessive dust.	Contractor	Throughout Construction Period
10. Once construction activities have been completed in	Contractor	Throughout

areas in which topsoil was removed. The stockpiled soil should be immediately replaced and used for the rehabilitation of the site.		Construction Period
11. The removed topsoil shall be stored on high ground within the footprint outside the 1:50 flood level within demarcated areas.	Contractor	Throughout Construction Period

6.15 Erosion Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The Contractor is responsible for monitoring all areas at which construction related activities have occurred for evidence of rill/sheet erosion.	Contractor	Throughout Construction Period
2. Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.	Contractor	Throughout Construction Period
3. Topsoil must be stripped and stockpiled separately and replaced on completion.	Contractor	Throughout Construction Period
4. Where possible, undertake construction during the dry season.	Contractor	Throughout Construction Period
5. Soil stockpile areas should be located in designated areas of already hardened surface or disturbed areas on site. These areas should preferably be located on level ground in a previously disturbed area of vegetation approved by the Environmental Control Officer (ECO). Stockpile areas must not be located within watercourses or their associated buffer areas.	Contractor	Throughout Construction Period
6. Construction activities should be scheduled to minimise the total amount of soil exposed at any given time.	Contractor	Throughout Construction Period
7. Vegetation should be cleared, and trenches excavated and infilled in a phased approach. As soon as trench excavation is complete, pipelines must be lain, and the trenches backfilled and rehabilitated. Trenches must not stand open for an extended period of time.	Contractor	Throughout Construction Period
8. Install trench breakers at appropriate intervals within the pipeline trenches in order to prevent erosion and wash-out of soils.	Contractor	Throughout Construction Period
8. Implement erosion control measures where required. Examples of erosion control measures include: <ul style="list-style-type: none"> o Covering steep/unstable/erosion prone areas with geotextiles. o Covering areas prone to erosion with brush packing, straw bales, mulch. o Stabilizing cleared/disturbed areas susceptible to erosion with sandbags. 	Contractor	Throughout Construction Period

<ul style="list-style-type: none"> Constructing silt fences / traps in areas prone to erosion, to retain sediment-laden runoff. Silt fences must be adequately maintained. Furthermore, the ECO / site manager must monitor sediment fences / traps after every heavy rainfall event and any sediment that has accumulated must be removed by hand. 		
9. If natural vegetation re-establishment does not occur, a suitable grass must be applied.	Contractor	Throughout Construction Period
10. Installation of retaining walls and other slope stabilising techniques such as reno mattress where slopes are steeper than 1 in 2 must occur.	Contractor	Throughout Construction Period
11. Energy dissipation structures at the discharge point of stormwater channels must be included to prevent scouring.	Contractor	Throughout Construction Period
12. In the event that soil erosion does occur, each case should be managed in as practicable way as possible.	Contractor	Throughout Construction Period
13. All areas along streams and drainage lines that could be impacted upon through trenching and construction activities should be protected against soil erosion.	Contractor	Throughout Construction Period
14. Re-vegetation of disturbed surfaces should occur immediately after the construction activities are completed.	Contractor	Throughout Construction Period
15. In the event of failure to implement timeous erosion control measures, the contractor shall be held financially responsible for the necessary rehabilitation.	Contractor	Throughout Construction Period
16. The site manager / ECO must check the surrounding watercourses as well as the recommended buffer areas for erosion damage and sedimentation weekly and after every heavy rainfall event. Should erosion or sedimentation be noted, immediate corrective measures must be undertaken.	Contractor	Throughout Construction Period
17. Erosion and sediment control measures are to remain in place until construction has been completed and operational storm water management infrastructure is in place and operating correctly.	Contractor	Throughout Construction Period
18. Existing vegetation must be retained as far as possible to minimise erosion problems.	Contractor	Throughout Construction Period

6.16 Stormwater Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. A stormwater management plan must be designed prior to the commencement of construction related activities which details how stormwater runoff from cleared and compacted surfaces will be controlled in order to prevent the erosion and sedimentation of watercourses.	Contractor	Throughout Construction Period
2. Flow dissipaters should be constructed to reduce the velocity of flow which should be released as diffuse as opposed to channelled flow.	Contractor	Throughout Construction Period
5. Examples of measures which can be included in the stormwater management plan are listed below: <ul style="list-style-type: none"> Strategically divert stormwater runoff from the construction footprint into sediment trapping devices. Energy dissipaters can be constructed where stormwater is released in order to reduce the water velocity and therefore erosion. Divert stormwater away from areas susceptible to erosion. Control stormwater runoff from cleared/disturbed areas with sandbags, swales, or berms. Install rows of silt fences on exposed areas of soil to break energy of stormwater runoff and prevent sedimentation. 	Contractor	Throughout Construction Period

6.17 Wet Works/Concrete Mixing

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. A method statement indicating how the contractor will minimise the passage of cement contaminants into the watercourses must be developed. This method statement must be approved by the ECO prior to the commencement of construction activities.	Contractor	Throughout Construction Period
2. All gravel, sand and stone used during construction must be obtained from a bona fide source.	Contractor	Throughout Construction Period
3. Concrete should preferably be imported as “ready-mix” concrete from a local supplier.	Contractor	Throughout Construction Period
4. Should onsite concrete mixing be required it must not be done on exposed soils.	Contractor	Throughout Construction Period
5. Cement/concrete mixing must take place on an appropriately lined or impermeable surface within the construction footprint. The area shall be bunded and sloped towards a sump to contain any spillages of substances.	Contractor	Throughout Construction Period

7. Temporary bunds must be constructed around areas where cement is to be cast <i>in situ</i> .	Contractor	Throughout Construction Period
8. Water contaminated with cement shall not be allowed to enter any natural watercourse or drainage line.	Contractor	Throughout Construction Period
9. Concrete and cement-related mortars should be disposed of in an environmentally sensitive manner (can be toxic to aquatic life). Disposal of any of these waste materials into the stormwater system or watercourses is strictly prohibited.	Contractor	Throughout Construction Period
10. Washout must not be discharged into the watercourses and their associated buffer areas or the stormwater system. A washout area should be designated, and wash water should be treated on-site.	Contractor	Throughout Construction Period
11. Construction waste (i.e. cement bags, litter) must be cleaned up on a daily basis and appropriately disposed of via the solid waste management system.	Contractor	Throughout Construction Period
12. All remaining construction rubble (i.e. concrete spoil, bricks, gravel, sand and stone) must be neatly stockpiled, collected and appropriately disposed of at a spoil site or permitted waste disposal site.	Contractor	Throughout Construction Period
13. Sand, aggregate, cement, or additives used during the mixing process must be contained and covered to prevent contamination of watercourses, the surrounding vegetation and natural rock through wind or water dispersion.	Contractor	Throughout Construction Period
14. All visible remains of excess concrete shall be physically removed on completion of the plaster or concrete pour section and disposed of. Washing the remains into the ground is not acceptable. All excess aggregate shall also be removed and disposed of in an approved landfill site.	Contractor	Throughout Construction Period

6.18 Public Protection

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The Contractor shall be responsible for protecting the public from anything dangerous to persons or property and for the safe and easy passage of pedestrians and vehicular traffic in those areas affected by the Works.	Contractor	Throughout Construction Period
2. Any excavation, material dumps, spoil dumps or other obstructions likely to cause injury to any persons or thing shall be suitably barricaded.	Contractor	Throughout Construction Period
3. The Contractor's staff shall in no way be a nuisance to residents in the vicinity of construction activities. Any work in public places shall be adequately barricaded and steps shall be taken to minimise the disruptive effects of construction.	Contractor	Throughout Construction Period
4. Any complaints received by the Engineer will be addressed and the relevant persons will face suspension from the project.	Contractor	Throughout Construction Period
5. No construction activities may take place during the night (sunset-sunrise).	Contractor	Throughout Construction Period

6.19 Existing Services

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The Contractor shall ensure that existing services, (i.e. road, pipelines, power lines and telephone services) are not damaged or disrupted unless required by the Contract and then they shall only take place with the permission of the Engineer.	Contractor	Throughout Construction Period
2. The Contractor will be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted.	Contractor	Throughout Construction Period
3. Such repair or reinstatement will be to the Contractor's cost and shall receive top priority over all other activities. A time limit may be stipulated by the Consulting Engineer.	Contractor	Throughout Construction Period

