

1.1 Project Owner

The details of the project owner are as per Table1-1

Table1-1: Project Owner/Manager

Name of Owner	Department of Transport
Contact Person	Mrs Khumbu Sibiya
Postal Address	172 Burger Street, Pietermaritzburg
Telephone Number	0333550594
Mobile Number	0798713983
Fax	033-345 7537
Email	Khumbu.Sibiya@kzntransport.gov.za

1.2 (Contractor To be appointed)

1.3 Isolendalo Environmental Consulting was appointed by VNA Consulting Engineers as an Independent Environmental Assessment Practitioner (EAP) to compile the EMP

Table 1-2: Environmental Assessment Practitioner

Name of Consultancy	Isolendalo Environmental Consulting
Contact Person	Welcome Nogobela
Postal Address	P. O. BOX 1503, Manaba Beach, 4276
Telephone Number	(039) 315 0437
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1.2.1 Expertise of the EAP to prepare EMP

EAP	Firm	QUALIFICATIONS	Experience
Welcome Nogobela	Isolendalo Environmental Consulting	B.Environmental Sc, Hons Environ Sc	15 Years

EXECUTIVE SUMMARY

This EMPr is developed as a necessary tool for mitigation measures through environmental monitoring plans and institutional measures to be implemented during construction. This project is aimed and providing a road access to all communities as specified in the scope of work by VNA Consulting Engineers. Therefore, this document aims to be a guideline document for construction of causeway and upgrade of road. This EMPr will aim to provide feedback for continual improvement in environmental performance as well as to serve as a framework for the acceptable implementation of environmental and social initiatives. The EMPr was compiled after a comparative assessment was carried out of published EMPr's, whilst site-specific conditions and new information that has come to light were also incorporated.

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ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

1. INTRODUCTION

Department of Transport (KZN) through their processes has identified the need to construct a causeway linking the communities on both sides of the Emoyeni River within Imbabazane Local Municipality. The Emoyeni causeway is due for construction on road D1238 (km 3.3) as well as upgrading gravel road to D1238 (km 3.1 to km 6.7), in the Uthukela District (DC 23).

As such DoT is proposing the following activities:

The demolishing and replacing of the existing structure and upgrading the road 3.6km of D1238 which will ultimately tie in to the causeway bridge to form a crucial link between D1238 and D1239 which links back to the provincial roads P331, P10-1 and P212 via D214. The specifications of the construction of the causeway is as follows:

- Total length – 22.950 m (which includes 6m of approaching slab – 3m each side)
- Total cells – 9 x 1.5 m x 1.5 m
- Width – 10.980 m
- Development footprint – 251.991 m²

The proposed road upgrade is identified as an activity that may have major negative impacts on the environment if not monitored. As a result the Environmental Management Programme (EMPr) is developed with the intention to define environmental measures and procedures to prevent, minimize and mitigate adverse impacts and to ensure compliance with applicable environmental standards during both construction and operation of the road.

The proposed development is identified as an activity that may have major negative impacts on the environment. As per EIA Regulation, 2014 and National Environmental Management Act (NEMA) as amended, prescribed a principle of “Duty of Care and Remediation”, the Environmental Management Programme (EMPr) is developed with the intention to define environmental measures and procedures to prevent, minimize and mitigate adverse impacts and to ensure compliance with applicable environmental standards during both construction and operation of the road.

The EMPr is compiled a comparative assessment was carried out of published EMPr's, whilst site-specific conditions and new information that has come to light were also incorporated.

This EMPr is developed as a necessity tool for mitigation measures through environmental monitoring plan and institutional measures to be implemented during construction. Therefore, this document aims to be a guideline document for the construction of the causeway and gravel extension. This project is aimed and providing a road access to all communities as specified in the scope of work by VNA Consulting Engineers.

1.4 Project Owner

The details of the project owner are as per Table1-1

Table1-1: Project Owner/Manager

Name of Owner	Department of Transport
Contact Person	Mrs Khumbu Sibiya
Postal Address	172 Burger Street, Pietermaritzburg
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EAP	Firm	QUALIFICATIONS	Experience
Welcome Nogobela	Isolendalo Environmental Consulting	B.Environmental Sc, Hons Environ Sc	15 Years

1.3 Environmental Authority

Table1-3 indicates the contact details of the Environmental Authority responsible for monitoring the implementation of the EMPr.

Table1-3: Environmental

Name of Authority	Department of Economic Development, Tourism and Environmental Affairs
Contact Person	Mrs Lungile Mkhize-Langa
Telephone number	(034) 299 9679
Mobile number	073 652 2210
Fax number	(034) 299 9674
Email	Lungile.Mkhize@kzndard.gov.za

2. THE ENVIRONMENTAL PROCESS

In accordance with the Integrated Environmental Management Guidelines published by the Department of Environmental Affairs & Tourism (DEAT) in 1992, the purpose of an Environmental Management Programme (EMPr) is “to describe how negative environmental impacts will be managed, rehabilitated or monitored and how positive impacts will be maximised”. It is a detailed plan of action prepared to organise and coordinate environmental mitigation, rehabilitation and monitoring so that positive impacts are enhanced, and negative impacts and damage to the environment are avoided, minimised or rectified where required.

The objectives of the EMPr are to:

- Provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site.
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the safety recommendations are complied with.

This EMPr, which forms an integral part of the contract documents, informs the land owner as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction and operational activities associated with the project. This is to include any rehabilitation and landscape work which is needed during the post-construction and which would be carried out by the contractor or specialist subcontractor who may be appointed to do such rehabilitation work. The provisions of the EMPr are binding on the Contractor during the contract period and the landowner in the operational phase.

Any environmental issues that are identified during or after construction will be addressed in consultation with the environmental consultant. As such it should be viewed as a dynamic document that may require updating or revision where necessary.

All activities and earthworks associated with construction and reticulation of services will be undertaken in accordance with SABS 1200 standards, which deal with guidelines for civil engineering and general construction works.

3. LEGISLATION

Environmental legislation applicable to the formulation of an EMPr includes but is not restricted to the following:

- Atmospheric Pollution Prevention Act (Act No. 45 of 1965)
- Environment Conservation Act (Act No. 73 of 1989)
- National Environment Management Act (Act No. 107 of 1998)
- Integrated Management Act (IEM)
- National Water Act (Act No. 36 of 1998)
- National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004).
- The National Heritage Resources Act (Act No 25 of 1999 as amended)
- Development Facilitation Act (Act No 67 of 1995).
- National Environmental Management; Biodiversity Act, 2004 (Act 10 of 2004).
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
- South African Constitution Act (Act No. 107 of 1998), including the Bill of Rights (Chapter 2, Section 24).
- In terms of the above, all regulations framed there under and amendments there to.
- The relevant Municipal Bylaws.

4. PARTIES INVOLVED

Project Manager / Engineer (PM / E)

The Project Manager / Engineer is the administrator of the project acting as an agent of the main line department (DAEA). The engineer is responsible for all direct communication with the contractor.

Contractor (CT)

This refers to the main contractor(s) appointed by the client for the construction of the Project, or portion of the Project. The main contractor(s) are required to adhere to the EMPr and are responsible to ensure that all sub-contractors, suppliers and staff appointed by them also adhere to the EMPr.

All Staff

All workers employed by the contractor or developer, persons involved with activities related to the project, or persons present or visiting the construction area, including permanent, contract, or casual labour and informal traders.

Environmental Control Officer (ECO)

An individual nominated by the developer to act on behalf of a Contractor in matters concerning the day-to-day implementation of the EMPr, and for liaison with the DAEA, Municipality, EKZNW and DWAF and the public and owners or managers of properties affected by construction.

EDTEA

The Compliance Officer appointed by the KZN Department of Economic Development, Tourism and Environmental Affairs to this project.

Local Community

People residing or present in the region and near the construction activities, including the owners and/or managers of land affected by construction, workers on the land, and people in nearby towns and villages.

Public

Any individual or group concerned with or affected by the Project and its consequences, including the local community, local, regional, and national authorities, investors, workforce, customers, consumers, environmental interest groups, and the general public.

Environmental Control Officer / Monitoring

An Environmental Control Officer (ECO) must be appointed in terms of Section 34 (b) and (d) of GN R. 544 of December 2010, who will inspect this development on a regular basis during the construction and rehabilitation phases, and will advise EDTEA and anyone acting in accordance with the Record of Decision (e.g. developers, contractors etc.). In addition, anyone acting in accordance with the Record of Decision (e.g. developers, contractors etc.) would have to comply with the EMPr. Furthermore anyone acting in accordance with the Record of Decision (e.g. developers, contractors etc.) would need to sign an acknowledgement form, which will form part of the contractual agreements between individuals acting in accordance with the Record of Decision (e.g. developers) and the contractors to ensure compliance with the conditions and requirements of the EMPr.

5. PROJECT DETAILS

5.1 Location and Development parameters

Please refer to scope of work document by the Engineer attached.

6. RECORD KEEPING

Copies of any Authorisation or EMPr required for specific construction activities shall be kept on site and made available for inspection by visiting officials from the employer or relevant environmental departments.

The Project Manager will monitor the Contractor's adherence to the approved impact prevention procedures and shall issue the Contractor a notice of non-compliance whenever transgressions are observed. The Contractor must document the nature and magnitude of any non-compliance in a designated register, the action taken to correct the non-conformance, the actions taken to mitigate its effects and the results of those actions. Any non-conformance shall be documented and reported to the Project Manager in a monthly report.

The Contractor shall also record all complaints received regarding activities on the construction site pertaining to the environment, and the response noted with the date and the action taken. These records shall also be submitted to the Project Manager in the monthly report.

7. COMPLIANCE AND PENALTIES

The duration over which the Contractor's controls shall be in place cover the construction period of the project as well as the limited time after the contract completion in the General Conditions of Contract, and the project specifications, as the defects liability period.

The landowner/contractor is deemed not to have complied with the EMPr if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;
- Environmental damage occurs due to negligence;
- The contractor fails to comply with corrective or other instructions issued by the Project Manager or Engineer or Environmental Control Officer within a specified time frame;
- The contractor fails to respond adequately to complaints from the public or local community

The Contractor shall act immediately after a notice of non-compliance is received, and correct the cause for the issuing of the notice. Application of a penalty clause will apply for incidents of non-compliance. The penalties imposed per incident or violation will be as follows:

Incident / Violation	Penalty
Failure to stockpile material correctly	R 1 000
Pollution of water bodies	R 5 000
Failure to control Stormwater runoff	R 1 500
Failure to provide adequate sanitation	R 5 000
Unauthorised clearing / removal of vegetation	R 5 000
Failure to provide adequate waste disposal facilities and services	R 15 000
Failure to reinstate disturbed areas within specified time period	R 3 000
Failure to rehabilitate disturbed areas within 3 months of completion	R 5 000
Any other contravention of the environmental specification	R 1 000

The imposition of such a penalty shall not preclude the relevant provincial authority from applying an additional penalty in accordance with statutory powers.

Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as deemed fit. The polluter-pays principle applies.

The “polluter-pays” principle provides that “the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment. NEMA imposes a duty of care on every person who causes, has caused or may cause significant pollution or degradation of the environment is authorised by law or cannot reasonably be avoided, NEMA requires that the pollution must be minimised and rectified.

Furthermore NEMA makes provision for damages to be awarded by the courts where loss or damage has occurred as a result of a contravention of certain environmental statutes. For example, offences under the National Water Act No. 36 of 1965 and the Environmental Conservation Act No. 73 of 1989 may result in penalties being imposed in terms of NEMA. Importantly, NEMA provides for the liability on conviction of employees, managers, agents and directors for any offences resulting from the failure to take all the reasonable steps that were necessary under the circumstances to prevent the commission of an offence.

8. AMENDMENTS TO THE EMPR

Any major issues not covered in the EMPr as submitted, will be addressed as addend to this EMPr, and submitted for approval prior to completion.

The EMPr is a living document and is subject to change from time to time in consultation with EDTEA. Any amendments to the EMPr will require approval from EDTEA. A confirmation letter from EDTEA approving the amendments to the EMPr will be attached as addenda.

9. ENFORCING THE EMPr

The Contractor and the landowner have a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, etc.). The EMPr shall be part of the terms of reference for all contractors, sub-contractors and suppliers. All contractors, sub-contractors and suppliers have to give some assurance that they understand the EMPr and that they will undertake to comply with the conditions therein. All senior and supervisory staff members shall familiarise themselves with the full contents of the EMPr. They shall know and understand the specifications of the EMPr and shall be able to assist other staff members in matters relating to the EMPr. On completion of construction, the EMPr shall be part of the terms of reference for the owner and shall be made available to all on-going contractors entering the property.

10. SIGNING OF THE EMPr

The acknowledgement form at the back of the approved EMPr is to be signed by the landowner and all the Contractors. All the Contractors employees, especially the machine and equipment operators, are to be made aware of the conditions as contained in the EMPr and the contractual conditions relating to the environment, as contained in the contract document.

11. RECOMMENDATIONS FOR THE PROPOSED CAUSEWAY

It is the view of the Environmental Consultant that the preferred activity will NOT have any major geophysical, biophysical or socio-economic environmental impacts, provided the recommendations regarding the mitigation and rehabilitation measures presented in this EMPr are adhered to. The Environmental Consultants believes that the proposed development will have strong social benefits and help to maximize both the need and desirability of development to the applicant and the surrounding community.

12. PROCEDURE

12.1 Pre-construction Phase

The requirements of the EMPr will be discussed at professional team meetings in order to understand the

environmental content of the document. The requirements of the EMPr must be incorporated into any tender/contract documents by way of specific clauses that convey the impact and mitigation required. These clauses are to be agreed between the responsible professional members of the team and the environmental consultant.

12.2 The Construction Phase: Responsibilities and General Matters

Miscellaneous environmental matters and the relationships between the Contractors, ECO and the other members of the professional team are outlined in this section.

12.3 The Contractor

The Contractors must comply at all times with the requirements of the EMPr and must acknowledge in writing by signing the acknowledgement form that they will abide by the contents of EMPr. Copies of the signed acknowledgement form are to be forwarded to Environmental Consultants.

12.4 The Environmental Control Officer (ECO)

The landowner must appoint an independent ECO for the purpose of ensuring that the environmental conditions as outlined in this EMPr are implemented by the Contractor.

Other environmental site-related issues will be monitored and reported on by the ECO as and when they may arise. The ECO is to have access to the site at all times, for the purpose of inspections to ensure that the environmental conditions of the EMP are being implemented and adhered to. The ECO must report on the environmental aspects of the contract to the responsible person /Project Manager at agreed intervals.

The Contractors must have access to the ECO via the landowner for advice on the environmental aspects of the contract and any other associated information. The need for any deviations or variations in the environmental conditions must be reported to the Project Manager and the ECO prior to these being undertaken.

12.5 Environmental Management Programme

The provisions of this EMPr are binding on the Applicant during the life of the project, thus until decommissioning and closure. As the decommissioning and closure phases are not anticipated, the EMPr shall be binding on any authority to which responsibility has been delegated to, until such time that the DEARD or applicable environmental authority has formally absolved the Municipality from its responsibilities in terms of this EMPr. It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all time. To the EMPr requirements, each aspect related to the EMPr has been addressed in the table below. Each action within the EMPr is supported by the priority of when the specific action will need to be implemented. Each of these aspects is briefly described below for ease of reference.

12.6 Activity

This section highlights the various aspects or impacts related with the project i.e the Applicant / Contractor's activities that will interact with the environment.

12.7 Management/Mitigation Measures

This section in the table indicates the actions required to either prevent and / minimize the potential impacts on the environment that is associated with the project

12.8 Responsibility

The section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMP. Formal responsibilities are necessary to ensure that key procedures are executed.

12.9 Frequency/Timing

This section indicated when and/how often the actions for that specific aspect must be implemented and /or monitored.

Environmental Audits shall be undertaken at least once a month until the construction is complete.

Table of abbreviations used below:

Abbreviation	Meaning
C	Contractor
E	Engineer
PM	Project Manager
ECO	Environmental Control Officer

A. PRE-CONSTRUCTION PHASE

Activity	Management / Mitigation	Responsibility	Frequency / Timing
A1 - Legislation, permits, agreements and EA requirements	In all instances, Site Owner, Developer, Service Providers, Contractors and Project Managers must remain in compliance with relevant local and national legislation. The supreme law of the land is "The Constitution of the Republic of South Africa" which states: "Every person shall have the right to an environment which is not detrimental to his or her health or well-being". Laws applicable to protection of the environment in terms of Environmental Management (and relating to construction activities) include but are not restricted to those listed in section 2 above.	All	Prior to moving onto site, during construction and during operation

	<p>a. The approved Environmental Management Programme (EMPr) must be kept on site and made available to the Interested and Affected Parties on request.</p> <p>b. In case the activity is managed off-site, each official and / or worker operating on site must be educated about the Environmental Management Programme (EMPr) and made aware of his/her responsibilities.</p> <p>c. Soil erosion prevention measures and soil erosion control measures must be implemented during construction of the project, particularly in the steeper areas of the site.</p> <p>d. Unnecessary removal of ground cover vegetation must be prevented. Where indigenous vegetation has been cleared beyond the construction footprint, appropriate measures must be taken to ensure that the disturbed area is rehabilitated and re-vegetated with locally appropriate indigenous.</p> <p>e. Alien invasive plant species within the road reserves and affected footpaths must be removed and must be disposed appropriately. Monitoring and control programmes must be put in place until natural vegetation is well established.</p> <p>f. Topsoil must be stockpiled separate from the subsoil for use in rehabilitation processes. Stockpiles must be positioned away from watercourses or storm water drains to prevent soil from eroding directly into the watercourse, drain or adjacent wetlands.</p> <p>g. The working area is to be clearly demarcated and all construction work is to be kept within the demarcated area.</p> <p>h. Any inference with the natural hydrological functioning of the area, including construction of structures across the river and other natural drainage systems, must be carefully monitored and must be in accordance with specifications of the Department of Water Affairs (DWA).</p> <p>i. A copy of the authorization must be kept at the premises where the activity will be carried on. The authorization must be produced to any authorized official of the Department who requests</p>	All	Ongoing
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	to see it and must be made available for inspection by any employee or agent of the holder of the authorization who works or undertakes work at the premises.	C & PM	At all times
A2 - Access to site	A2.1 Routing		
<i>Sound environmental principles must be followed</i>	a. The Contractor will have to ascertain the existing condition of the access road and repair accordingly should damage occur due to construction of the proposed pedestrian bridge.	ECO, C & PM	Prior to moving onto site and during construction
	b. Access route must be clearly defined with white stakes/painted rocks and disturbance outside these areas is not permitted.		
	c. The Contractor must take into account any limitations identified and recommendations made during the environmental studies when deciding on an access route to the construction site.		
	d. The location of all underground services and servitudes must be identified and confirmed before construction commences. (IF ANY)		
	e. Choice of access routes must take into account minimum disturbance to residents.		
	f. A working corridor must be determined to avoid excess trampling and damage to the site.		
	A.2.3 Survey Points	E	During surveys and preliminary investigations
	a. Marking of survey points must be done with the Engineers approval. b. Vegetation clearing and disturbance must be kept to a minimum during the survey operations, taking into account the high C-Plan irreplaceability values of the site.	PM / ECO	
	A3.1 Layout & Location	E / C / PM / ECO	

<p>A3 – Setting up the construction camp</p> <p><i>Careful planning of the construction camp can ensure that time and costs associated with environmental management and rehabilitation are reduced (It is recommended that any disturbances which may take place commence only after the first spring flush so that any indigenous vegetation can be relocated for rehabilitation.)</i></p>	a. Choice of site for the Contractor's camp requires the engineer's permission and must take into account the location of local residents and / or ecologically sensitive areas, including flood zones and slip / unstable zones. A site plan must be submitted to the Engineer for approval. The construction camp must preferably be positioned on previously disturbed area.		During surveys and preliminary investigations and prior to moving onto site	
	b. If the Contractor chooses to locate the campsite on private land, he must get prior permission from both the Engineer and the landowner.			
	c. The size of the construction camp must be minimized (especially where natural vegetation or grassland has had to be cleared for its construction).			
	d. The construction camp must be properly fenced and secured. It must be kept in a clean and orderly state at all times. This will deter rodents and other fauna from entering the camp.	E / C / PM	During site establishment and on-going weekly inspections	
	e. The construction camp must be located on a level area at least 50m from any watercourse, wetland or water supply. The position of the camp must be ratified by the Engineer and the Environmental Control Officer.	E / C / PM / ECO	During site establishment	
	f. The Contractor's camp may not be situated in a flood plain or on slopes greater than 1:3.			
	g. The construction camp must be fenced with a 1.8m high bonnox (or similar type) fence.			
	h. The Contractor must attend to the drainage of the campsite to avoid sheet erosion and / or standing water.	E / C / PM / ECO	During site establishment	
	A3.2 Ablutions			
	a. Where water borne sewage is not available, temporary chemical toilets must be provided by a company approved by the Engineer. These toilets must be made available to all staff, and must be no closer than 50m from any watercourse. Such facilities, which shall comply with local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced. They shall be positioned in an appropriate place.	PM / C / ECO	During set-up	

	b. The construction of a "long-drop" is forbidden.	E / PM / C	On-going
	c. There shall be a minimum of 1 toilet for every 20 workers and these must be situated no further than 100m from the work front.		
	d. Under no circumstances may open areas or the surrounding bush or degraded and built up areas be used as a toilet facility.		
	A3.3 Provision for Camp Waste Disposal		
	a. Bins and / or skips shall be provided at convenient intervals for the disposal of waste within the camp. The bins must be covered to prevent wind-blown rubbish and scavenging by people and animals.	PM / C / ECO	During site set-up and on-going
	b. Bins should have liner bags for efficient and safe disposal of waste.		On-going
	c. At least three rubbish bins must be located at the construction camp for the collection of waste.		
	d. Recycling and the provision of separate waste receptacles for different types of waste should be encouraged. Where possible, plastics, paper, glass and cans should be separated from other domestic waste for recycling. If waste is to be recycled, appropriately labelled waste receptacles must be made available.		
	e. Any potentially hazardous containers must be punctured or disabled prior to disposal.		
A4 – Establishing Equipment Lay-Down & Storage Areas <i>Storage areas can be hazardous, unsightly and can cause environmental</i>	A4.1 – General Substances and Materials		
	a. Choice of location for equipment lay-down and storage areas must take into account prevailing winds, distances to water bodies, general on-site topography and water erosion potential of the soil. These areas must be located within previously disturbed areas for this project. Impervious surfaces must be provided where necessary.	PM / E / C / ECO	During site set-up
	b. Fire prevention and fire fighting facilities must be present at all storage facilities.		

<p><i>pollution if not designed and managed carefully. Hazardous substances are those that are potentially poisonous, flammable, carcinogenic, or toxic. Some examples are: diesel, petrol, oil, bitumen, cement, solvent based paints, lubricants, explosives, drilling fluids, pesticides, herbicides, LPG.</i></p>	<p>c. Storage areas must be secure so as to minimise the risk of crime. They must be safe from access by children and animals etc.</p>	<p>PM / E / C / ECO</p>		
	<p>d. Equipment lay-down and storage areas must be designated, demarcated and fenced.</p>			
	<p>A4.2 –Hazardous Substances and Materials</p>			
	<p>a. It is very important that the proximity of other developments e.t.c is taken into account when deciding on storage areas for hazardous substances or materials. The areas must be suitably signed, fenced and access controlled.</p>			
	<p>b. These storage facilities must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources. The Contractor shall submit a method statement to the Engineer and ECO for approval.</p>			
	<p>c. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes.</p>			<p>Ongoing</p>
	<p>d. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. The Contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing / equipment in case of spillages or accidents and have received the necessary training.</p>			<p>During construction</p>
<p>e. All concrete mixing must take place on a designated, impermeable surface.</p>				

	f. No vehicles transporting concrete may be washed on site.		
	g. No vehicles transporting, placing or compacting cement or any other bituminous product may be washed on site		
	h. Lime and other powders must not be mixed during excessively windy conditions.		
	i. All substances required for vehicle maintenance and repair must be stored and sealed containers until they can be disposed of / removed from the site.		
	j. Hazardous substances / materials are to be transported in sealed containers or bags.		
A5 – Education of site staff on general and environmental conduct <i>These points need to be made clear to all staff on site before the project begins</i>	A5.1 – Education		
	a. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics to be covered must include: <ul style="list-style-type: none"> • What is meant by “environment”; • Why the environment needs to be protected and conserved; • How construction activities can impact the environment; • What can be done to mitigate against such impacts; • Awareness of emergency and spills response provisions; • Social responsibility during construction e.g. being considerate to local residents. It is the contractor’s responsibility to provide the site foreman with no less than 1 hour’s environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.	PM / C / ECO	During staff induction and on-going
	b. Staff operating equipment shall be adequately trained and sensitised to any potential hazards associated with their tasks	PM / E / C / ECO	During staff induction, followed by on-going monitoring
	c. Translators are to be used where necessary.		

	<p>d. The Engineer / ECO must be on hand to explain more difficult / technical issues and to answer questions which may be raised.</p> <p>e. Construction workers must be made aware that they are not to make excessive noise e.g. shouting, hooting.</p> <p>f. The use of pictures and real-life examples is encouraged as these tend to be more easily remembered.</p> <p>g. Use should be made of environmental awareness posters on site.</p> <p>h. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Management.</p> <p>i. All employees must undergo the necessary safety training and wear the necessary protective clothing at all times.</p> <p>j. The need for a “clean site” policy also needs to be explained to the construction workers.</p>		
	<p>A5.2 – Worker conduct on site</p> <p>a. A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following rules:</p> <p>b. No alcohol / drugs to be present on site, no vehicles or machinery are to be operated whilst under the influence of alcohol or drugs.</p> <p>c. Prevent excessive noise to minimise disturbances to local residents.</p> <p>d. No firearms allowed on site or in vehicles transporting staff to / from the site (unless used by security personnel).</p> <p>e. No unsocial behaviour will be permitted.</p> <p>f. Bringing pets onto site is forbidden.</p>	PM / C	During staff induction, followed by on-going monitoring

	g. Construction staff are to make use of facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility is strictly forbidden)		
	h. No fires to be permitted on site. Encourage the use of gas-operated cookers for preparation of food on site.		
	i. Trespassing on private / commercial properties adjoining the site is forbidden.		
	j. Only pre-approved security staff and workers shall be permitted to live on the construction site.		
	k. No worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do.	PM / C	Prior to moving onto the site and on-going
	l. The staff conduct rules are described in a separate table of Rules (Section F of the EMP). This is aimed at providing staff with the basic information regarding worker conduct on site)	PM / C	Prior to moving onto the site and on-going
A6 – Social Impacts	A6.1 Public Participation		
<i>It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work and increase cost in the form of delays</i>	a. All Interested and Affected Parties (IAPs) must be contacted in order to inform them of the starting date of construction and the proposed duration. IAPs must be notified of the construction process and the manner to which it will be implemented via public notices.	E / PM/ C	Prior to moving onto the site and on-going
	b. Open liaison channels must be established between the site owner, the developer, operator, the contractors and Interested and Affected Parties (IAPs) such that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s). These people would usually have been identified by the environmental consultant that was assigned to the project (during Scoping). If this wasn't the case, the IAPs can be identified as those that live close by the site, work close to the site, will have their services / infrastructure affected by the project, have a general interest in the project, and / or the ward Councillor in which the construction is taking place.	E / PM	Prior to moving onto site and on-going

	c. Should the construction staff be approached by members of the public or other stakeholders, they must assist them in locating the Engineer / Contractor, or provide them with a number on which they may contact the Engineer / Contractor.	C / PM / E	Monthly
	d. The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the Engineer.	C / PM / E	
	e. Adequate designated parking must be provided for site staff and visitors.	C / PM	Prior to moving on site
	f. A complaints register must be kept on site. IAPs need to be made aware of the existence of the complaints book and the method of communication available to them. Details of complaints must be incorporated into the audits as part of the monitoring process. This must be in carbon copy format, with numbered pages.	C / PM / ECO	On-going
	A6.2 Noise Impacts		
	a. Construction vehicles / machines are to be fitted with standard silencers prior to the beginning of construction.	E / PM / C	During surveys and Prelim Investigations and site set up.
	b. Construction workers must be made aware of not creating unnecessary noise such as hooting and shouting,	PM / C	During site set up and on-going.
	c. Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers etc) will be used as per operating instructions and maintained properly during site operations.	PM / C	During site set up
	A.6.3 Visual Impacts		
	a. Storage facilities, elevated tanks and other temporary structures on site must be located such that they have as little visual impact on local residents as possible.	PM / C / ECO	On-going – more frequently during dry and windy conditions

	b. Lighting on the construction site must be pointed downwards and away from oncoming traffic and nearby houses.	E / PM / C / ECO	During set up and on-going
	c. Special attention must be given to the screening of highly reflective materials on site.	PM / E / C / ECO	During site set up.
A7 – Dust / Air / Light pollution	a. Vehicles travelling along access roads must adhere to speed limits to avoid creating excessive dust.	PM / C	Throughout the duration of the project
<i>Establishment of the camp site, and related temporary works can reduce air quality</i>	b. Camp construction / haulage road construction – areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust.	ECO / C / E	During site set up
	c. The Contractor must make alternative arrangements (other than fires) for cooking and / or heating requirements. LPG gas cookers may be used provided that all safety regulations are followed.	PM / C	Throughout the duration of the project
A8 Soil Erosion	A.8.1 Conservation of Valuable Soil Resources		
<i>The stripping of vegetation during preliminary activities on site greatly increases the risk of soil erosion.</i>	a. The time that stripped areas are left open to exposure must be minimised wherever possible. Care must be taken to ensure that lead times are not excessive.	PM / C / E / ECO	Throughout the duration of the project.
	b. Wind screening and storm water control must be undertaken to prevent soil loss from the site. It is recommended that gabion mattresses are placed at culvert inlets and outlets as erosion control measures.	E / PM / C / ECO	Throughout the duration of the project
	c. Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set up phase, i.e. topsoil is to be conserved while providing access to the site and setting up the camp.	E / PM / C / ECO	Throughout the duration of the project
	d. Topsoil stripped from the construction camp and other construction areas must be stockpiled away from any potential disturbances.	E / PM / C / ECO	Throughout the duration of the project
A9 Stormwater	A.9.1 Stormwater Damage Prevention		

<i>Serious financial and environmental impacts can be caused by unmanaged storm water.</i>	a. To prevent storm water damage, the increase in storm water runoff resulting from the construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings.	E / ECO / PM	During surveys and preliminary investigations.
	b. During site establishment, all material to be used during construction must be placed safely and accordingly as deemed necessary by the Engineer.	E	During site establishment
	c. Temporary cut off drains and berms may be required to capture storm water and promote infiltration.	ECO / E	During site set up.
A.10 Water Quality	A.10.1 Maintenance of Water Quality		
<i>Incorrect disposal of substances and materials and polluted run-off can have serious negative effects on groundwater quality.</i>	a. Storage areas that contain hazardous substances must be bunded with an approved impermeable liner.	E / PM / ECO	During site set up.
	b. Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimise pollution risk and reduced bunding capacity.	E / ECO / C / PM	
	c. A designated, bunded area is to be set aside for vehicle washing and maintenance. Materials caught in this bunded area must be disposed of to a suitable waste disposal site or as directed by the Engineer.		
	d. Provision must be made during set up for all polluted run off to be treated to the Engineers approval before being discharged into the storm water system. Any waste that cannot be treated to acceptable standards on site must be treated and disposed by a licensed treatment company.		During site set up, to be monitored weekly
A.11 Conservation of the Natural Environment	A.11.1 Fauna and Flora		
	a. No vegetation may be cleared without prior permission from the ECO / Engineer.	E / ECO	During site set up, and on-going.

<i>Alien plant encroachment is particularly damaging to natural habitats and is often associated with disturbance to the soil during construction activities.</i>	b. Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas	ECO / C	On-going in campsite, haulage areas.
A.12 Set up of Waste Management	A.12.1 Waste Management		
	a. The contractor is responsible for the internal collection of refuse and for transporting it to a registered landfill site once every week; unless a service agreement is entered into between the contractor and the municipality.	C	During site set up
	b. The excavation and use of rubbish pits is forbidden.	PM / ECO / C	During site set up
	c. Burning of waste is forbidden ¹ .		
	d. A fenced area must be allocated for waste sorting and storage prior to removal.	C / PM / ECO	During site set up and on going
	e. Individual skips for different types of waste (e.g. 'household' type refuse, building rubble, etc.) must be provided.		
A.13 Cultural Environment	A.13.1 Protection of Cultural Environment		
Prior to the commencement of construction, all the staffs' needs to know what possible archaeological or historical objective of value may look like, and to notify the Engineer / Contractor should such an item be uncovered. If any artefacts or graves are uncovered during construction, all work on site is to cease and AMAFA as well as the ECO is to be notified for comment. Construction may only commence once approval by AMAFA is granted.	ECO / PM / C	During site set up and on-going.	

¹ A possible exception to this may be that the alien invasive vegetation, which is removed from the site, should be burned to prevent the spread of the plants.

A.14 Safety and Security	A.14.1 Fencing / Demarcation		
	a. Potentially hazardous areas such as trenches / storage areas are to be demarcated and clearly marked.	PM / C / ECO	On-going.
	A.14.2 Lighting		
	a. Lighting on the construction campsite is to be set out to provide maximum security and to enable policing of the site, without creating a visual nuisance to local residents or businesses.	PM / C / ECO	On-going
	A.14.3 Risks Associated with Materials on Site		
	a. Material stockpiles or stacks, such as pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.		
	b. Flammable materials must be stored as far as possible from adjacent residents / businesses.		
	c. Fire fighting equipment must be present on site at all times as per OHSA.		
	d. Obstruction to drivers' line of sight due to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.		
	e. No materials are to be stored in unstable or high-risk areas such as in floodplains or on steep slopes.		
f. All IAPs must be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are stringing of power lines, blasting, earthworks / earthmoving machinery on steep slopes above houses / infrastructure, risk to residences along haulage roads / access routes.			

B. CONSTRUCTION PHASE

This pertains to all environmental impacts associated with construction and is not limited to the land on which the Project is to be located. It includes the site footprint, construction campsites, access roads and tracks, as well as any other area affected or disturbed by construction activities. The EMPr (particularly the specifications for rehabilitation) is relevant for all areas disturbed during construction. Furthermore, the EMPr must take into account all secondary impacts on the local community and the public. *(It is recommended that any disturbances, which may take place, commence only after the first spring flush so that any indigenous vegetation can be relocated for rehabilitation.)*

Activity	Management / Mitigation	Responsibility	Frequency / Timing
B1 – Access to the site	B1.1 Maintenance of the access		
	a. The access to the site will need to be upgraded to an acceptable standard during construction (i.e. such that large amounts of dust are not generated and there is no unwarranted damage caused to construction vehicles).	PM / E	Initial set up and on-going
	b. Contractors shall ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damages as soon as these develop.	E / C / ECO	Establish at setup
	c. There needs to be adequate drainage of water underneath the access roads (both during construction & in operation). This can be done through a culvert / water diversion system.	PM / E / ECO	When necessary
	d. During construction, any dirt access roads could potentially be surfaced with a compacted gravel layer (shale) in order to allow for the increase in vehicular traffic on these roads. A chemical stabilizer could be added to assist with the surface binding and reduce the dust produced by vehicular traffic on the road.	PM / C	When necessary

	<p>e. It is recommended that entry and exit points to the proposed development are clearly marked and designed in such a way as to allow for good line of sight and traffic viewing (allowing a 100m – 150m line of site on both sides of the access). Convex mirrors should be placed on opposite sides of the entry/exit points to allow motorists exiting the development to see oncoming vehicles. These are intended to minimize potential incidents of vehicles collision.</p>		
	<p>f. Any large trees or foliage that blocks entry / exit visibility should be removed (with prior permission from the ECO) to increase traffic visibility.</p>	PM / E / ECO	
	<p>g. Unnecessary compaction of soil by heavy vehicles must be avoided; construction vehicles must be restricted to demarcated access, haulage routes and turning areas.</p>	PM / C / ECO	On-going, and specifically after heavy rains

	h. The construction signs must be placed at the beginning of the project indicating who is constructing the road and the local Municipality. Approval must be sought from the KwaZulu-Natal Department of Transport or any relevant authority for the installation of the signage.	PM / E / C / ECO	
	i. Machine / vehicle operators must receive clear instructions to remain within demarcated access routes. Movement of heavy-duty vehicles and vehicles not connected with work in progress must be restricted to the construction zone in order to control related impacts such as damage in the construction zone, compaction of soil, damage to vegetation and noise pollution.	E / C / PM	On-going, and specifically after heavy rains
	j. Person and vehicle access must be restricted during construction so as to control access to otherwise potential dangerous excavations and materials.	E / PM / C	On-going, and specifically after heavy rains
B.1.2 Haulage Roads			
	a. Contractors shall ensure that all side and mitre drains as well V Drains and scour check walls on access and haul roads are functioning properly and are well maintained.	C / PM / E / ECO	On-going, and specifically after heavy rains
B.2 Maintenance of Construction Camp	B.2.1 Surfaces		
	a. The Contractor must monitor and manage drainage of the campsite.	PM / C / ECO	Weekly inspection
	b. Run-off from the campsite must not discharge into neighbours' properties.		
	B.2.2 Ablutions		
	a. Chemical toilets are to be maintained in a clean state on a regular basis and must be moved to ensure that they adequately service the work areas.	PM / ECO	On-going

	b. The Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility.	PM / C / ECO	Weekly
B.2.3 Camp Waste Disposal			
	a. The Contractor shall ensure that all litter is collected from the work and camp areas daily. The construction area must be cleared of litter, debris (e.g. Cement packets, bitumen residues etc) and other domestic waste on completion of the day's work.	PM / C / ECO	On-going
	b. Bins and / or skips must be emptied regularly and waste must be disposed of at a registered landfill site. Waybills for all such disposal are to be kept by the Contractor for review by the Engineer / ECO.	PM / C / ECO	Daily
	c. A registered chemical waste company is to be used to remove waste from chemical toilets on site.	PM / C / ECO	Weekly / As needed
B.2.4 Eating Areas			
	a. Eating areas must be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	E / PM / C	Weekly monitoring
	b. All litter throughout the site must be picked up on a daily basis and placed in the bins provided.	E / PM / C	On-going monitoring
B.2.5 Housekeeping			
	a. The Contractor shall ensure that his camp and working areas are kept clean and tidy at all times.	PM / C	On-going

B.3 Staff Conduct	B.3.1 Environmental Education and Awareness		
	a. The Contractor must monitor the performance of the construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear.	PM / C / ECO	On-going
	B.3.2 Worker Conduct on Site		
	a. The rules that are explained in the worker conduct section must be followed at all times. Non-compliance of these rules could result in the removal of workers by the contractor.	PM / C / ECO	On-going
B4 – Dust / Air Pollution <i>Main causes of air pollution are dust particles from vehicle movements and stockpiles, vehicle emissions and fires</i>	B.4.1. Dust & Air Pollution		
	a. Vehicles travelling to and from the construction site must adhere to the speed limits so as to avoid producing excessive dust. A speed limit of 30 km/h must be adhered to on the construction site.	E / C / PM	As directed by Engineer
	b. Limiting construction operational hours from 07h00 and 17h00 will reduce congestion and disturbance in surrounding areas and minimize road deterioration and consequent dust creation.	E / C / PM	As directed by Engineer
	c. Access points and other cleared surfaces must be dampened whenever necessary and especially in dry and windy conditions to avoid excessive dust.	PM / C	On-going
	d. Vehicles and machinery are to be kept in good working order and to meet the manufacturer's specifications for safety, fuel consumption etc. Should excessive emissions be observed, the Contractor is to have the equipment seen to as soon as possible.	PM / C / ECO	On-going

	e. Stockpiles may cause dust and so must be managed in accordance with the guidelines in Materials Management.	PM / C / E	On-going
	f. If dust is unavoidable, screening will be required utilising wooden supports and shade cloth.	E / PM / C	On-going
	g. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.	E / PM / ECO	On-going
B5 – Soil Erosion	B.5.1 Topsoil Stripping and Stockpiling		
	a. Excavated soil must be deposited in a landfill site. Soil disturbance will be minimized by establishing the extent of the construction site (pre-construction) and clearly demarcating this on the site layout plans. No construction personnel or vehicles may leave the demarcated areas except when authorised to do so by the Project Manager.	PM / C / ECO	As each activity is completed.
	b. Erosion prevention measures must be implemented: Berns, sand bags and hessian sheets may be used to contain all sediment whilst energy dissipaters must be constructed at all outflow points. The site must be monitored weekly for any sign of off-site siltation. All exposed earth must be rehabilitated promptly with suitable vegetation to protect the soil.	E / PM / C / ECO	On-going
	B.5.2 Exposed Surfaces		
	a. Side tipping of soil and excavated materials shall not be permitted – all spoil material shall be exposed of as directed by the Engineer.	E / C / PM	As directed by the Engineer
b. Storm water control and wind screening must be undertaken to prevent soil loss from the site.	E / ECO / PM	As directed by the Engineer	

	c. There must be no offsite impacts of storm water. A general rule is that the storm water velocity eddies on the site must be the same as the predevelopment area.	E / ECO / PM / C	As directed by the Engineer
	d. In areas where steep slopes are excavated, erosion control measures need to be initiated and these may include the planting of indigenous vegetation at short intervals to prevent the formation of gullies.	E / ECO / PM / C	As directed by the Engineer
	f. The Storm Water Management Plan must be developed, provided and implemented by the engineer. Drainage must be controlled to ensure that runoff from the access road will not lead to erosion and offsite pollution of any water resources along the road. The storm water drainage system must not be contaminated by other waste sources generated during construction phases of the development. The temporary toilet facilities must not be allowed to enter the storm water drainage system. Waste from these facilities must be collected by the service provider and disposed of at a permitted waste disposal site. These facilities must be regularly serviced and would be managed according to the service plan developed by the Engineer.	PM / E / C / ECO	On-going and as directed by the Engineer
	g. Battering of all banks shall be such that cut and fill embankments are no steeper than previous natural slopes unless otherwise permitted by the Engineer. Cut and fill embankments steeper than previous ground levels shall be re-vegetated immediately on completion of trimming or shall be protected against erosion using bio-engineered stabilisation measures.	PM / E / C / ECO	Ongoing and as directed by the Engineer

	h. If cut and fill earthworks are required, these must be limited to the minimum necessary for the proposed development. Cut and fill banks must not be sloped steeper than 1: 1.5. All fill must be well compacted in layers on placement and must not be loose end-tipped. No cut or fill slope must exceed 2.5 m vertical height. All earthworks must be vegetated as soon after completion of construction as is practically possible with locally sourced indigenous vegetation where possible.	E / PM	Directed by the Engineer
	i. All embankments, unless otherwise directed by the Engineer, shall be protected by a cut off drain to prevent water from cascading down the face of the embankment and causing erosion.	E / C / ECO	Directed by the Engineer
B6 – Storm Water	B6.1 General Principles		
<i>Construction activities frequently result in diversion of natural water flow resulting in concentration of flow and an increase in the erosive potential of the water</i>	a. The Contractor shall not in any way modify nor damage the banks or beds of streams, rivers, wetlands, other open water bodies and drainage lines adjacent to or within the designated area, unless required as part of the construction project specification. Where such disturbance is unavoidable, modification of water bodies must be kept to a minimum in terms of: removal of riparian vegetation; and opening of the stream channel.	E / PM / ECO	As surface becomes exposed
	b. Earth, stone and rubble is to be properly disposed of so as not to obstruct natural pathways over the site. i.e. these materials must not be placed in storm water channels, drainage lines or rivers.	E / PM / ECO / C	On-going
	c. The use of high velocity storm water pipelines must be avoided in favour of open, high friction, semi-permeable channels wherever feasible.	E / PM	On-going
	d. Stormwater outfalls must be designed to reduce flow velocity and avoid stream bank and soil erosion.	E / PM	On-going

	e. A number of smaller storm water outfall points must be constructed rather than a few large outfall points.	E / PM / ECO / C	Regular monitoring, on-going
	f. The provisions of the National Water Act 36 of 1998 shall be complied with at all times.	PM / C / E / ECO	
	g. The Contractor is to ensure that impediments to natural water flow is avoided during construction, or is temporarily diverted.		
	h. There must be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.		
B.6.2 Un-channelled Flow			
	a. During construction un-channelled flow must be controlled to avoid soil erosion.	PM / C / E / ECO	On-going monitoring
	b. Where surface runoff is concentrated (e.g. along exposed tracks), flow must be slowed by contouring.	E / ECO / PM	On-going
	c. Rock Bolsters are to be placed across the invert of drains susceptible to erosion for every 2m vertical drop.	PM / C / E / ECO	On-going
B7 – Water	B7.1 Water Quality		
<i>Water quality is affected by the incorrect handling of substances and materials. Soil erosion and sediment is also detrimental to water quality. Mismanagement of polluted run-off from vehicle and plant washing and wind dispersal of dry</i>	a. The Department of Water Affairs and the ECO as well as other emergency contact numbers provided by the Municipality must be contacted in order to deal with spillages and contamination. The Contractor is to compile a list of emergency contact numbers to refer to in order to deal with fire, spillages and contamination of land and aquatic environments.	PM / E	On-going monitoring
	b. Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.	PM / E / ECO	On-going monitoring / as the work progresses

<i>materials into rivers and watercourses are detrimental to water quality.</i>	c. Care must be taken to ensure that runoff from vehicle or plant washing does not enter surface or ground water. Vehicles and machinery may only be cleaned at a designated place at the construction camp.		
	d. Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface.	PM / E / C	
	e. Contaminated wastewater must be managed by the site manager to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility.	PM / C / ECO	
	f. Site staff shall not be permitted to use any watercourse or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction related activities. Municipal water (or another source approved by the Engineer) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, compacting etc.	PM / C / ECO	
	g. Dewatering of vessels, tanks, etc is to take place in a controlled manner. No uncontrolled release of water shall be allowed onto the site area. Water wastage must be kept to a minimum and where possible water must be recycled. In the event of a problem occurring during dewatering, it must be stopped immediately until rectification of the problem. All taps must be maintained in good working order. It is not acceptable to have dripping taps or taps left open.	PM / C / ECO	
B7.2 Water Supply			

	a. Use of natural fountains, springs and adjoining river water for water provision is strictly prohibited.	E / PM / ECO	
	b. Ensure that the existing potable water source is maintained for domestic use during construction.	E / PM	
B8 – Conservation of the Natural Environment	B8.1 Fauna and Flora		
	a. The Contractor is to check that vegetation clearing has the prior permission of the E / ECO. Vegetation that is removed is to be replanted and excavation is to be kept to a minimum. Removal of indigenous trees needs to be authorized by the Department of Water Affairs.	ECO / PM / E / C	On-going monitoring / as the work progresses
	b. Development infrastructure must be screened wherever possible from ecologically sensitive areas to reduce the human disturbance factor.	C / PM / ECO	
	c. Alien vegetation encroachment onto the site as a result of construction activities must be controlled during construction. Immediate re-vegetation of stripped areas and removal of aliens by weeding must take place.	ECO / PM / E	
	B8.2 Geology		
	a. In the event of excavation, the material that is removed must be separated into topsoil and subsoil. The top 150mm would be considered topsoil and must be stockpiled separately.	PM / C / ECO	On-going monitoring
	b. In the event of infilling, replacement of subsoil must precede the topsoil replacement, and all material must be well compacted.		
	B8.3 Stream Crossings		

	A design plan must be submitted to DWAF before construction may commence.	E / ECO	Prior to commencement of construction
B9 – Materials Management	B9.1 Stockpile Management		
	a. Stockpiles must not be situated such that they obstruct natural water pathways.	PM / C / ECO	On-going monitoring
	b. Stockpiles must not exceed two (2) metres in height unless otherwise permitted by the Engineer or be left for longer than three (3) months.	PM / C / ECO / E	On-going monitoring
	c. If stockpiles are exposed to windy conditions or heavy rains, they must be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.	PM / C / E / ECO	On-going monitoring
	d. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.		
	B9.2 Handling of Hazardous Materials		
	a. Cement, bitumen and other potential environmental pollutants must be mixed on an impermeable surface with special provisions for storm water management.	E / PM / C / ECO	On-going
	b. All empty containers must be removed from the site for appropriate disposal at a licensed commercial facility.		
	c. No vehicles transporting concrete or bitumen to the site may be washed on site.		
	d. No vehicles transporting, placing or compacting asphalt or any other bituminous product may be washed on site.		

	e. Lime and other powders must not be mixed during excessively windy conditions.		
	f. All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site.		
	g. Hazardous substances / materials are to be transported in sealed containers or bags.		
	h. Spraying of herbicides / pesticides must not take place under windy conditions and must comply with OHSAs specs and other chemical handling laws.		
	j. The Contractor is to outline a method statement for the dealing of accidents / spillages of hazardous materials. This statement must be handed to the Engineer as well as to DWAF should the incident occur near to or in a water body.		
B9.3 Sourcing construction materials			
	a. Wherever possible, materials that have been produced locally must be used for the construction of the site camp (e.g. bricks, window frames, etc)	E / C / PM	On-going monitoring
B10 – Waste Management	B10.1 On-site Waste Management		
<i>Definition; “Refuse” refers to all construction waste (such as rubble, cement, bags, timber, cans etc)</i>	a. The Contractor shall ensure that all refuse is collected from the camp and work areas daily.	PM / ECO	Monitored weekly and at the start of the builders holidays
	b. All material used for construction and maintenance must be removed from the site after construction or maintenance work.	PM / ECO	On-going

	c. Refuse must be placed in the designated skips / bins which must be regularly emptied. These must remain within demarcated areas and must be covered to prevent wind-blown rubbish and scavenging by people and animals.	PM / C / ECO	On-going
	d. In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.	ECO / PM / C	On-going
	e. Littering on site is forbidden and the site shall be cleared of litter at the end of each working day.	ECO / PM	On-going
	f. Recycling is to be encouraged by providing separate receptacles for different types of waste and making sure that staff are aware of their uses.	ECO / PM	On-going
B.10.2 Waste Disposal			
<i>Non – hazardous waste</i>			
	a. All waste must be removed from the site and transported to a registered landfill site.	E / PM / ECO	At least 24 hours prior to the activity
	b. Waybills proving disposal at each site shall be provided by the Engineers.	E / PM / C / ECO	On-going
	c. Any construction rubble shall be disposed of at registered disposal sites.	PM / E / C / ECO	On-going
	d. Waste from chemical toilets must be disposed of regularly and in a responsible manner by a registered waste contractor. Care must be taken to avoid contamination of soils and water, pollution and nuisance to adjoining areas.	PM / ECO	On-going
<i>Hazardous Waste</i>			

	a. Contaminated water associated with construction activities must be contained in separate bermed areas and must not be allowed to enter into the natural drainage system.	PM / C / ECO	On-going
	c. Chemical waste must be stored in appropriate containers and disposed of at licensed disposal facilities.	PM / C	On-going
	d. Soil that is contaminated with, e.g. cement, bitumen, petrochemicals or paint must be disposed of at a registered hazardous landfill site.	PM / ECO / C	On-going
	e. A sump must be created for concrete waste. This is to be de-sludged regularly and the cement waste is to be removed to a tip site as approved by the local authority.	E / PM / ECO	At least 24 hours prior to the activity taking place.
B.11 Social Impacts	B.11.1 Disruption of Infrastructure and Services		
<i>Regular communication between the Contractor and the IAPs is important for the duration of the contract.</i>	a. Contractors activities and movement of staff is to be restricted to designated construction areas.	PM / C	On-going
	b. Should the construction staff be approached by members of the public or other stakeholders, they must assist them in locating the Engineer or Contractor, or provide a number on which they may contact the Engineer or Contractor.	E / PM / C	Monthly
	c. The conduct of the construction staff when dealing with the public or stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the Engineer.	E / PM / C	
	d. Disruption of access for local residents must be minimised and must have the consent of the Engineer.	E / PM / ECO	

	e. The Contractor is to inform neighbours in writing of disruptive activities at least 24 hrs beforehand. This can take place by way of leaflets placed in the post boxes giving the Engineers and Contractor's details or other method approved by the Engineer.	PM / C / ECO / E	
	f. Drivers of construction vehicles must exercise care when travelling to and from the site specifically when travelling through villages – a maximum speed limit of 20km/h must be adhered to. Drivers of construction vehicles must be considerate of other road users. They are to be especially careful at narrow sections and water crossings or where livestock is being herded.	PM / C	
B.11.2 Visual Impacts			
	a. Lighting on the construction site must be pointed downwards and away from oncoming traffic and nearby houses.	E / PM / ECO	On-going / As required
	b. The site must be kept clean to minimise the visual impact of the site.	PM / C / ECO	As required
	c. If screening is being used, this must be moved and re-erected as the work front progresses.		
B.11.3 Noise			
	a. Machinery and vehicles are to be kept in good working order for the duration of the project to minimise noise nuisance to neighbours.	PM / C / ECO	On-going
	b. Notice of particularly noisy activities must be given to residents / businesses adjacent to the construction site. Examples of these include: noise generated by jackhammers; blasting; drilling; dewatering pumps.	PM / C / ECO	On-going
	c. Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract.	PM / C	On-going

B.11.4 Communication with Interested and Affected Parties (IAPs)			
	a. The Engineer and Contractor are responsible for on-going communication with those people that are interested / affected by the project.	PM / C / E / ECO	On-going
	b. A complaints register must be housed at the site office. This must be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor. This register is to be tabled during monthly site meetings.		
	c. IAPs need to be made aware of the existence of the complaints book and the methods of communication available to them.		
	d. Queries and complaints are to be handled by: <ul style="list-style-type: none"> - documenting details of such communications; - submitting these for inclusion in the complaints register; - bringing issues to the Engineers attention immediately; - taking remedial action as per Engineer's instruction. 		
	e. Selected staff are to be made available for formal consultation with IAPs in order to: explain the construction process; answer questions.		
B12 – Cultural Environment	a. Should any archaeological sites or items of historical or archaeological value, including old stone foundations, tools, clay ware, jewellery, remains, fossils, graves etc be uncovered during construction, their existence must be reported to the ECO and AMAFA, an archaeological study may be required.	PM / C / ECO / E	On-going

	b. If any artefacts are uncovered the Research and Professional Services Division of AMAFA must be contacted and work must be stopped immediately. AMAFA's head office is in Ulundi and a satellite office is located in Pietermaritzburg. Contact: WeziweTshabalala – tel: (033) 394 6543; fax :(033) 342 6097 or Barry Marshall fax: (035) 870 2054, PO Box 523, Ulundi, 3838.	PM / C / ECO	On-going
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C. POST-CONSTRUCTION – REHABILITATION PHASE

Rehabilitation of the proposed bridge upgrade and the road D1238, shall be done exclusively into all areas that the construction activities are complete and where it is anticipated that no further activities relating construction shall take place. This will allow for smooth establishment of areas where rehabilitation especially grass planting has been done. Doing rehabilitation whilst other continuing with construction is highly motivated as this will ensure consistent monitoring of the establishment of grass daily during the construction span of the project.

Activity	Management / Mitigation	Responsibility	Frequency / Timing
C.1 Construction Camp	C.1.1 Construction Camp Rehabilitation		
	a. All structures comprising the construction camp are to be removed from site.	E / PM / C / ECO	Project completion.
	b. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint and fuels, etc. and these must be cleaned up.		
	c. All hardened surfaces within the construction camp area must be ripped, all imported materials removed, and the area shall be top-soiled and re-grassed using the guidelines set out in the re-vegetation specification that is attached to this document.		
d. The Contractor must arrange the cancellation of all temporary services.			
C2 – Vegetation	C.2.1 Landscaping		

	<p>a. All disturbed areas or areas, which have been engineered for the purpose of the development, are to be rehabilitated with indigenous vegetation, which must be sourced from surrounding areas where possible. This will aid in preventing erosion within the site.</p> <p>b. The exposed ground must be seeded with stabilising grass mix, suited to the conditions. The quantity of seed used will depend on the slope. For slopes:</p> <p>>15 degrees : 25 – 50kg/ha <15 degrees: 15-25kg/ha</p> <p>c. The natural seed bank in the topsoil will implement the seed mix applied. The seed mix should be consist of pioneer grass species common to the area, and will also depend on what species are commercially available during the season required. A standard seed mix would consist of the following species (in decreasing order of proportion constituting the seed mix:</p> <ul style="list-style-type: none"> • Andropogon chinensis (hairy blue grass) • Aristida congesta (Tassesl Three-awn) • Cynodon dactylon (couch grass) • Themeda triada (red grass) <p>d. Sedges such as Schoenoplectus spp (and Juncus spp should be used for bridge crossings.</p> <p>e. If the grass has not been established after two months after seeding, the areas should be applied prior to seeding;</p> <p>f. Slope stabilization measures may be necessary where grass has not been established and where there is erosion risk;</p>		
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	g. All alien vegetation has to be appropriately removed and disposed of.		
C3 – Land Rehabilitation	C.3.1 Land Rehabilitation		
	a. Topsoil that has been stockpiled during construction must be applied on the affected areas to undergo rehabilitation Excavated soil and soil disturbance – excavated soil not used in the development must be disposed of in a landfill site. Soil disturbance will be minimized by establishing the extent of the construction site (pre-construction) and clearly demarcated in on-site layout plans. No construction personnel or vehicles may leave the demarcated areas except when authorized to do so by the Project Manager. Surfaces are to be checked for waste products from activities such as concreting and asphaltting and cleared in a manner approved by the engineer.	E / PM / C / ECO	Project Completion
	b. Rehabilitation must be executed in such a manner that surface runoff will not cause erosion of disturbed areas during and after rehabilitation.	E / PM / C / ECO	Project Completion
	c. All areas to be vegetated that comprise surfaces hardened due to construction activities are to be ripped and imported material thereon removed.	PM / C / ECO	
	d. All rubble is to be removed from the site to an appropriate disposal site as approved by the Engineer. Burying of rubble on site is prohibited.		
	e. The site is to be cleared of all litter.		

	f. All embankments are to be trimmed, shaped and re-planted to the satisfaction of the Engineer.	E / PM / C / ECO	
	g. Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer.	E / PM / C / ECO	
	h. All trimmed and / or compacted areas must be left rough to facilitate binding of topsoil and vegetation.	E / PM / C	
	i. The Contractor is to check that all watercourses are free from building rubble, spoils materials and waste materials.	E / PM / C / ECO	
C4 – Materials and Infrastructure	C.4.1 Removal of Barriers, Remediation of Damage		
	a. All material used for building and maintenance must be removed from site after construction or maintenance.	PM / C / ECO	As completed
	b. All leftover building materials must be removed from the site.	PM / C / ECO	On completion
	c. The Contractor must repair any damage that the construction works has caused to adjacent areas.	PM / C / ECO	Continually as necessary
	d. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.	PM / E / C	On completion
	e. All residual topsoil stockpiles must be removed to registered landfill sites or spread on site as directed by the Engineer.	PM / E / C	On completion
	f. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer and ECO.	PM / E / ECO / C	On completion

C5 – General	C.5.1 General Remediation		
	a. Temporary road works must be closed and access across these blocked.	E / PM / C	On completion of the construction and maintenance phases
	b. All areas where temporary services including the borrow pit are to be rehabilitated to the satisfaction of the Engineer and ECO.	E / PM / C / ECO	
c. A Meeting is to be held on site between the Engineer, ECO, and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer and ECO.		On completion of the construction and maintenance phases	

D. OPERATIONAL PHASE

Activity	Management / Mitigation	Responsibility	Frequency / Timing
D1 – Vegetation / Landscape Management	a. All rehabilitated areas will need to be maintained and re-seeded with local indigenous vegetation where necessary on a regular basis. This would need to be undertaken by the local municipality.	The local Municipal Authority	On-going
D2 – Noise Control	a. There is not expected to be a great deal of noise resulting from the development. Noise would be emitted by vehicles during the construction and operational phases however this would be within the acceptable limits.		
D3 – Traffic / Transport	a. Appropriate signage and road markings are to be installed to bring attention to the access. A 60-km/h-speed restriction is recommended. Speed restrictions would need to be adhered to along the road to protect maintenance and community members as well as livestock from harm. b. Appropriate signs are to be installed to advise traffic of the railway crossing ahead. c. Hazardous substance spills from vehicles, e.g. oils, grease etc, will have to be monitored and cleaned up on discovery. This would be the responsibility of the local municipality.		
D 5.3 Storm water Management	a. The storm water management system for the development needs to be implemented and maintained on a regular basis as directed by the engineer. This would be the responsibility of the local municipality's engineer. b. All storm water attenuation measures must be monitored on an annual basis through a general environmental audit.		

D 5.6. Solid Waste / Refuse Removal	<p>a. Waste removal generated through maintenance must be undertaken by the Local Municipality waste removal services as and when required.</p> <p>However, the following measures must form part of the general management of the site:</p> <ul style="list-style-type: none"> • Monitoring of solid waste removal • Disposal of hazardous substances (i.e. paint) in an approved manner. 		
D 5.5 - Sewerage	<p>a. Portable toilet facilities must be provided for maintenance workers and serviced and maintained as and when necessary by a registered waste disposal company.</p>		
D6 - Soil Erosion	<p>a. The following measures need to form part of the management of the site:</p> <ul style="list-style-type: none"> • Monitoring storm water exit points. • Fill in and re-vegetated eroded areas. • Regularly maintain storm water structure to maintain effectiveness. <p>b. Community and users of the road must be encouraged to use the upgraded road and not create alternative roads and paths.</p>		
D7 – Management of the Development	<p>a. The bridge must be maintained regularly.</p>		
D8 - Compliance with Record of Decision and other planning regulations and specifications	<p>a. All conditions and designs stipulated by the Engineer (see Appendices D for the Technical Report) and ECO must be strictly adhered to by all members of the development team during all phases of the development. National and Local regulations pertaining to the construction of roads must also be adhered to.</p>	E / C / PM / ECO / The local Municipal Authority	Project Completion

E. DECOMMISSIONING PHASE

The objective of providing guidelines during the decommissioning phase is to prevent structures from being left to deteriorate and look unsightly. It is imperative that non-functional structures be removed as soon as possible, and that the site be rehabilitated as soon as possible. If non-functional structures are not needed anymore, and not removed, it must be maintained that they will be used to prevent the environmental degradation of the site.

The local authority is responsible for ensuring the access road is properly maintained at all times.

F. STAFF CONDUCT CONTROL AND INFORMATION SHEET

	<u>ALL STAFF MUST OBEY THE FOLLOWING RULES:</u>
1	DO NOT leave the construction site untidy and strewn with rubbish that will attract animal pests.
2	DO NOT bring your pets to the construction site.
3	DO NOT trespass on private properties not linked to the project.
4	DO NOT carry a weapon on the construction site or in the vehicles transporting workers to and from the construction site.
5	DO NOT set fires unnecessarily.
6	DO NOT cause any unnecessary disturbing noise at the construction camp/site or at any designated worker collection/drop off points.
7	DO NOT drive a construction-related vehicle under the influence of alcohol.
8	DO NOT exceed the national speed limits on public roads or exceed the recommended speed limits in this management plan (where applicable) whilst driving a construction vehicle.

9	DO NOT drive a vehicle that is generating excessive noise (noisy vehicles must be reported and repaired as soon as possible).
10	DO NOT litter along the roadsides, including both public and private roads.
11	DO NOT remove or destroy vegetation at the construction camp/construction site without the prior consent of the Project Manager and Environmental Control Officer.
12	DO NOT tamper with, destroy or remove vegetation from any areas that have been fenced off or marked.
13	DO NOT pollute watercourses, whether flowing or not.

11. OTHER IDENTIFIED IMPACTS & POTENTIAL MITIGATION MEASURES

Socio-Economic Impacts

N/A

Conservation of the Natural Environment

Add relevant information

The C-Plan system of conservation areas has been designed to secure the full extent of biodiversity (pattern and process) in KwaZulu-Natal (Goodman 2002), which the EKZNW C-Plan product. The project, which is ongoing as new information is accumulated, identifies and ranks land areas of conservation value according to indices that reflect their importance in terms of biodiversity. The concept of Irreplaceability is used to determine the conservation value of land in KwaZulu-Natal. Irreplaceability is an index assigned to a parcel of land to indicate the importance of that land area to achieving regional conservation targets for biodiversity. Biodiversity, in this case, reflects both the distribution of critical species (pattern) as well as the ecological mechanisms that maintain and generate the patterns (process) such as animal migration, plant dispersal, pollination and fire disturbance. Areas of particularly high priority are land parcels of high Irreplaceability that are also vulnerable to transformation processes that threaten biodiversity (e.g. agriculture, forestry, urbanisation, heavy alien plant infestations). The scale at which the conservation planning process is undertaken is coarse ("planning units" are grids of 1km x 1km) but serves to highlight land areas in the province that are considered important and that will require further investigation before any development may proceed. Irreplaceability ranges from 0 (not important) to 1 (critically important).

Irreplaceability value – 0

Where a planning unit has an irreplaceability value of 0, all biodiversity features recorded here are conserved to the target amount, and there is unlikely to be a biodiversity concern with the development of the site (Goodman, undated).

Irreplaceability value – 1

These planning units are referred to as totally irreplaceable and the conservation of the features within them is critical to meet conservation targets. A full EIA will be required and, depending on the nature of the proposal, unlikely to be granted (Goodman, undated).

Irreplaceability value > 0 but < 1

Some of these planning units are required to meet biodiversity conservation targets. If the value is high (e.g. 0.9) then most units are required (few options available for alternative choices). If the value is low, then many options are available for meeting the biodiversity targets.

12. ACKNOWLEDGEMENT FORM

Record of signatures providing acknowledgment of being aware of and committed to complying with the contents of this Environmental Management Programme (EMPr), which relates to the environmental mitigation measures for the project outlined below, and the environmental conditions contained in the civil and other construction contract documents.

PROJECT NAME:

THE PROPOSED EMOYENI/EMADWALENI CAUSEWAY AND GRAVEL ROAD UPGRADE, UTHUKELA DISTRICT, KWAZULU-NATAL.

DEVELOPER / PROPONENT:

Signed: Date:

PROJECT MANAGER:

Signed: Date:

CONTRACTOR:

Signed: Date:

ENVIRONMENTAL CONTROL OFFICER

Signed: Date: