

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR

**PROPOSED SEWER PIPELINE AND PIPE
BRIDGE, PAUL ROUX,**

DESTEA REF. NO.: EMB/19,12/20/09

PREPARED FOR



PREPARED BY



ENVIRONMENTAL & SOCIAL SCIENTISTS

AUGUST 2020

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LIST OF ABBREVIATIONS

EA – Environmental Authorisation

EAP – Environmental Assessment Practitioner

ESA – Environmental Support Area

DESTEA – Department of Economic, Small Business Development, Tourism and Environmental Affairs

DLM – Dihlabeng Local Municipality

DWS – Department of Water and Sanitation

EMPR – Environmental Management Programme

PSC – Project Steering Committee

1. INTRODUCTION

SEMO-THABURE TMR JV on behalf of Dihlabeng Local Municipality (“DLM”) has appointed *NSVT Consultants* as independent environmental assessment practitioners (“EAP”) to undertake a Basic Assessment to obtain an Environmental Authorisation (“EA”) from the Department of Economic Development, Small Business, Tourism and Environmental Affairs (“DESTEA”) as well as an application to obtain a Water Use License from the Department of Water and Sanitation (“DWS”) to ensure environmental compliance in terms of Environmental Management Amendment Act (Act 107 of 1998) and National Water Act (Act 36 of 1998), for the proposed sewer pipeline from Fateng tse Ntsho, Extension 5 to the outfall sewer line connection point, which will then connect to the Paul Roux wastewater treatment plant and a pipe sewer bridge across the Sand river. The Environmental Management Programme (“EMPr”) is a requisite when undertaking a Basic Assessment process.

2. DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

The curriculum vitae of the EAP is attached hereto as **Appendix A**.

EAP	NSVT Consultants		
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QUALIFICATIONS	B. Sc (Natural Science) B. Sc Hons (Wildlife)	EXPERIENCE	17 years working in the environmental management field as an EAP. She has completed environmental impact assessment, basic assessment, drafting of EMPRs and environmental compliance monitoring for various development within the Free State., North West, Northern Cape and Eastern Cape Provinces.
EXPERTISE/ TRAINING	Resources & Sustainability, Physical & Biological Environment and Informatics Project Management for Environmental Management Social & Economic Sustainability Use of Matrices in EIA Public Participation Training Introduction to Social Impact Assessment		

	<p>Integrating HIV/Aids and Gender related issues into EIA Process</p> <p>Integrated Water Resources Management, Water Use Authorisation and Water Use License Application</p> <p>One Environmental Systems</p> <p>Introduction to Environmental Law</p>	PROFESSIONAL AFFILIATE	<p>South African Council for Natural Scientific Professionals: Professional Natural Scientist-4000161/09</p> <p>Member of International Association for Public Participation Southern Africa Affiliate-2010/ZA/FS/0001)</p> <p>Member of international Association for Impact Assessment South Africa - 2191</p>
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3. PROJECT DESCRIPTION

3.1. BACKGROUND INFORMATION

Dihlabeng Local Municipality must provide adequate sanitation service to the new Fateng tse Ntsho establishment, Extension 5. The new residential development will be connected to the existing bulk sewer reticulation network. The underground pipeline, which is approximately 1.58km will run on the eastern side of the National Road N5, across Sand river, wetland, and a drainage line. The section where the pipeline crosses Sand river, it will be carried by a pipe sewer bridge, running parallel to the existing bridge on the N5.

3.2 SENSITIVITY OF THE PROPOSED ROUTE

The development footprint on which the activity will be undertaken crosses a river, a wetland and drainage line, which are regarded as sensitive features, which needs to be protected so alleviate the impact on them as a result of the development. From the heritage assessment findings, the river as well as 10m wide section of alluvium flanking both sides of the river at the bridge is designated a site rating of General Protected A, Therefore, for the development to continue as planned, an archaeologist must be appointed to monitor excavations at the crossing including the 10m wide sections flanking both sides of the river and the rest of the linear development is designated a site rating of Generally Protected C.

From the findings of the Ecological study, the following were observed:

1. The vegetation type, Eastern Free State Clay grassland is classified as Nationally Threatened Ecosystem, which renders the entire vegetation type a priority ecosystem type for conservation on a national scale.

2. The entire assessment area falls within an Ecological Support Area two (ESA 2) in accordance with the Free State Provincial Spatial Biodiversity Plan 2017.
3. The Sand River constitutes a significant perennial watercourse and forms an important part of the regional surface water catchment and drainage area.
4. The small portion of the river where the sewer bridge crosses, mainly constitutes an aquatic environment dominated by aquatic and hydrophytic vegetation.
5. Individuals of the legally declared invasive species *Rosa rubiginosa*, *Datura stramonium* & *Argemone mexicana* (all Category 1b) are sparsely present.
6. There are no Red Data Listed or any other species of conservational significance along the route.
7. Provincially protected species *Helichrysum rugulosum* are found on the relatively undisturbed portion of the pipeline route nearer to the new establishment.
8. The area does not fall within an Important Bird Area.
9. The proposed development is viewed as being of moderate conservational significance for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type as well as the Sand River.

Sensitivity map of the proposed site is shown in *Figures 1* below:

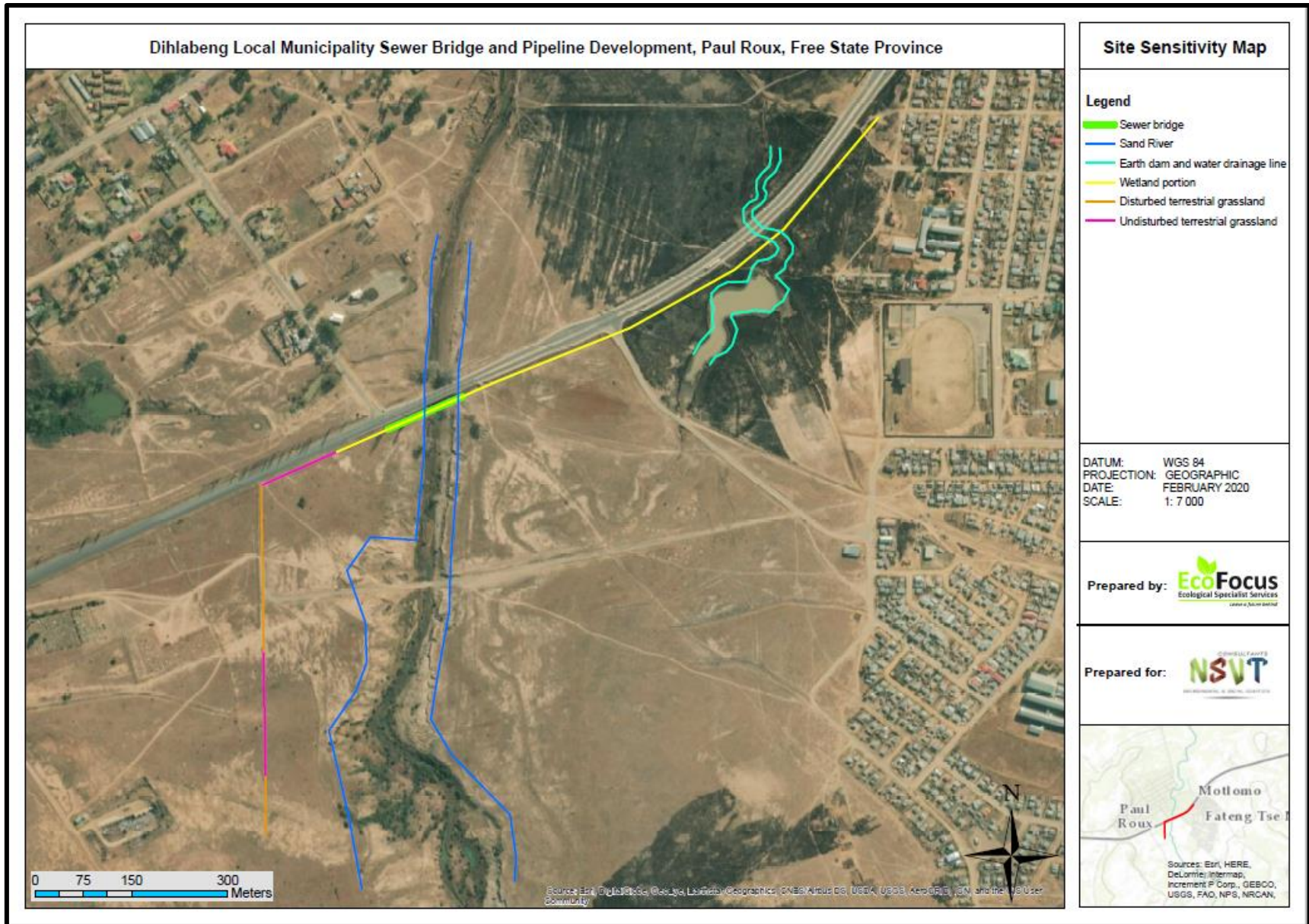


FIGURE 1: SENSITIVITY MAP REPRESENTING VEGETATION ALONG THE ROUTE

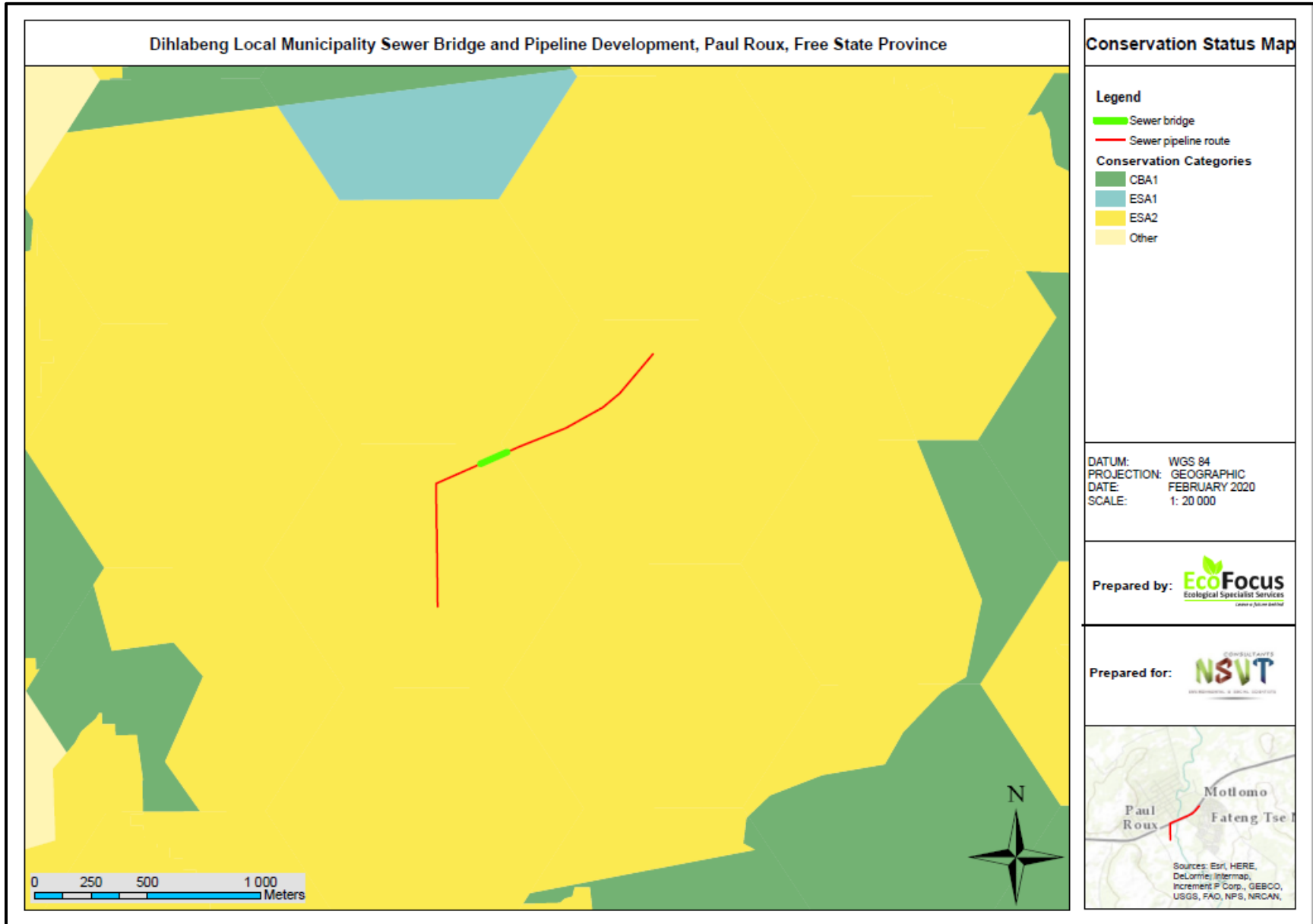


FIGURE 2: MAP DEPICTING CONSERVATION STATUS ASSOCIATED WITH PIPELINE ROUTE

4 CHECKLIST FOR THE PIPELINE PROJECT

1. Give a detailed description of the development:

The development of the pipeline construction consists of the following components:

- Construction of a sewer uPVC pipeline and pipe bridge to carry the pipeline across Sand River, wetland a drainage line, whereby material will be removed, then bedding material be placed within the trenches followed by laying of the pipe and the backfilling and compaction. For the bridge structure, there will be excavations to the required level to cast concrete base for placing piers that would support the lattice steel frame concrete sewer bridge.
- The pipeline length will be approximately of 1.59 km with a diameter of DN1500mm and the length of the bridge is 138.860m.

2. Give a brief description of the surrounding area:

The pipeline is placed on municipal land along the southern side of the national road N5. Fateng tse Ntsho is located to the east and Paul Roux to the west.

3. Is the project significantly different from the surrounding land use?

No, there are other linear development in the vicinity, e.g. National road, Eskom overhead powerline.

4. Are any of the following located on the site chosen for the development?

- i. River, stream, dam, wetland – Yes, Sand River, wetland and drainage line
- ii. Open space area – Yes
- iii. Residential (formal or informal settlement) – It's nestled between Paul Roux and Fateng tse Ntsho and it will be used to service the new establishment, Extension 5
- iv. Area of cultural importance, e.g. graveyards, old houses, museum, etc. – Cemetery

5. Are there any protected areas close to the construction site?

No, there are no protected areas within/near the route for the proposed pipeline.

6. Will the project be considered a noisy intrusion to the neighbours?

No

7. Would it be necessary to construct roads to access the construction site?

It would be determined by the contractor

5 ENVIRONMENTAL MANAGEMENT PROGRAMME

5.1. INTRODUCTION

The EMPr has been divided into four different phases associated with the development, namely the pre-construction planning phase, the construction phase and operational phase. This draft EMPr will be considered a Final EMPr if approved by DESTEA and it will be implemented by DLM. It should be read in conjunction with the contract documentation to ensure the contractor works in an environmentally sensitive manner, thus ensuring the impacts on the receiving environment. Should there be any conflict between the EMPr and project specifications, then terms herein shall be secondary.

5.2 OBJECTIVES OF THE EMPR

The aim of the EMPr is to ensure that impact on the environment due to the construction of the new development is limited. To achieve this, the EMPr has the following objectives:

- ❑ To identify possible impacts of the proposed activity on the environment and mitigation thereof.
- ❑ To provide information on construction activities associated with the identified environmental issues.
- ❑ To provide guidelines for the management of the identified environmental issues.
- ❑ To provide guidelines to the responsible person to follow appropriate contingency plans in the case of various possible impacts.

5.3 RESPONSIBLE PERSON (S)

The implementation of this EMPr requires the involvement of various role players, each with specific responsibilities to ensure that the development is completed in an environmentally sensitive manner.

The Developer: Dihlabeng Local Municipality

Responsibility: To implement the final EMPr after approval by DESTEA before completion of the construction phase and ensure the constructed development complies with the National Environmental Management Act (Act 107 of 1998) requirements and the conditions of the EA.

The Project Consultants: SEMO THABURE TMR JV

Responsibility: To undertake the detailed design for the pipeline development and to ensure that necessary permit has been obtained. To ensure the contractor sign the EMPr before commencement of construction.

The Environmental Control Officer (“ECO”): To be appointed

Responsibility:

- ❑ To ensure that the contractor implements the EMPr for the duration of the project from construction to post-construction.
- ❑ To review the method statements with the resident engineer.
- ❑ To maintain direct open line between the project consultant, contractor, the project steering committee (“PSC”) and DLM.
- ❑ To audit the implementation of the EMPr and compliance to the environmental authorisation once a month until project completion.

The Contractor: To be appointed

Responsibility:

- ❑ To implement the EMPr and keep a copy on-site for the duration of the construction phase because obligations imposed by the document are legally binding to environmental legislation.
- ❑ To comply with the Environmental Authorisation and undertake his construction activities in an environmentally sensitive manner and rehabilitation of the site.
- ❑ To undertake good housekeeping practices during duration of the project.
- ❑ To ensure that adequate environmental awareness training takes place in the language of the Employees.

Designated Environmental Officer (“DEO”): To be appointed by the Contractor

Responsibility:

- ❑ To implement the environmental management programme.
- ❑ To maintain records of environmental queries for duration of the construction.
- ❑ To resolve environmental issues during the construction phase of the project.

The Project Steering Committee (Environmental Forum): A committee that comprises of representatives of DLM, Project Engineers, Ward Councillor, Ward Committee Members, Local Community and Contractor.

Responsibility:

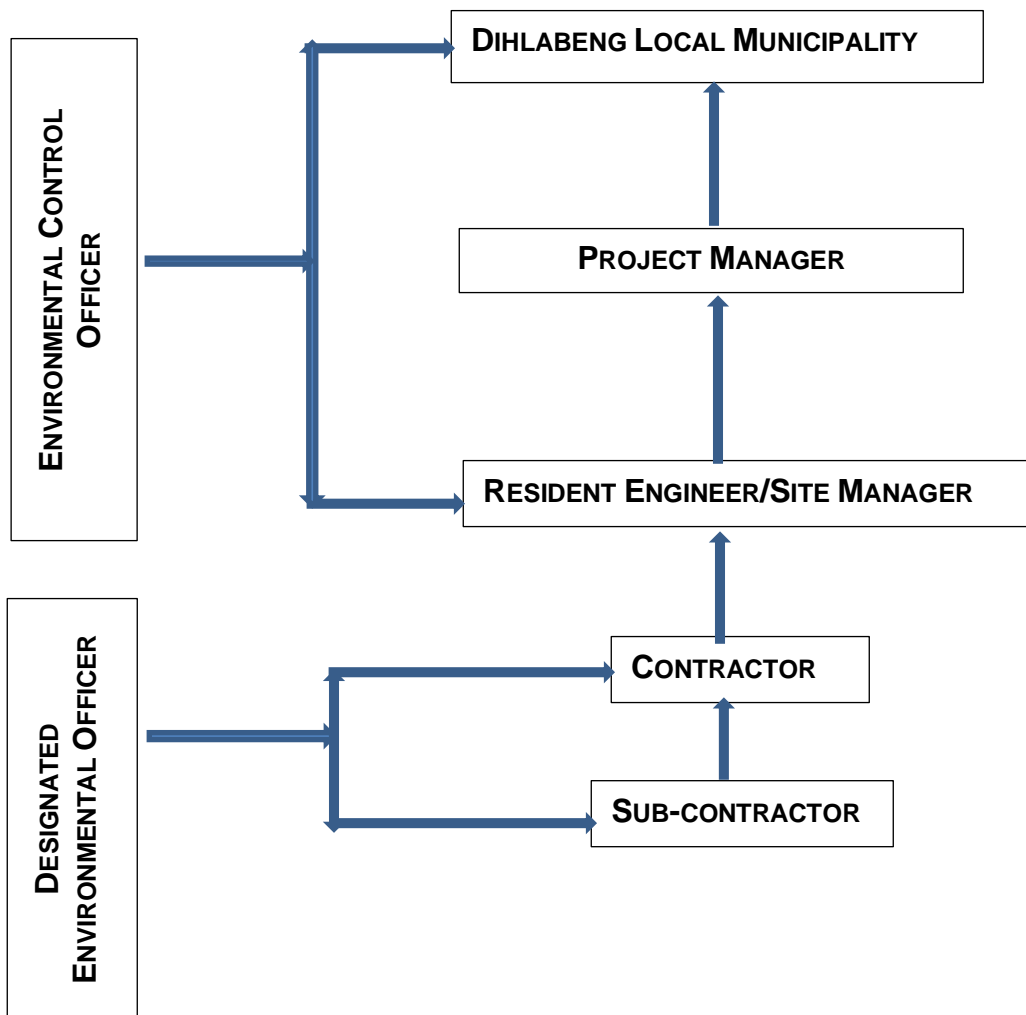
- ❑ To monitor the implementation of the EMPr.
- ❑ To assist in sourcing general workers from the local community.
- ❑ To ensure participation of local contractors during construction.
- ❑ To assist in resolving social or environmental issues that may arise during construction.

5.3.1. PROPOSED MECHANISMS FOR MONITORING COMPLIANCE WITH THE EMPR AND REPORTING THEREOF

The ECO must have adequate environmental knowledge to understand and implement this EMPr. They may not be someone appointed by the contractor, engineer or other party involved with the project. The ECO must be appointed and report to DLM only. If, in the opinion of the ECO, that there is a serious threat to or impact on the environment caused directly by the construction activities, the ECO may petition the Engineer to stop the works. Upon failure by the contractor or his workforce to show adequate consideration to the environmental aspects of this EMPr, the ECO may recommend to the engineer to have the contractor's representatives or any employee(s) removed from the site or the work suspended until the matter is remedied. If the transgression continues, the ECO in consultation with the Engineers may issue the contractor with a penalty.

5.3.2. ORGANIGRAM FOR REPORTING LINES

The organogram below depicts reporting lines for implementation of the EMPr.



5.4 METHOD STATEMENT

A method statement outlines construction activities to be undertaken with mitigation measures. The contractor should give a written statement to the resident engineer at least two weeks before the activity so that any irregularities can be handled before construction commences and also communicated to the Employees. The format of the method statement should clearly indicate the following:

1. Construction and Operational Procedures
2. Materials and Equipment used
3. How and where materials will be stored
4. When actions will be undertaken





Based on the EMPr specifications, the following method statements are required as a minimum:

- Site clearing
- Site layout and establishment
- Storage of hazardous substances and accidental spillages of hazardous substances
- Cement mixing
- Waste management procedures
- Wastewater management procedures
- Stormwater Management
- Traffic accommodation
- Erosion remediation
- Fire control and emergency procedures

5.5 ENVIRONMENTAL AWARENESS TRAINING

DLM, workforce of the contractors and sub-contractors involved with the work in the construction phase are to be briefed on their obligation towards environmental protection and methodologies in terms of the EMPr prior to work commencing. The briefing must be done by the DEO prior to construction in the form of an on-site talk (toolbox talks) and demonstration. There should be records for the said presentation, which should be done in a language that will be easily understood by all. This should be done prior to commencement of construction activities and for new sub-contractors and general workers if construction has commenced.

The environmental training should, as a minimum include the following:

-  The importance of conformance with all the environmental policies and legislation.
-  The roles and responsibilities in achieving conformance with the EMPr.
-  The environmental Impact, actual or potential, of their work activities.
-  The mitigation measures required from specified operating procedures.

- ✚ The potential consequences of departure from specified operating procedures.

The basic rules of conduct, which should be considered for the duration of the project, are shown in *Table 1* below.

TABLE 1: BASIC CONDUCT RULES DURING CONSTRUCTION

Do	Do Not
Use of toilet facilities provided and report when dirty or full	Make open fires for cooking, dedicated areas should be provided.
Clear your work areas of litter and building rubbish at the end of each day. Use the waste bins provided and ensure that litter would not be blown away	Allow any cement bags or litter to be blown around
Report all leakages and/or spillages	Dispose of cigarettes and burning matches randomly
Confine work and storage of equipment and comply with all safety procedures	Leave food lying around
Provide fire extinguisher in good working condition and easily accessible	Dump any waste substance into the watercourse
Use areas designated for food preparation	
Only emergency repairs of construction vehicles are allowed on the construction site	
Use all safety equipment and comply with all safety procedures	
Prevent excessive dust and noise	

5.6 RECORD KEEPING

There must be an up to date filing system at the site office for the duration of the project whereby method statements, environmental incidents report, training records, audit reports and public complaints register are kept. It is advised that photographs of the site must be taken pre-, during and post-construction as a visual reference and must be stored with other records related to the implementation of the EMPr. These records must be kept for a minimum of 2 years after completion of the project. It is therefore imperative that there be a file dedicated for Environmental Documentation.

5.7 PENALTIES

In cases of transgressions and non-compliance to the EMPr by the contractor, he should be liable to a penalty fine. Transgressions should be recorded in a dedicated register and be kept at the site office for the duration of the project. The resident engineer will issue the penalties in terms of the severity on the environment; however, *Table 2* below may be used as a guideline.

TABLE 2: PENALTIES FOR TRANSGRESSIONS

TRANSGRESSION	PENALTY
Littering and bush-toileting	R1000
Concrete mixing on the ground	R2000
Spillages	R1000-R10 000 depending on the magnitude)
Soil erosion	R2000
Veld fires	R5000

The penalty could be donated to an environmental charity in the area or any need for environmental protection.

5.8. COMPLIANCE WITH ENVIRONMENTAL LEGISLATION

The proposed pipeline must be in compliance with the applicable Environmental Legislation in *Table 3* below and necessary authorisation, permits and licenses obtained before commencement of construction activities as shown.

TABLE 3: APPLICABLE ENVIRONMENTAL LEGISLATION

LEGISLATION	APPLICABLE			OBTAINED	
	YES	NO	N/A	YES	NO
Environmental Authorisation in terms of Section 24 of National Environmental Management Act (Act 107 of 1998)	X				
Water Use License in terms of Section 21(c) and (i) of the National Water Act (Act 36 of 1998)	X				X
Permit in terms of National Environmental Management Act: Biodiversity Act (Act 10 of 2004)	X				X
Section 38 of National Heritage Resources Act (Act 25 of 1999)			X		
Section 37 of the Mineral Resources Development Act (Act 29 of 2002)			X		
Bedding material must be obtained from a borrow pit with a Mining Permit or a commercial quarry.					
Waste Management License in terms of National Environmental Management: Waste Management Act (Act 59 of 2008)			X		

5.9. IMPACT AND MANAGEMENT MEASURES

The EMPr is outlined in *Table 4* below and adherence to this plan during construction will ensure that the environmental impacts associated with the proposed development, will be mitigated, thus promoting sustainable development. The commitment and co-operation of the identified responsible person(s) will ensure effective implementation of the EMPr for the duration of the implementation. The Contractor must familiarize himself with the requirements of the EMPr, keeping in mind that this EMPr specifies the minimum performance specifications and that other site-specific requirements and possible additional requirements from relevant stakeholders (government departments), as outlined in the conditions of the Environmental Authorization, must be complied with.

TABLE 4: DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	FREQUENCY
1. PRE-CONSTRUCTION PHASE					
Project Contract and Programme	Adherence to the EMPR	<ul style="list-style-type: none"> ◇ The EMPr must be included in the tender documentation and a copy of should be available on-site for the duration of the project. ◇ The environmental responsibilities should be formalized, and environmental awareness should be introduced to the labourers in their language as toolbox talks. 	CONTRACTOR & ENGINEERS	Ensure that EMPr is adhere to	Frequency Once off
Location of Camp and Depot	Environmental damage	<ul style="list-style-type: none"> ◇ The camp depot should be located in an area where the surrounding land users are not disturbed or inconvenienced. ◇ The contractor should provide the project engineer with the layout plan of the camp depot for approval before commencement with the construction phase. The plan should include site offices, temporary fencing boundary, sanitation facilities, waste and 	CONTRACTOR & RESIDENT ENGINEERS	Prevent environmental damage and disturbance of neighbouring land users	Frequency Once off

		<p>petroleum products storage facilities, stockpiling areas, etc. The parking of vehicles, storage of equipment and materials must strictly be confined to designated areas.</p> <ul style="list-style-type: none"> ◇ No storage of construction material must be allowed on watercourses. ◇ If located on the “virgin” ground, the area has to be rehabilitated once the project is completed. ◇ The construction area must be adequately cordoned off. 			
MANAGEMENT ACTION		A camp depot must be approved by the Resident Engineer. An agreement should be in place between the contractor and landowner prior to commencement of construction phase. Photographs of the approved area before and after establishment must be kept for recordkeeping.			
Water Supply	Source of water during the construction phase.	<ul style="list-style-type: none"> ◇ Potable water must be available at the camp depot, office site and construction site. ◇ No boreholes can be established without DWS approval. ◇ No water must be abstracted from the watercourse without a Water Use License. 	CONTRACTOR, ENGINEERS & MUNICIPALITY	Prevent borehole establishment without DWS approval.	<u>Frequency</u> Once off
MANAGEMENT ACTION		A written agreement between the contractor and property owners or Water Use License for abstraction must be in place. If water will be obtained from the municipality, then an agreement must be in place. Container marked potable water must be placed at the construction site.			
Access Control for the camp depot	Hazards to livestock, and stealing of construction materials	<ul style="list-style-type: none"> ◇ Fence or suitably secure main site office and material storage area. ◇ Unauthorized entry must be prohibited 	CONTRACTOR AND ENGINEER	Keep the site secure from trespassing or theft and keep animals out.	<u>Frequency</u> Duration of the project
MANAGEMENT ACTION		A fenced off camp depot with access control, e.g. site access register and complaints book should be in place.			

ASPECT	POSSIBLE IMPACT	◇ MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Access route	Erosion and dilapidation of the access routes	<ul style="list-style-type: none"> ◇ Upgrade the access routes used during construction to an acceptable condition. ◇ Proper maintenance must be done to ensure the quality of the access road is improved. ◇ Implement erosion protection works at identified problem areas. 	CONTRACTOR, ECO & ENGINEERS	Prevention of dilapidation of access route	<u>Frequency</u> Weekly
MANAGEMENT ACTION		Photographs depicting conditions of the road pre- and post-construction.			
Power Supply	Safety Impacts	◇ A safety officer must be appointed to undertake safety audits.	CONTRACTOR & ENGINEERS	Implement safety measures	<u>Frequency</u> Monthly
MANAGEMENT ACTION		Appointment letter of the Safety Officer must be in place.			
Solid Waste	Littering/ Pollution of environment with waste materials	<ul style="list-style-type: none"> ◇ Refuse receptacles marked for different waste streams must be provided. ◇ System for regular waste removal must be set up. ◇ Letter or agreement between contractor and pollution control officers or companies dealing with hazardous waste should be on site. The service provider must have the necessary accreditation to transport and dispose waste. 	CONTRACTOR & ENGINEERS	Prevent environmental pollution with waste materials and visual impact.	<u>Frequency</u> Duration of the Project
MANAGEMENT ACTION		Method Statement for storing, handling, and disposal of waste and Record keeping of all records. Letter of Agreement for handling of hazardous waste between contractor and Service Provider must be in place.			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Sewage	Pollution of environment with waste materials	<ul style="list-style-type: none"> ◇ Adequate sanitation facilities e.g. chemical toilets must be provided at the camp depot and construction site. ◇ Letter of consent from a registered waste facility to allow contractor to empty the toilet facility at their sewer system should be in the environmental document. 	CONTRACTOR & ENGINEERS	Prevent environmental pollution	Frequency Duration of the project
MANAGEMENT ACTION		Record keeping for emptying of the chemical toilets. Written agreement between contractor and the chemical toilets service provider must be in place.			
Social & Socio-Economic Aspects	Dissatisfaction	<ul style="list-style-type: none"> ◇ Community Liaison Officer must be appointed. ◇ A project steering committee (PSC), which comprises of the municipality, Engineers, contractors, farmers and community representatives must be established. ◇ The PSC must meet regularly to address any concerns/ issues from the neighbouring land users and employing local labourers. 	CONTRACTOR, ENGINEERS, WARD 17 COUNCILLOR & DLM	Ensure satisfaction of workers and neighboring land users	Frequency Monthly
MANAGEMENT ACTION		Appointment letter for the CLO must be in place. Contravening of PSC meetings and Records of the Minutes			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Health & Safety	Danger to the neighbouring land users	<ul style="list-style-type: none"> ◇ The contractor should provide employees with suitable equipment to protect them from hazards being presented and that will allow them to work without risk to the health in a hazardous environment, e.g. hard hats, gloves, boots, etc. ◇ An Emergency Preparedness Plan must be compiled and approved by the Resident Engineer, Safety Officer and ECO before construction commences. ◇ A list of all emergency telephone numbers, i.e. fire, ambulance, ECO, engineers, etc. should be available all the time at the construction and camp site. ◇ A medical first aid kit should be available on site for duration of the project. ◇ Safety signs complying with SABS and SANS standards should be placed on-site in a manner clearly visible to the public. ◇ Construction methods should adhere to the Occupational Health and Safety Act (Act 85 of 1993). ◇ A safety officer should arrange a safety awareness meeting with the neighbouring community 	CONTRACTOR & ENGINEERS	To avoid endangering of the community members in proximity to the pipeline construction.	<u>Frequency</u> Duration of the Project
MANAGEMENT ACTION		Risk register should be in place			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Existing Infrastructure	Encroachment of the pipeline route onto the existing servitudes	<ul style="list-style-type: none"> ◇ Wayleave application must be submitted to the SANRAL if pipeline will be within the road reserve. ◇ An application must be submitted to Eskom Distribution Free State Operating Unit, Land Development and Environmental Management Department for permission to encroach their powerline servitude. 	DIHLABENG LOCAL MUNICIPALITY	To avoid any damage or destruction to the existing infrastructure.	<u>Frequency</u> Once-Off
MANAGEMENT ACTION		Wayleave will be in place prior to commencement of construction activities.			
Heritage Artefacts	Destruction of heritage artefacts	<ul style="list-style-type: none"> ◇ An Archaeologist must be appointed prior to commencement of construction activities at the Sand River crossing to monitor excavations at the river crossing as well as 10m wide sections of alluvium flanking both sides of the river at the bridge. 	Dihlabeng Local Municipality/ Contractor	To avoid damage to unearthed heritage artefacts	<u>Frequency</u> Duration of construction at the river crossing
MANAGEMENT ACTION		An appointment letter of an Archaeologist to undertake excavation monitoring at the river crossing.			
Flora	Loss of provincially protected species	<ul style="list-style-type: none"> ◇ A Provincial Flora Permit must be obtained prior to commencement of construction activities. 	Dihlabeng Local Municipality/ Contractor	To obtain a flora permit for removal of provincial protected species	<u>Frequency</u> Once-off
MANAGEMENT ACTION		An appointment letter for an Ecologist to undertake the flora permit for removal of <i>Helichrysum rugulosum</i> .			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
WATER QUALITY	Impact on the water quality of Sand River	<p>◇ A comprehensive South African Scoring System 5 (SASS 5) aquatic bio-monitoring assessment by a suitably qualified and experienced ecologist must be conducted of the Sand River directly downstream of the proposed project area prior to commencement of the construction phase. This information will serve as baseline watercourse health data to be used for subsequent monitoring assessments to be conducted.</p> <p>◇ Water samples of the Sand River must be collected directly downstream of the proposed project area prior to commencement of the construction phase. The quality of these samples must be chemically and biologically analysed by an accredited laboratory in order to serve as baseline water quality data to be used for subsequent monitoring assessments to be conducted.</p>	Dihlabeng Local Municipality/ Contractor	To obtain health date/baseline information of watercourse	<u>Frequency</u> Once-off
MANAGEMENT ACTION		Appointment of an ecologist to undertake the monitoring and results of the chemical and biological analysis			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
2. CONSTRUCTION PHASE					
Characteristics of Watercourses	Destruction of watercourses along the pipeline route.	<ul style="list-style-type: none"> ◇ Adequate stormwater and erosion management measures must be implemented for the entire assessment area during the construction and operational phases. ◇ Temporary water diversion will take place upstream of the work area. ◇ Any soil that is removed for trenching within the watercourse must be stored in their respective layers and returned to the excavation in reverse order. ◇ Soils must be stored outside of the watercourse in order not to smother established vegetation growth in the drainage line. ◇ The movement of heavy machinery within the watercourses must be done with caution. ◇ Indiscriminate habitat destruction must be avoided and the construction footprint, including service and support areas should be kept to a minimum. ◇ Adequate site reinstatement must be implemented in order to abate the formation of erosion through modification of the surface water hydrology. 	CONTRACTOR, RESIDENT ENGINEER, ECO	To avoid the complete destruction of the watercourses	<u>Frequency</u> Throughout construction.

ASPECT	POSSIBLE IMPACT	◇ MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Water quality of the watercourses	Contamination of the watercourses due to accidental spillages or leaking of poorly services vehicles during construction	<ul style="list-style-type: none"> ◇ No fuel to be stored at or near to the watercourses. ◇ Equipment must be properly maintained and serviced. ◇ Fuel storage and pump area must be bunded to avoid accidental leakage. ◇ Accidental spills must be reported and cleaned immediately. ◇ Emergency Spill Kit must be available on the construction site. ◇ Adequate operational procedures for construction machinery and equipment must be developed in order to strictly govern movement of machinery only within the proposed development construction footprint area and to ensure environmentally responsible construction practices and activities. ◇ The movement of heavy machinery within wetland zones should be limited to only single access roadways. ◇ Guidelines for trenching in wetlands attached hereto as Appendix B must be followed. 	CONTRACTOR, RE & ECO	To protect and prevent contamination of the watercourses	<u>Frequency</u> Throughout construction
MANAGEMENT ACTION		ECO Compliance Report			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Flora	Loss of vegetation	<ul style="list-style-type: none"> ◇ Existing roads in proximity to the construction footprint area must be used during the construction phase. No new temporary roads or tracks may be constructed within the surrounding undeveloped areas outside the proposed development footprint and specifically not within the broader continuous wetland area to the south. ◇ Topsoil must be reserved and used as a top layer on disturbed areas to enable plant succession. ◇ Mechanical tools should be used for vegetation clearance where possible. ◇ Vegetation clearance should be confined to the development footprint and set out to avoid substantial vegetation disturbance. ◇ Adequate operational procedures for construction machinery and equipment must be developed to strictly govern movement of machinery only within the proposed development construction footprint area and to ensure environmentally responsible construction practices and activities. ◇ All excavations to be filled and rehabilitated before construction moves off sites. 	CONTRACTOR, ENGINEER, AND ECO	Prevent impacts on flora and destruction of red Data Species	<u>Frequency</u> Once off
MANAGEMENT ACTION		ECO compliance report, Photographs taken before the clearance of the vegetation is undertaken.			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION FREQUENCY
Fauna	Disturbance to fauna in the area	<ul style="list-style-type: none"> ◇ No hunting, snaring, shooting, nest raiding or egg collection by the construction staff must be allowed. ◇ Toolbox talks must include handling of animals. 	CONTRACTOR, RE, DEO & ECO	To avoid disturbance and prevent killings of fauna in the area	<u>Frequency</u> Duration of the contract
Topsoil	Loss of Topsoil	<ul style="list-style-type: none"> ◇ Exposure of bare ground must be minimized. Topsoil stripping should be limited to the development footprint. ◇ It must be stored separately from subsoil, i.e. no mixing of soils. ◇ In situ material should be removed to an average depth of 1000mm. ◇ Cleared and grubbed topsoil must be stockpiled as a top layer of at least 150mm thickness on the backfilled trenches for rehabilitation purposes. ◇ Soil conservation measures such as berms, gabions and mats should be used on-site to help reduce erosion. ◇ No stockpiling of topsoil in the watercourses. ◇ Double handling of topsoil must be avoided. ◇ Topsoil stockpile must be kept weed free. ◇ Litter must be removed from the topsoil stockpile. 	CONTRACTOR, ENGINEER & ECO	Conserve and protect topsoil from erosion and deterioration	<u>Frequency</u> Weekly
MANAGEMENT ACTION		ECO Compliance Report, photographs			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Topography	Disturbing the natural topography	<ul style="list-style-type: none"> ◇ The natural ground levels within the servitude are to be retained. ◇ Trenches, soil dumps and other working areas should be rounded-off to ensure the disturbed area(s) blend in with the natural environment and the possibility of erosion is minimized. ◇ All the excavations should be backfilled to avoid. ◇ Rehabilitation by covering the disturbed areas should hasten the succession process and minimize potential erosion. 	CONTRACTOR, ENGINEER AND ECO	Minimize the disturbance of topography	<u>Frequency</u> Duration of the project
MANAGEMENT ACTION		ECO Compliance Report			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Stormwater	Contamination of stormwater	<ul style="list-style-type: none"> ◇ An approved Stormwater Management Plan must be in adhered to. ◇ Stormwater control works must be constructed, operated, and maintained in a sustainable manner throughout the project. ◇ Stormwater leaving the construction site must in no way be contaminated by any substance produced, stored, dumped, or spilled on site. ◇ No contaminated water should be allowed to run freely into the watercourses. ◇ The construction footprint through the watercourse and drainage lines must be rehabilitated as soon as practically possible after construction to ensure the continuation of flow and ecological integrity. 	CONTRACTOR, ENGINEER AND ECO	Avoid contamination of storm water	<u>Frequency</u> Weekly
MANAGEMENT ACTION		Stormwater Management Plan must be in place and kept in the Environmental Documentation			

ASPECT	POSSIBLE IMPACT	◇ MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Soil erosion	Erosion	◇ Adequate stormwater and erosion management measures must be implemented for the proposed sewer tunnel bridge area during the construction and operational phases. This must be done in order to sufficiently manage stormwater runoff in order to prevent any significant erosion from occurring. ◇ Avoid steep-cut banks of watercourses or drainage lines. ◇ Effective sediment control practices must be in place. ◇ Gully formation must be prevented. ◇ A rock construction entrance, <i>i.e.</i> a bed rocks must be in place to remove sediment from vehicle tires when entering the watercourse.	CONTRACTOR, ENGINEER AND ECO	Prevent soil Erosion	<u>Frequency</u> Weekly
Air Quality	Nuisance and reduction in visibility	◇ Occasional wetting of the construction site must be done by means of a water tanker pipe to keep the dust down and vehicles should drive at 40km/h speed.	CONTRACTOR, ENGINEER AND ECO	To avoid dust from excavated materials and unnecessary visual impact caused by site operations	<u>Frequency</u> When necessary

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Noise	Nuisance	<ul style="list-style-type: none"> ◇ Construction should be limited to normal working days and office hours from 08h00 to 17h00. ◇ Ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours. ◇ Limit working hours of noisy equipment to daylight hours, ◇ Fit silencers to equipment. 	CONTRACTOR, ENGINEER AND ECO	To avoid excessive noise generation from site operations	<u>Frequency</u> Duration of Contract
Solid Waste	Littering/ Pollution	<ul style="list-style-type: none"> ◇ Toolbox talks should include a component of waste management. ◇ All waste should be appropriately separated, contained, and disposed be removed from the site to the registered landfill site in Paul Roux. ◇ Reduction, reuse and recycling of waste should be introduced. ◇ Illegal dumping should be forbidden. ◇ No dumping of builders' rubble earth or other materials within the servitude area and watercourses ◇ Good housekeeping practices must be in place. 	CONTRACTOR, ENGINEER AND ECO	Provide facilities for appropriate collection and disposal of different waste streams	<u>Frequency</u> Weekly

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Sewerage	Pollution of the receiving environment.	<ul style="list-style-type: none"> ◇ Adequate sanitation facilities i.e. 15 employees per facility should be provided. ◇ The toilets should be located at least 50m from the construction site. ◇ They should be kept clean and hygienic regularly to ensure that they are usable. ◇ Effluent must not be discharged into natural environment and bush-toileting is prohibited. ◇ No chemical toilets must be placed within the watercourses. 	CONTRACTOR, ENGINEER AND ECO	Provide facilities for sanitation	<u>Frequency</u> Weekly
Cement mixing	Pollution of soils, surface and groundwater	<ul style="list-style-type: none"> ◇ Mixing of cement should be done at specifically selected areas on mortar boards or similar structures to contain surface run-off. ◇ Cleaning of cement mixing equipment should be done on proper cleaning trays. ◇ No cement or cement containers should be left lying around. 	CONTRACTOR, ENGINEER AND ECO	Avoid polluting soil and groundwater	<u>Frequency</u> Weekly
Water Supply	Source of potable water during the construction phase.	<ul style="list-style-type: none"> ◇ Potable water must be available at the camp site and construction site in clearly marked containers. 	CONTRACTOR, ENGINEER AND ECO	To provide clean and safe potable water to the workforce	<u>Frequency</u> Weekly

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Alien invasive species	Prevent the spreading of alien invasive species especially to the surrounding cultivated areas	<ul style="list-style-type: none"> ◇ Implement an adequate Alien Invasive Species Establishment Management and Prevention Plan (Section 7 and 8) attached hereto as Appendix C. ◇ All the identified alien invasive species individuals must be actively eradicated from the assessment area and adequately disposed of in accordance with the National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014. ◇ A designated person must be appointed to keep the construction site weed free. ◇ Construction vehicles must be cleaned before entering the construction site. 	CONTRACTOR, ENGINEER AND ECO	To prevent and control establishment of weed and alien species	<u>Frequency</u> Weekly

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Power Supply	Safety Impacts	<ul style="list-style-type: none"> ◇ Limit the power supply cables & ensure the safety of the workers and neighbouring residents. ◇ All health and safety laws and regulations should be adhered. ◇ No stockpiling of construction material within the powerline servitude. 	CONTRACTOR, ENGINEER AND ECO	Avoid health and safety impacts	<u>Frequency</u> Weekly
Energy Efficiency	Saving of fossil fuels	<ul style="list-style-type: none"> ◇ Manual labour should be used as much as possible rather than machinery to conserve fossil fuels. 	CONTRACTOR, ENGINEER AND ECO	Saving of fossil fuels by means of using labour intensive work.	<u>Frequency</u> Weekly
Traffic Impact	Safety/ Traffic Impacts	<ul style="list-style-type: none"> ◇ The vehicle construction should limit speed to 40km/h and also be considerate of the surrounding land users. ◇ Only drivers with valid licenses should be allowed to drive the construction vehicles. ◇ In the event of abnormal vehicles, a permit must be obtained from the local Department of Traffic. 	CONTRACTOR, ENGINEER, ECO AND TRAFFIC OFFICER	Minimize the disruption of road users	<u>frequency</u> Weekly
MANAGEMENT ACTION		ECO Compliance Reports Photographic History			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
Fire Hazard	Risk of veld fires	<ul style="list-style-type: none"> ◇ No open fires are permitted in the construction site, except under strictly controlled conditions subject to the National Veld and Forest Act, (Act No. 101 of 1998). ◇ The contractors and labourers should be informed and advised on the associated risks, dangers and damage of property caused by accidental fires and how to prevent them. ◇ Fire extinguishers should be made available at the construction site, and the labourers should be informed of their location and shown how to use them. ◇ Restrict smoking activities to demarcated smoking activities. 	CONTRACTOR, ENGINEER AND ECO	Prevent veld fires.	<u>Frequency</u> Weekly
Vehicle Servicing Areas	Pollution	<ul style="list-style-type: none"> ◇ Vehicle servicing should be done at the identified camp depot on impermeable surfaces to minimize the likelihood of petrochemical spills on soil. ◇ In the case of accidents, polluted soil should be appropriately treated or taken away to an appropriate site. 	CONTRACTOR, ENGINEER AND ECO	Prevent soil Erosion	<u>Frequency</u> Weekly

		<ul style="list-style-type: none"> ◇ Used spares must be collected and disposed of in the correct manner. Oils must be drained into a suitable container, transferred to a larger storage container, and then supplied to oil recycling companies. ◇ Oil may under no circumstances be disposed of into the sewer lines, storm water system, stream, or the ground. 			
Areas of Palaeontological, Cultural and/or Historical Importance	Disturbance of important scientific artefacts	<ul style="list-style-type: none"> ◇ Monitoring of excavations at the river crossing by an Archaeologist. ◇ Should fossil material be discovered later, it must be appropriately protected, and the discovery reported to a palaeontologist for the removal thereof as per SAHRA legislation. ◇ Should any human skeletal remains be found during excavations, work must stop in the area. The findings should be reported immediately to SAHRA. 	CONTRACTOR, ENGINEER AND ECO	Prevent disturbance of historical scientific artefacts.	<u>Frequency</u> of the Duration of the Contract
MANAGEMENT ACTION		ECO Compliance Reports Photographic History			

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)	OBJECTIVES	MONITORING ACTION AND FREQUENCY
3. POST CONSTRUCTION PHASE					
Aesthetic view of the area	Aesthetic pollution	<ul style="list-style-type: none"> ◇ A Rehabilitation Management Plan attached hereto as Appendix C must be implemented. ◇ Areas surrounding the construction footprint must be adequately rehabilitated as soon as practically possible after construction. ◇ The site must be clear of litter and all waste and builders' rubble must be removed and disposed to the Paul Roux landfill site. ◇ All stockpiles must be removed to spoil or handled as directed by the engineers. ◇ Spoil heaps should be flattened to the similar adjacent ground, to prevent soil erosion, thus encouraging natural revegetation. ◇ All excavations should be backfilled, levelled properly and compacted. ◇ All surfaces hardened due to construction must be ripped and material imported thereon be removed. 	CONTRACTOR, ENGINEER AND ECO	Prevent pollution	Frequency Once off

		<ul style="list-style-type: none"> ◇ The original site topography should be restored where as much as possible. ◇ All disturbed areas should be revegetated with indigenous grass to ensure progressive plant succession. Topsoil should be applied at cleared area and where material was stockpiled for this purposed. ◇ A final audit must be completed before the contractor may leave the site to ensure that all requirements were adhered to. ◇ A meeting must be held between the stakeholders to ensure that the site has been restored to a satisfactory condition. 			
MANAGEMENT ACTION		Final Audit Report submitted to DESTEA			
4. OPERATION PHASE					
Soil erosion	Increased soil erosion due to the disturbed soils	◇ Monitoring of the watercourses for 12 months after the rehabilitation phase	DIHLABENG LOCAL MUNICIPALITY	Prevent land degradation	<u>Frequency</u> 12 months after rehabilitation, once a month
Soil and Water pollution	Contamination of soil and water due to leaks	◇ Regular maintenance of the pipeline should be in place	DIHLABENG LOCAL MUNICIPALITY	Prevent pollution	<u>Frequency</u> Regularly
MANAGEMENT ACTION		Emergency Response Procedure must be in place "As built drawings" and Maintenance and Operation Plan must be in place			

6 AUDIT AND MONITORING

Compliance monitoring provides useful information for gauging environmental performance throughout the duration of the project. The information obtained can be used to gauge how effective the mitigation plans in the EMPr are and determine whether the corrective actions undertaken are adequate and whether some modifications are required. The resident engineer (project manager) must monitor the overall aspects of the project, e.g. labor issues and complaints raised by the local community, so they can be addressed in conjunction with the PSC. A DEO must be on site for the duration of the project to ensure that the conditions of the EA and EMPr are adhered to. The ECO must monitor construction activities at least once a month and the monthly reports must be compiled and presented to the PSC for discussion if needs be. On completion of the construction phase, post-rehabilitation, an environmental audit must be conducted by an experienced and qualified auditor.

APPENDIX A
CV OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

NAME: Lorato Tigedi Pr. Sci. Nat. (400161/09)

Name of Firm: NSVT Consultants

Present Position: Director/ Environmental Assessment Practitioner

Phone: 051 430 1041/2

Years with the Firm: 9 Years

Cell: 082 784 8259

Mailing Address: 1 Fourth Street, Office 1A, Arboretum, 9301

E-mail: lorato@nsvt.co.za

Date of Birth.: 1980-09-25

Nationality: South African

Education:

Name of Institution	Degree Obtained	Dates Attended
University of the Free State	BSc. Natural Science (Zoology)	1999-2002
	BSc. Hons. Wildlife	2003-2004
	Masters in Environmental Management (Mini-thesis Outstanding)	

Professional Membership:

MEMBERSHIP	MEMBERSHIP No.
South Africa Council for Natural Scientific Professions (SACNASP)	Environmental Scientist (400161/09)
International Association for Impact Assessment South Africa Affiliate (IAIAsa)	Member (2191)
International Association for Public Participation Southern Africa Affiliate	Member (2010/ZA/FS0001)

Key Experience:

Lorato Tigedi joined Geo Pollution Technologies (Free State) in 2003 and partnered with a Geohydrologist to set up Bokamoso Consultants as an environmental consultant, trading as NSVT Consultants. From 2004-2005 after completion of BSc Hons (Wildlife) she continued to study Master's in Environmental Management in 2006 but only completed the modules work and still have Mini-Dissertation. In 2011, she set up NSVT Consultants CC as a sole member. She has approximately 17 years in environmental consulting and have completed basic assessment, environmental impact assessment, waste management license and water use license applications for Free State, Northern Cape, North West and Eastern Cape Provinces. She therefore has extensive knowledge regarding the competencies required to ensure implementation and alignment of environmental policy instruments such as EIA. For Continuous Professional Development, she has completed short courses in Planning for Effective Public Participation, Social Impact Assessment and Conflict Management, Introduction to Environmental Law, Introduction and Implementation of OHSAS 17001 and EMS 14001-2016 amongst other courses. Therefore, she possesses the technical expertise and scientific knowledge for conducting thorough environmental assessments. She has considerable public participation experience through her work in EIA and understand that an effective public participation process provides an opportunity for identifying problems during the EIA process and identifying opportunities that could be used in the decision-making process. Through her involvement in various projects, she has acquired analytical, problem-solving and excellent research skills

Current Employment:

Duration: March 2011 to date **Organization:** NSVT Consultants-Environmental and Social Scientists

Position: Director and Environmental Specialists/Scientist

Project: Basic Assessment for a new 132kV powerline from Rouxville substation to Melkspruit substation in Aliwal North

Client: Eskom Free State Operating Unit

Project: Environmental Compliance Monitoring for the Construction of a feeder pipeline to connect reservoir 8 with the existing water supply network, Section F, Botshabelo, Mangaung Metropolitan Municipality, Free State Province

Client: Flagg Consulting Engineers

Project: Environmental Impact Assessment for the proposed residential area in Mafube Local Municipality

Client: Pula Strategic Resource Management

Project: Basic Assessment, Water use License and Environmental Compliance Monitoring, for the Ficksburg Pipeline from Meulspruit Dam to the water treatment plant.

Client: Flagg Consulting Engineers

Project: Environmental Authorisation application for development of new residential area including associated infrastructure in Metsimaholo Local Municipality and Maluti-a-Phofung Local Municipality.

Client: YB Mashalaba & Associates

Project: Environmental Authorisation application for development of new residential areas including associated infrastructure in Phumelela Local Municipality, Dihlabeng Local Municipality, Tswelopele Local Municipality.

Client: Phethogo Consulting Engineers

Project: Application for rectification for upgrading the treatment works without obtaining an Environmental Authorisation in Vredefort

Client: Sobek Engineering

Project: Waste management license applications for development of new treatment plant.

Client: ISA & Partners

Project: Environmental Authorisation application and Environmental Compliance Monitoring for a new interchange, overhead and pedestrian bridge.

Client: UWP Consulting Engineers

Project: Environmental authorisation applications for a new landfill sites in Mantsopa Local Municipality.

Client: Bigen Africa

Project: Environmental Compliance Monitoring for the Upgrading of 31km of widening and rehabilitation of N9 Sec 7 between Wolwefontein and Colesberg as well as the construction of a new access interchange at Colesberg which required the utilization of 10 borrow pits.

Client: South African National Resources Agency SOC Limited Eastern Region

Responsibilities: Business Operations, Marketing, Project Management, Community Facilitation, Internal EIA Evaluation and associated administration work including Determine whether the Basic Assessment or Environmental Impact Assessment is required, Initial assessment of site to identify potential environmental constraints, Initial screening (considering sensitivity/environmental flaws) of borrow pits and selection of suitable ones, Team co-ordination, Collate project information, i.e. civil reports and review, Consult with the Competent Authority to ensure the project is compliant with applicable national requirements and social legal requirements and policies, Consult with relevant Stakeholders per requirements of the National Environment Act of 1998, Undertake Site Investigation, Review of the Draft Environmental Management Plan and amendments following the confirmations of the route selection and alignment, Compilation of Progress Reports (Weekly or Monthly as required), Undertake public participation process, Compilation of construction EMP since no Basic Assessment/Environmental Impact Assessment was required, Compilation of EMPR as part of mining permit application for borrow pits, Approval of EMPRs and obtaining mining permit applications, Internal Review of Environmental Reports, Mentoring of Environmental Management Undergraduate Students

Previous Employment:

Duration: March 2004 to February 2011 **Organization:** Bokamoso Consultants- Environmental Scientists and Geohydrologist

Project: Environmental Impact Assessment for the upgrading of the wastewater treatment works in Dewetsdorp

Client: Ninham Shand Consulting Engineers

Project: Application for exemption from conducting EIA process for the upgrading of the treatment works in Marquard

Application for exemption from conducting EIA process for the upgrading of the treatment works in Senekal

Client: ISA & Partners Consulting Engineers

Project: Environmental Impact Assessment for a new access road in Mount Arthur

Client: Thuso Development Consultants

Project: Environmental Impact Assessment for the upgrading of D313 road from Morokweng to Vorstershoop

Client: Babereki Consulting Engineers

Project: Environmental Impact Assessment for the upgrading of the wastewater treatment plant in Jan Kempdorp

Client: Phokwane Local Municipality

Project: Environmental Impact Assessment for the upgrading of wastewater treatment works in Jagersfontein

Client: Phethogo Consulting Engineers

Project: Community facilitation and public participation process for the resettlement planning and environmental authorisation application for Khuis Community

Client: regional Land Claims Commission Northern Cape

Position: Environmental Consultant

Responsibilities: Site visits, undertake public participation process and compile public participation report and/or comments and responses report, compilation of basic assessment and scoping report, compilation of environmental management plan, liaison with stakeholders and competent authorities, Water use License Applications, Waste Management License Applications, Environmental Compliance Monitoring,

Duration: March 2003 to February 2004

Organization: Geo Pollution Technologies (Bloemfontein)

Project: Application for rezoning and closure of the landfill site in Thaba Nchu and Botshabelo
Client: Mangaung Local Municipality

Project: Environmental Impact Assessment for the wastewater treatment works in Ladybrand
Client: Kwezi V3 Consulting Engineers

Project: Environmental Impact Assessment for the new reservoir in Ladybrand
Client: Trubuild Consulting Engineers

Position: Junior Environmental Consultant


Responsibilities: Site visits, undertake public participation process and compile public participation report and/or comments and responses report, compilation of basic assessment and scoping report, compilation of environmental management plan, liaison with stakeholders and competent authorities.

Reference:

CONTACT NAME	ORGANISATION	TELEPHONE NUMBERS
Mamofolo Matebele	Babereki Consulting Engineers	051 522 4865
Tokelo Motheane	Dipabala Consulting Engineers	071 163
Christiaan Vermaak	Tucana Solutions	082 703 5680

Consent:

I confirm that the above CV is an accurate description of my qualifications and experience in environmental management, waste management license applications, which included basic assessment and environmental impact assessment processes, water use license and mining permit and rights applications, and environmental compliance monitoring, and public participation, stakeholder engagements and social facilitation.



Signature

2020-08-21

Date

APPENDIX B
GUIDELINES FOR TRENCHING IN WETLANDS

The following guideline procedures on trenching on wetlands should be followed:

1. Wetland boundaries should be clearly marked in work areas to assist the project personnel, contractors and environmental officer to avoid unplanned disturbances to the wetlands. This is also to demarcate the area to which these guidelines apply.
2. Preferably trenching should be done in the dry season to minimize the risk of compaction and disturbance to the wetland.
3. Where machinery is to be used, the necessary precautionary measures need to be put in place to minimize their impact, especially when this involves driving through the wetland. Where vehicles need to enter the wetland for trenching, the impact can be mitigated by lowering the tyre pressure, thereby distributing the load over a larger area. This more so for wetter wetlands. The weight of construction vehicles can also be dissipated by creating a wooden platform (thick wooden slats/planks) for vehicles to drive on whilst trenching. This is not thought to be necessary for the wetlands associated with the proposed development area though);
4. Maintain only the minimal footprints for the work necessary to accomplish the task at hand. This is essential to limiting the impact on the wetlands.
5. Remove the top 30 cm as sods, i.e. the vegetation and underlying soil must be removed as a unit and stored separately from the underlying material. These can be stockpiled immediately next to the trench (by placing on a material layer (shade cloth or a geotextile). This will ensure that wetland vegetation is not smothered and will negate the need for re-establishment of the wetland vegetation once removed) if backfilling is to occur within 24 hours and if the local hydrological conditions allow, i.e. there is no surface water on site.
6. Replace the soil in the reverse order in which it was removed, i.e. the soil that was removed last must be used as the first backfill.
7. Ensure that the top 30 cm of the backfill is the topsoil (sod) layer of the material that was excavated from the wetland.
8. The backfill must be restored to its pre-construction elevation upon completion of the work. This is to prevent the establishment of preferential flow pathways.
9. Ensure that trenching does not create a subsurface drain, i.e. an underground preferential flow path due to i.e. backfilling with soil of lower permeability. This in particular where trenching is to occur in the same direction of the natural flow. Precautions can include inserting clay plugs at approximate 1 m – 2 m intervals.

Trenching through a wetland for a pipeline of this diameter should be done to below the impermeable clay layers (the G-horizon). It is this impermeable clay layer that allows for the persistence of surface waters to within 500 mm of the surface and, therefore, the existence of the wetland. Trenching to below this layer and then the resealing of this impermeable layer will ensure the retention of proper hydrological functionality of the wetland. It cannot be stressed more that wetland functionality is dependent on the characteristics of the soil stratification within the local area. This stratification must be maintained post construction by placing soils in the reverse order of removal.

APPENDIX C
REHABILITATION AND ALIEN INVASIVE MANAGEMENT PLAN