6.20 Dust Control

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. The Contractor is responsible for controlling nuisance dust that is created through construction and installation activities.	Contractor	Throughout Construction Period
2. Control of dust may involve spraying with water. The quantities of water used should not be large enough or applied with sufficient force to generate	Contractor	Throughout Construction Period

run off which could result in soil erosion.		
3. Dust suppression measures must be implemented in the dry and/or windy months. Where feasible, laydown areas must be placed in previously disturbed areas.	Contractor	Throughout Construction Period
4. Excavated soil that is not being utilised for rehabilitation must be removed from site or covered. Unused soil must be removed from site once construction is complete.	Contractor	Throughout Construction Period
5. Reference must be made to the National Dust Control Regulations, 2013, in terms of section 53 (o), read with section 32 of the National Environmental Management: Air Quality Act, 2004 (Act no. 39 of 2004) with regards to acceptable dust fall standards, applicable monitoring requirements deliverables should this be required.	Contractor	Throughout Construction Period

6.21 Noise Control

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Noise levels are to be kept within reasonable norms as determined by the CE, taking into account the context of the site location.	Contractor	Throughout Construction Period
2. All machinery, vehicles and earth moving equipment must be maintained and the noise these create must meet industry minimum standards. e.g. the sound generated by a machine must be below a certain decibel as prescribed in the relevant noise control regulations.	Contractor	Throughout Construction Period
3. Silencers on all machinery and vehicles must be well maintained.	Contractor	Throughout Construction Period
4. The Contractor shall inform residents of any excessive noise that is anticipated due to construction activities, for example blasting for excavation. This notice shall be given at least 3 days before the event generating higher noise levels.	Contractor	Throughout Construction Period
5. All work that needs to be undertaken in the vicinity of private residences or public places should be carried out at between 07:00 and 17:00.	Contractor	Throughout Construction Period

6.22 Hazardous Waste Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Drip trays are to be placed under plant and vehicles that are parked overnight. The disposal of the contents of drip trays is to be in accordance with relevant hazardous materials disposal requirements.	Contractor	Throughout Construction Period
2. Hazardous material spills are to be avoided as far as	Contractor	Throughout

is practically possible. Where spills occur compromised soil/vegetation should be removed and disposed of in a hazardous waste drum.		Construction Period
3. The Contractor is to record all hazardous material spills in the emergency incidence register.	Contractor	Throughout Construction Period
4. All collected and stored hazardous waste must be disposed of at a registered waste handling facility for toxic/hazardous materials/chemicals.	Contractor	Throughout Construction Period
5. Receipts from such sites must be kept in the environmental file.	Contractor	Throughout Construction Period

6.23 Rehabilitation & Landscaping

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts associated with the activity whilst maximizing the future utilization of the site. Significant aspects to be borne in mind in this regard is visibility of the disturbance footprint, revegetation of the footprint, erosion, stability and environmental risk. The immediate area of the workings must also be free of alien vegetation.

Additional broad rehabilitation strategies / objectives include the following:

- Rehabilitating the worked-out areas to take place concurrently within prescribed framework established in the EMP.
- All infrastructure, equipment, plant and other items used during the construction period will be removed from the site.
- Waste material of any description, including scrap, rubble and tyres, will be removed entirely from the site and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
- Final rehabilitation shall be completed within a period specified by the Engineer.
- A suitable after care period may be required for a period specified by the Engineer.

Topsoil and Subsoil Replacement

Topsoil and subsoil will be stripped separately from the work area. The topsoil and subsoil removed from the initial cut will be stockpiled separately and only used in rehabilitation work towards the end of the operation. This is in contrast to the gravel activity where rehabilitation and topsoil replacement was earmarked at the completion of each phase.

Stripped overburden will be backfilled into the worked out areas where needed. Stripped topsoil will be spread over the re-profiled areas to an adequate depth to encourage plant regrowth. The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.

The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The top-soiled surface will be left fairly rough to enhance seedling establishment, reduce water runoff and increase infiltration.

Revegetation

All prepared surfaces will be seeded with suitable grass species to provide an initial ground cover and stabilize the soil surface. The following grass seed mix, that is commonly available and suitable is recommended:

Botanical name	Common name	Approx seed mixture /Ha
<i>Cynodon dactylon</i>	Kweek	12 kg/ Ha
<i>Eragrostis curvula</i>	Weeping Love Grass	6 kg/ Ha
<i>Eragrostis tef</i>	Teff	2 kg/ Ha
<i>Digitaria eriantha</i>	Smuts Grass	4 kg/ Ha
Other indigenous veld grasses can be added to the seed mix		± 4 kg/Ha

The overall revegetation plan will, therefore, be as follows:

- Ameliorate the aesthetic impact of the site
- Stabilise disturbed soil and rock faces
- Minimize surface erosion and consequent siltation of natural water course located on site
- Control wind-blown dust problems
- Enhance the physical properties of the soil
- Re-establish nutrient cycling
- Re-establish a stable ecological system

Every effort must be made to avoid unnecessary disturbance of the natural vegetation during operations.

Drainage and Erosion Control

To control the drainage and erosion at site the following procedures will be adopted:

- Areas where construction is completed should be rehabilitated immediately.
- Areas to be disturbed in future activities will be kept as small as possible (i.e. conducting the operations in phases), thereby limiting the scale of erosion.
- Slopes will be profiled to ensure that they are not subjected to excessive erosion but capable of drainage runoff with minimum risk of scour (maximum 1:3 gradient).
- All existing disturbed areas will be re-vegetated to control erosion and sedimentation
- Existing vegetation will be retained as far as possible to minimize erosion problems.

Visual Impacts Amelioration

The overall visual impact of the proposed activities will be minimised by the following mitigating measures:

- Confining the footprint to an area as small as possible
- Re-topsoiling and vegetating all disturbed areas

As construction is completed for each project component, rehabilitation must begin (i.e. do not wait for the whole project to be complete before rehabilitation begins). The natural rocks that have been removed must be used and positioned to recreate micro-habitats for the re-establishment of fauna and flora. Temporary construction areas must be revegetated with indigenous grasses (e.g. *Themeda triandra*) to stabilise the soil.

6.24 Close Out of Site Camp

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. All structures comprising the construction camp are to be removed from site.	Contractor	Post Construction
2. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc., and these shall be cleaned up and contaminants disposed of appropriately.	Contractor	Post Construction
3. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and re-grassed.	Contractor	Post Construction

7. ENVIRONMENTAL SPECIFICATIONS – OPERATION PHASE

7.1 Erosion Impact Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Erosion control measures must be implemented in vulnerable areas and maintained accordingly.	Project Proponent	Continuous

7.2 Stormwater Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. All stormwater and drains etc. must be kept free of silt and debris.	Project Proponent	Continuous

7.3 Infrastructure Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. A leak detection system should be incorporated into the design of the pipelines such that any leaks are detected and dealt with expediently.	Project Proponent	Continuous
2. Correct and continuous maintenance of infrastructure is essential for their continued functionality.	Project Proponent	Continuous

7.4 Invasive Alien Species Management

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Regular invasive species control is required, as per section 6.12.	Project Proponent	Regularly. Continuous
2. Alien and invasive plant species must be monitored and eradicated during construction and must be ongoing for at least 6 months post-construction.	Project Proponent	Regularly. Continuous

8. ENVIRONMENTAL SPECIFICATIONS – DECOMMISSIONING PHASE

8.1 Rehabilitation

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Should at any time, any aspect of the activity be closed or decommissioned, all building rubble must be removed off site and the disturbed site must be rehabilitated to a condition with suitable vegetation cover that is the same or better than the surrounding natural environment.	Project Proponent	Decommissioning of any facet of the development
2. After construction is completed, rehabilitate all areas no longer required for operational phase to a state like the local indigenous character of the area and ensure animals can move through and around new infrastructure areas unencumbered.	Project Proponent	Decommissioning of any facet of the development
3. No additional activity/development is allowed outside that approved in the EMPr.	Project Proponent	Decommissioning of any facet of the development
4. Area must be regularly monitored and rehabilitated as needed and ecological connectivity always maintained.	Project Proponent	Decommissioning of any facet of the development

8.2 Alien Vegetation

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. All aliens on the site must be removed and a plan must be put in place to regularly remove seedlings in the undeveloped open spaces until natural vegetation has been re-established.	Project Proponent	Decommissioning of any facet of the development

8.3 Planting of Vegetation

MANAGEMENT MEASURES	RESPONSIBILITY	TIME FRAMES
1. Only plant species that are indigenous to the area and are sourced locally to maintain genetic similarity are to be used in rehabilitation/landscaping activities.	Project Proponent	Decommissioning of any facet of the development
2. A separate rehabilitation plan must be formulated for the decommissioning phase, if applicable at all.	Project Proponent	Decommissioning of any facet of the development

9. COMPLIANCE

9.1 Work Stoppage

1. The ECO shall have the right to order work to be stopped in the event of significant infringements of the Project Environmental Specifications, until the situation is rectified in compliance with the specifications. In the event of this happening the Contractor shall not be entitled to claim for delays.

9.2 Monitoring and Auditing

1. A monitoring programme should be implemented for the duration of the construction.
2. The project proponent must appoint a suitably qualified (Environmental Qualification) individual to be assigned as the Environmental Control Officer.
3. The monitoring programme, undertaken by the Environmental Control Officer, will include the following:
 - The ECO must visit the construction site in order to monitor the project's performance in relation to the Environmental Specifications on at least a **monthly basis** during construction period.
 - After each inspection a report will be prepared for the Proponent and incorporated into the monthly site meeting minutes. The ECO must record any issues of non-compliance and recommend corrective actions and action on these recommendations. These are to be submitted to the Project Proponent, Consulting Engineer and main Contractor.
 - The ECO is to make recommendations in order for the contractor to achieve compliance (corrective actions).
 - During site visits the ECO is to look out for any other incidental environmental issues not covered by this EMPr.
 - From time to time throughout the construction phase, the ECO will conduct audits of the project and compile an audit report which will be submitted to the Competent Authority.
 - The ECO must undertake a detailed post construction phase compliance audit after completion of the relevant phase. This audit report should be submitted to the Competent Authority.

9.3 Non-Compliance

1. Any non-compliance items issued to the Contractor shall be rectified immediately.
2. Any complaints received regarding activities on the construction site relating to the environment shall be recorded in a specific register and the response noted with the date and action taken.
3. The ECO is to monitor these complaints and follow up if a response/ action has not yet been provided.
4. The Contractor is deemed not to have complied with the EMPr if, *inter alia*:

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction site, site extensions and roads- i.e. construction footprint;
- There is contravention of the EMPr specifications which relate to activities outside the boundaries of the construction site.
- Environmental damage as a result of negligence;
- Construction activities that take place outside of the demarcated development footprint;
- The Contractor fails to comply with corrective or other instructions issued by the Engineer within a specific time period.

9.4 Penalties

1. Should failure to comply with any of the environmental specification contained and a result, environmental damage occurs, the project proponent and/or the Contractor shall be liable.
2. Examples of violations that warrant the need for penalties are the following:
 - Hazardous chemical/oil spill and/or dumping in non-approved sites.
 - Damage to sensitive environments.
 - Damage to cultural and historical sites.
 - Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
 - Uncontrolled/unmanaged erosion.
 - Unauthorised blasting activities (if applicable).
 - Pollution of water sources.

The table below provides a guideline for penalties and fines for transgressions or resultant environmental damage.

TRANSGRESSION OR ENVIRONMENTAL DAMAGE	<u>MIN</u> <u>FINE</u>	<u>MAX</u> <u>FINE</u>
Failure to comply with prescriptions regarding ECO appointment and monitoring of EMPr/ Environmental Specifications	R1 000	R2 000
Failure to comply with prescriptions regarding environmental awareness training	R2 000	R10 000
Failure to rectify ongoing non-compliances addressed by the ECO in prior audit reports	R 2 500	R 10 000
Failure to comply with prescriptions regarding method statements	R1 000	R2 000
Failure to report environmental damage or EMPr/ Environmental Specifications transgressions to the ECO or Project Manager/ Agent/ Resident Engineer	R1 000	R2 000
Failure to carry out instructions of the ECO regarding the environment of the EMPr/ Environmental Specifications	R1 000	R2 000
Failure to comply with prescriptions regarding a complaints register	R1 000	R2 000
Failure to comply with prescriptions regarding site demarcation and enforcement of “no go” areas	R2 000	R10 000

Failure to comply with prescriptions regarding site clearing	R2 000	R10 000
Failure to comply with prescribed administration, storage or handling of hazardous substances	R1 000	R2 000
Failure to comply with prescriptions regarding equipment maintenance and storage	R1 000	R2 000
Failure to comply with fuel storage, refuelling, or clean-up prescriptions	R1 000	R2 000
Failure to comply with prescriptions regarding procedures for emergencies (spillages and fires)	R2 000	R10 000
Failure to comply with prescriptions regarding construction camp	R2 000	R10 000
Failure to comply with prescriptions for the use of ablution facilities	R1 000	R2 000
Failure to comply with prescriptions regarding water provision	R1 000	R2 000
Failure to comply with prescriptions for the use of designated eating areas, heating source for cooking or presence of fire extinguishers	R1 000	R2 000
Failure to comply with prescriptions regarding fire control	R2 000	R10 000
Failure to comply with prescriptions for solid waste management	R2 000	R10 000
Failure to comply with prescriptions to prevent water pollution and sedimentation	R2 000	R10 000
Failure to comply with prescriptions to the protection of natural features, flora, fauna and archaeology	R2 000	R10 000
Failure to comply with prescriptions regarding speed limits	R1 000	R2 000
Failure to comply with prescriptions regarding noise levels of construction activity	R2 000	R10 000
Failure to comply with prescriptions regarding working hours	R2 000	R10 000
Failure to comply with prescriptions regarding aesthetics	R1 000	R2 000
Failure to comply with prescriptions regarding dust control	R1 000	R2 000
Failure to comply with prescriptions regarding security and access onto private property	R1 000	R2 000

9.5 Incident Reporting and Remedial Measures

- Should a major incident event, such as a major leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident.
- The following information must be provided to the relevant emergency services and documented in an incident report for rectification and follow up:
 - the location;
 - the nature of the load;
 - the extent of the impact; and
 - the status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire)
 - Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time.
 - Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences.

10. DETAILS OF AUTHORS

10.1 Indwe Environmental Consulting

Indwe Environmental Consulting CC is a registered environmental consultancy that specialises in all facets of environmental management. Our focus is on project based environmental studies. Broadly, the services offered are Basic Assessments, full Scoping and Environmental Impact Assessments; Strategic Environmental studies (State of the Environment Reporting, Strategic Environmental Assessments, and Environmental Management Frameworks) and integrated waste management planning. Through strategic partnerships with other emerging consultancies we offer specialist environmental services throughout the Eastern Cape and abroad.

The Indwe Environmental team is headed up and overseen by Brendon Steytler and Megan Hugo. Together they have a vast amount of experience in the environmental consulting industry of South Africa. Brendon Steytler was the founding member of Indwe Environmental Consulting in 2010 and has been instrumental in growing the company into the trusted and quality driven organisation that it is today.

10.2 Expertise

Project Team:

Megan Hugo

Megan started working as an Environmental Consultant in February 2015 following the completion of her Honours degree in Environmental Science at Rhodes University in Makhanda (formerly Grahamstown). Prior to this she completed a Bachelor of Science degree, also at Rhodes University, with Zoology and Environmental Science as her majors. Megan has completed accredited courses in environmental impact assessments and ISO 14001.

Megan joined Indwe Environmental Consulting in September 2017 and was made a main member of the company in April 2018. Megan is a Registered Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (Reg. No 2019/1530). She is also registered with the South African Council for Natural Scientific Professions (Reg. No. 118810) and an active paid-up member of the International Association of Impact Assessment (IAIA) South Africa.







Megan is responsible for all company related operations and financial management as well as acquiring new projects at Indwe Environmental Consulting. Megan has gained experience in all aspects of Integrated Environmental Management (Full Scoping and Environmental Impact Assessments, Basic Assessments, Mining Permitting, Auditing, Strategic Environmental Planning), Ecological Reporting, Water Use related approvals through DWS, and General Project Management. Additionally, Megan is well versed in permitting requirements relating to ToPS, PNCO and NFA legislation. Example of fields in which Megan was the project manager and lead report writer include large public infrastructure projects (e.g. Regional Water Supply Schemes, Overhead Powerlines, National Road upgrades), private commercial and residential developments, small and large agricultural projects, mixed use developments, renewable energy projects, large scale public and








private in stream and off stream storage dams and rehabilitation of coastal and terrestrial related environments.

Megan's key skills include her knowledge and experience in South African policy and legislation relating to development, particularly in the Eastern Cape province. Her 11-year presence in the industry has provided much insight and experience into project, technical and financial management.

Megan held the position of Registered EAP.

11. APPENDIX A – PROPOSED ENVIRONMENTAL AWARENESS EDUCATION COURSE GUIDELINE

SYMBOL	SITE ASPECT	SYMBOL	SITE ASPECT
	<p><u>WORKING AREAS</u></p> <p>Workers and equipment must stay inside the site boundaries at all times</p> <p>Do not enter the 'no-go' areas</p> <p>Respect the privacy of all residents</p>		<p><u>PLANTS & ANIMALS</u></p> <p>Do not kill or injure animals</p> <p>Ask the site agent / foreman to remove nuisance animals</p> <p>Alert the site agent / foreman of DANGEROUS animals</p>
	<p><u>FIRE</u></p> <p>No fires without permission</p> <p>Do not burn rubbish</p> <p>Know procedures and locations of fire-fighting equipment</p>		<p><u>NOISE</u></p> <p>Do not make loud noises around site</p> <p>Know site working hours</p> <p>Report noisy equipment</p>
	<p><u>SMOKING</u></p> <p>Put cigarette butts in dustbin</p> <p>No smoking near paint, petrol or gas</p>		<p><u>TRANSPORT</u></p> <p>Always keep to the speed limit</p> <p>Use approved entry and exit points</p>

	No smoking outside the site camp		Report leaks, spills No overloading
	<u>HAZARDOUS SUBSTANCES</u> Work with petrol, diesel and oil in marked areas Use drip trays and protective clothing Report any spills	 Do not litter	<u>RUBBISH</u> Do not litter Use dustbins with sealable lids Report full bins
	<u>PLANTS</u> Do not damage trees, grass or plants Do not pick flowers		<u>TOILETS</u> Use toilets provided Report damage leaks
	<u>EATING</u> No cooking of food on site Only eat in demarcated areas Use dustbins with sealable lids close to eating area		<u>FINES AND PENALTIES</u> Spot fines will apply Removal from site Construction stopped

	<p><u>EMERGENCY NUMBERS</u></p> <p>Know all emergency numbers</p> <p>Report all emergencies to site agent / foreman / ECO</p>		<p><u>DUST CONTROL</u></p> <p>Apply dust suppression measures</p> <p>Report complaints from public to site agent / foreman / ECO</p>
	<p><u>SAFETY</u></p> <p>No public access to site</p> <p>Wear PPE</p> <p>Ensure roadworthiness of all vehicles</p>		<p><u>HEALTH</u></p> <p>HIV/AIDs and STD awareness</p> <p>Sick staff must report to the site agent / foreman</p> <p>All staff in contact with stormwater runoff to regularly wash their hands and arms, especially before meals</p>
	<p><u>ACCIDENTS</u></p> <p>Inform the site and safety manager immediately</p> <p>Open excavation / dangerous areas must be demarcated with hazard tape</p>		<p><u>DISTURBED AREAS</u></p> <p>Must be restored to pre-activity state</p> <p>No burying of material</p>
	<p><u>CEMENT OPERATIONS</u></p> <p>Take place in designated area</p> <p>No batching directly on the soil</p>		<p><u>STOCKPILE SITES AND SURPLUS MATERIAL</u></p> <p>Stockpiles must have stabilized sloped</p>

	<p>All dirty water contained and reused</p> <p>Solid residue disposed as waste</p>		<p>No burning of surplus plant material</p>
--	--	---	--

12. APPENDIX B – METHOD STATEMENT EXAMPLE

METHOD STATEMENT

Organisation:

.....

Date:

Contract:

Author:

Reviewer:

PROPOSED ACTIVITY

Provide the title of activity that and reference number from the EMPr.

.....

WHAT WORKS ARE TO BE UNDERTAKEN

Provide a brief description of the works to be undertaken.

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

WHERE IS THE ACTIVITY GOING TO BE UNDERTAKEN

Provide a full description of the extent of works, and if possible, an annotated plan.

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

START DATE:

END DATE:

HOW ARE WORKS GOING TO BE UNDERTAKEN

Space available below for an annotated sketch of the process.

METHOD STATEMENT REVIEW AND APPROVALS

Environmental Control Officer (ECO)

The information provided in the Method Statement is deemed satisfactory, provided the methodology is followed effectively.

Signed:

ECO Name:

Date:

PERSON UNDERTAKING THE WORKS (I.E. FOREMAN, MAIN CONTRACTOR, SUB-CONTRACTOR)

The contents of the Method Statement are duly noted and the activity will be carried out according the specifications outlined above.

Signed:

Name:

Date: